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THE EVERLASTING NOW.

PHOTOGRAPHY has done much, and vastly more may reasonably be expected of it, to lessen the limitations which time and space impose upon humanity; and now, at the beginning of the new year, we may well pause to consider not only how near we are to realising, what in 1860, Sir J. F. W. Herschel put forward in the PHOTOGRAPHIC NEWS almost as a dream—as a thing scarcely to be hoped for seriously.

Herschel wrote in the PHOTOGRAPHIC NEWS for May 11th, 1860, and suggested that one day this might be possible: "The stereoscopic representation of scenes in action, the vivid and lifelike reproduction and handing down to the latest posterity of any transaction in real life, a battle, a debate, a public solemnity, a pugilistic conflict, a harvest home, a launch—anything, in short, where any matter of interest is enacted within a reasonably short time, which may be seen from a single point of view."

We, of the last decade but one of the nineteenth century, know that the above half-dreamed prediction of Sir J. F. W. Herschel is now quite realizable to any skilled photographer who controls a sufficiency of the current symbol of riches, and who chooses to take the necessary trouble to arrange the apparatus: while looking forward to-day, as Herschel looked forward nearly thirty years ago, we can see possibilities of very much more.

We can see in recent investigations as to the photographing of coloured surfaces—especially looked at side by side with the researches made about ten years ago by Mr. Ducros du Hauron—some hope that before very long photography in all the colours and tints of nature may be an accomplished fact, and this in the near future.

Even now, not only can visible objects in movement be photographed in all their phases, but even sound can be exactly recorded upon the photographic plate; but at present, although the reconstruction of the vision of moving objects is easy enough when one has a proper set of photographs, we are not aware that the photographic records of speech and sound have yet been actually used to reproduce the original speech and sound, but to do so would be quite easy. If, however, the reader will refer to page 318 of our volume for 1877, where Dr. Stein's method of photographing the human voice is described, it will be easy to see how the vibration of the diaphragm may be made to regulate the amount of light passing through the image hole without shifting its position, so that the resulting image is a straight line varying in intensity according to the amplitude of the vibrations. A relief—such as the relief used in the Woodbury process—would give us the means of actuating a receiving apparatus like that of a phonograph. In practice, the line on the negative would naturally take the form of a spiral, so as to make the most of the surface.

Another point perfected and reduced to practice—the transmission of the visible image by electric agency—a matter which, even now, is rather a question of complexity of means and the degree of perfection in results which will be acceptable; we may dream of advances in photography which seem strange just now.

We may suppose every house to be fitted with something more than the appliances shadowed forth in the rather remarkable psychical romance recently written, under the title of "Looking Backwards," by Mr. Edward Bellamy, and issued by Ticknor and Co., of Boston. Indeed, we may suppose that at a great central station there are kept photographic records, both of the sight and sounds incident to all important events, ready to be switched off to any house on the reception of the signal calling for them. The mere newspaper would then have scarcely a place in social economy, for if any citizen could, by operating a signal arrangement, have before him the actual representation of the sight and sounds of any distant event—whether a current event, or one which had taken place within the time of the organisation of the system—there would probably be but little inclination to put up with a mere newspaper version.

Photographing the actual past may seem still more visionary than anything yet suggested, but we have been reminded by Mr. W. J. Harrison that when we do photograph at all, we do photograph the actual past, for is not an interval required for the light to travel from the object to the sensitive plate, and is not the extent to which we photograph after the event determined by the distance between camera and object? Indeed, it might be possible to determine the position in space where the camera should be placed in order to include, say, the landing of Julius Cæsar in Britain, although, as a matter of fact, this particular locality would be somewhat too far off for obtaining a representation of the scene, even if the camera could be placed there.

We are under the impression that the late Dr. Draper once, in lecturing, told his audience that the physical world around us takes a lasting impression of every event which has taken place, and of every shadow which has passed; in fact, that the material universe is the Book of God bearing the complete record of every deed, and perhaps of every thought. Perhaps intelligence higher than ours may clearly read that full record, but we, with our present means, may perhaps hope to secure, by the development of photographic methods, a substantial record of much that passes—a record which may be made almost to again live, move, and speak at the will of man.

All the above tends towards the regarding of space and of time rather as mere forms of thought than as realities, and indeed the everlasting now—the eternal it is—may be regarded as a road along which the mind of man rolls, while

something akin to persistency of vision gives him somewhat more of a notiou of what we figure as the past, thau what we look to as the future. The eomplex photographic record of the coming time—the record which is to make the past move, speak, and come within the everlasting now—may perhaps be looked on as a crude artificial aid to that persistency of visiou.

Carlyle, in his "Sartor Resartus," a book written as a popular exposition leading towards the Kantian philosophy, speaking of space and time, says :—"But deepest of all illusory appearances, for hiding wonder, as for many other ends, are your two grand fundamental world-enveloping appearances, Space and Time. These, as spun and woven for us from before birth itself, to clothe our celestial Me for dwelling here, and yet to blind it—lie all-embracing, as the universal canvas, or warp and woof, whereby all minor illusions, in this phantasm existencc, weave and paint themselvcs. In vain, while here on earth, shall you endeavour to strip them off; you can, at best, but rend them asunder for moments, and look through."

Photography may help us cven in this.

THE AIR BRUSH.

ALTHOUGH extensively used in the United States, the so-called Air Brush has, up to the present time, been but little employed in this country, but the fact of an agency haviug been opened in London makes it desirable to make some especial reference to the instrument, which has already been briefly described in our columns.

The air brush consists of an arrangement for regularly delivering minute charges of liquid pigment into a fine stream of air issuing from a small jet, and this jet of air blows the pigment into a spray of greater or less fineness. If the nozzle of the apparatus is held close to the surface to be operated upon, aud at the same time drawn across the surface, a liue of greater or less intensity is produced ; the intensity being greater iu proportion as the speed of the air brush is slower. If the air brush be operated at an increased distance from the paper, or other receiving surface, the spray becomes diffused so as to give a tint.

The thumb of the hand which holds the air brush controls not only the air stream, but also the amount of liquid colour fed into the air stream, and an increase in the amount of colour leads to the formatiou of a coarser spray.

The geueral aspect of the air brush is shown by the accompanying cut. The treadle works a small air pump,



Fig. 1.

rom which the air is compressed into a cyliudrical metal casc shown at the right of the sketch ; from the latter it passes, by a thin india-rubber pipe, to the air brush, shown as in the right hand of the operator.

The moving parts of the instrument are shown in the subjoined cut (fig. 2). C is a spoon-shaped receptacle for the

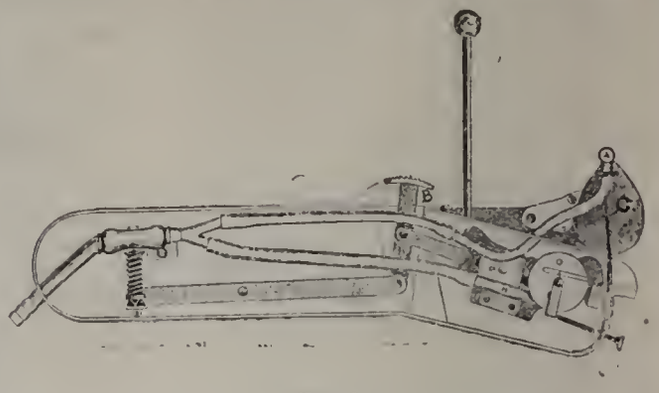


Fig. 2.

liquid colour—let us suppose it to be Indian ink—and across this receptacle there works a fine needle, which is driven rapidly backwards and forwards by a little wiud motor wheel. This needle serves to carry the colour across the jet which is in the tube termiuating at A, and which jet looks downwards across the tip of the spoon. Downward pressure on the thumb-piece B serves to open the air-valvc, and start the flow of the colour spray, while a drawing backward of the thumb-piece serves to increase the throw of the needle, so that more of it passes across the air jet. It will thus be seen that the operator has very completc control over the results.

With the air brush large portraits in imitation of the style of a photographic enlargement can be rapidly executed, and it is also admirably suited for working up bromide enlargemeuts : its use effecting a very great saving of time. It also can be used with excellent effect for working up large negatives, and for vignetting small ones. As regards its application to lithography we need say nothing, but it is worthy of remark that when a suitable resist is used, the air brush is very valuable for working up tint blocks on the zinc before etching.

The London agent for the air brush is Mr. McEntee, of 64, Chancery Lane, and the apparatus is to be seen at his office.

FRENCH CORRESPONDENCE.

HAND AND POCKET APPARATUS—QUESTIONS CONCERNING THE PHOTOGRAPHIC CONGRESS — THE PHOTOGRAPHIC CLUB OF PARIS—PHOTO-CHRONOSCOPIC PHOTOGRAPHY —PHOTOGRAPHY WITH MAGNESIUM LIGHT.

Hand and Pocket Apparatus.—It may be said that the manufacturers of photographic apparatus have no other view than that of the discovery of new portable cameras. Not a week passes, so to speak, without our seeing a new model spring up—often very ingenious, but more frequently deprived of the quality of portability—so much sought after by inventors. It seems to us that they are much more occupied with making their apparatus unrecognisable than in making them easy of transport. Up to the present we do not quite know which of these instruments best realizes our ideal. Just now, for instance, there is a great deal said about the "Kodak," which the Eastman Company has issued with so much publicity. We have just made an attentive study of this certainly most interesting apparatus. It is a great thing to have arrived at such a reduction of volume as to enable us to take a hundred views in succession—that is an unquestionable progress to have realized—but along with this is the very serious drawback of only being able to work in full sunshine on instantaneous subjects. How often do we find ourselves in certain places without sunshine, and then we are condemned to inaction. It may doubtless be objected to this

statement, that in these cases we have the resource of giving a more or less extended exposure. This contention is in our eyes valueless. An instrument of this kind we consider has not been worked out for persons who understand photography, but for the public in general. Now, since there is a necessity for judging the time of exposure, a certain amount of initiation is required, and that destroys the whole system: the object pursued by the Eastman Company is not achieved. In our judgment, then, there remains for the perfection of this ingenious instrument that it should be endowed with operative rapidity, sufficient to give good instantaneous negatives, in all cases where they would be obtained under good conditions with other apparatus. We are aware that this relative slowness of the Kodak proceeds from the fact that the lens adapted to it is of the wide-angle character; it must therefore be diaphragmed down considerably, and this is the cause of its feeble luminosity. An objective of this kind permits us to use a lens of very short focus, and to represent objects situated at a distance of a metre only from the apparatus. In truth, would the sacrifice be so great if we resigned ourselves to being able to reproduce no objects nearer than from four to five metres from the apparatus? The focal distance would then be a little augmented, the length of the instrument would be slightly increased, but much would be gained in rapidity, an advantage sufficient to compensate largely for the increase of volume imposed by such a perfecting of the instrument. Doubtless there is room to hope that new films, more sensitive yet than those actually at our disposal, will in time succeed in completing the work of the Eastman Company, without the necessity of seeking other improvements. For ourselves, who desire to see realised a veritable photographic pencil, we find the ideal still far off, which would consist of the ability to bear always in the pocket the means of instantaneously making a sketch by the aid of light. The incessant efforts made in this direction promise us, within a time not too distant, every satisfaction in this respect.

Questions concerning the Photographic Congress.—We have to return, in a few words, to the interesting subject of the Congress which is in course of preparation on the occasion of the Universal Exhibition of 1889. The sub-committee has just met under the Presidency of M. Janssen; the subjects to be treated are those which the Belgian Association of Photography had adopted—that is to say, an understanding as to the standard of light; on the uniformity of notation of diaphragms; on an easy interchangeability of different lenses upon different camera fronts; on the adoption of sizes for plates that may be international; on a uniform method for testing the mechanical speed of shutters. These are, up to the present, the questions laid down, the solution of which will belong to the International Congress; but it has been decided that the members of the preliminary committee are to be consulted afresh, before the programme is published. We had forgotten, in the preceding enumeration, the very important question relating to the uniformity of systems of the mensuration and notation of formulæ. Without doubt new subjects will arise for consideration; those, for example, of instruments, such as photometers and sensitometers, various types of which must be examined so as to be able to recommend those which shall appear to be the most suitable for general use. Within a fortnight the work of the sub-committee will have been accomplished, and the documents relating to the Congress will be shortly afterwards published. We have learned that the Minister of Commerce, following a step taken by the Syndical Chamber of Photography, has consented to add to the committee three names chosen from the ranks of professional photographers.

The Photo Club of Paris.—Every one is agreed upon the necessity for endowing Paris with a centre for meeting and for action, calculated to encourage photographic progress. Almost at the same time two groups have been constituted, each having in view the formation of a photographic club or circle, such as the London Camera Club or other associations of this kind. One of these groups has just established an installation, and has inaugurated itself with an exhibition of works, both professional and amateur. We have visited this little exhibition, of which we cannot say much, having seen it very badly in consequence of the great obscurity which reigned in the rooms—a dense fog cutting off all natural light. What we were best able to judge of was the premises, the insufficiency of which for such an association as we should like to see, appears to us to be very unfortunate. We should not allow ourselves the smallest criticism on this point, if it were not that the title appears to us so little in harmony with the cramped character of the premises, and also of the published programme. When the title, "The Photo Club of Paris," is adopted, an idea is given of something that should be worthy of this capital which contains so many distinguished photographers, professional and amateur. How astonishing it is, on entering this place, of less than moderate proportions, to see what it is to which is given such an appellation. Certainly, we do not mean to say that there should be nothing but cathedrals—chapels have also their charms; but why endow with the name of cathedral that which is in reality only a chapel? One word more on this subject. A great stir exists just now amongst the dealers in photographic apparatus, chemicals, &c.; the Photo Club having announced that it would furnish all its members with products and apparatus, giving them the benefit of the allowance, which it will be easy to obtain from the manufacturers, who will treat it as a dealer. The discontented think that they see in the shadow of this Association a sort of trading house, and an opposition is being organized against this rivalry. It does not belong to us to unravel what there may be of truth in these statements, and we limit ourselves to wishes that the other group—whose programme is on a vaster scale—may arrive at the end which it proposes to reach. Paris will then be endowed with a veritable Photographic Club, where the notabilities of the photographic world visiting this city may receive worthy and comfortable hospitality.

Photochronoscopic Photography.—Colonel Sebeck has had constructed an apparatus by means of which he can photograph a fish-torpedo six times consecutively, and at equal intervals, immediately after it has been projected; he has been inspired by the counsels of M. Marey, whilst supported by his own great experience in attempts of this kind. We have to do in this case with a photographic revolver, allowing, during rotation, the disc-shaped plate-carrier to expose successively a series of photographs at equal intervals, the duration of which can be regulated according to need, which series of photographs, or rather of operations, will show the law of movement. It is in this way that M. Marey has worked in order to study the law of the flight of birds, the running of animals, &c. Unfortunately, apparatus of this kind is not to be had ready made; for this reason it is necessary to devote one's self to a study of this kind. We have to proceed tentatively before acquiring a good apparatus fit for the photographing of successive positions.

Photographing with Magnesium Light.—We should have thought that photography with the aid of magnesium light would have proved more of a success than it appears to have done; it permits us, however, to realize effects that we should not have known how to achieve by any other means. For a moment the vogue of this method of lighting was great, but now we hardly hear anything of it. No means, however, is equal to this simple one for photographing at night, for interiors, and for producing portraits and groups in conditions of truly exceptional rapidity. This momentary indifference proceeds from the fact that there arose immediately such a profusion of formulæ that the amateur was lost amongst them; he did not know which to follow, and then he judged it better to wait. Little by little the process will return to fashion, and in

any case it will render important services to the professional photographer; and such, we repeat, that no other means of artificial light will be able to supplant this one. It is a matter of course that electrical lighting is the best; but it cannot everywhere be obtained. Magnesium light, on the contrary, is everywhere obtainable at a small cost, and without requiring any apparatus or causing any inconvenience. In connection with this subject we have a word to say on scenic photography, of which M. Liebert has just made an interesting application at the Ambigu, where he has photographed by electric light the whole of the piece "Roger la honte." These photographs have been made during the ordinary representation. This means that the actors have posed, a very short time certainly, but sufficiently long to ensure the success of the operations. The results obtained by M. Liebert are very remarkable, giving an idea of what may be done in this way to perpetuate the *souvenir* of the playing of the actors, taken from life, at the most dramatic moments. In this way, there will survive a means for reconstituting pieces, with the record written by photography, of the attitudes, expressions, gestures, and costumes of the actors, of the decorations—in one word, of the *misc en scene* complete. This will be more valuable than all the descriptions, than the most successful drawings. LEON VIDAL.

COLLODIO-BROMIDE EMULSIONS.

BY F. C. BEACH.*

IN bringing this subject to your attention, I am remiuded of the fact that it is nearly ten years since I had the pleasure of experimenting with collodio-bromide emulsions, not so much in manufacturing them as in using those put on the market at that time made after the formula of Mr. Henry J. Newton. We then had to prepare our own dry plates and give a considerably longer exposure than is now necessary, but we had the satisfaction of obtaining beautifully clear, crisp, and dense negatives. There was more latitude in exposure and development than now.

Considerable attention has been given of late to lantern slide making, aud as a few of our members have had difficulty in obtainiug good slides on the special gelatine lantern commercial plates, owing to a loss of sensitiveness, or fogginess and flatness, which does not fully show itself until after the plate is fixed, it occurred to me it might be useful to explain a few formulas for making and using collodio-bromide emulsions, for the reason that they are rather more convenient for the amateur than the use of the ordinary wet-plate collodion process, since the use of the silver bath is avoided, and beautifully crisp slides full of clear bright lights are readily obtained.

In making lantern slides a slow washed collodio-bromide emulsion is preferable; one to be had ready-prepared that gives fine results is made by Mr. W. Brookes, of Reigate, London, and it is what I have lately been experimenting with. The formula for making the emulsion was given by Mr. Brooks to a Mr. Frederick Dunsterville, of Rayapuram, Madras, and what follows will be a description taken from Mr. Brooks and Mr. Dunsterville's directions, as reported in the *British Journal of Photography*:—

Prepare three separate solutions in ordinary daylight as follows:—

Plain Collodion.

Alcohol (methylated)	4½ drachms
Ether...	3½ ,,
Gun-cottou, high temperature ...	12 grains

Bromide Solution.

Alcohol (methylated)	1½ drachms
Distilled water	20 minims
Ammonium bromide	13 grains

Silver Solution.

Distilled water	12 minims
Silver nitrate	20 grains

The most important feature of these solutions is the employment of a suitable kind of pyroxyline or cotton (in this country Haucc's is considered the best), then the process is comparatively easy and certain. Make a stock of plain collodion and let it rest for some time, so that all insoluble particles and other impurities may sink to the bottom; tall narrow bottles are best to store it in. The proportion for a stock solution may be—

Alcohol	22 ounces
Ether	18 ,,
Gun-cotton (high temperature) ...	1 ounce

Referring to the three solutions before mentioned: the bromide should be made by first dissolving the bromide of ammonium in the given quantity of water heated to near the boiling poiut, then when cooled to 70° F. the alcohol is added. The water of the silver solution should also be warmed to dissolve the silver easily and rapidly.

To make the emulsion, pour one ounce of the prepared plain collodion into a clean four-ounce bottle with glass stopper, then add the bromide solution as previously given, shaking well for some minutes; the bottle containing the bromized collodion should then be taken to the dark-room and the silver solution added little by little, shaking well between each addition. It is well to rinse out both the bromide and silver bottles with a little of the collodion to insure the whole of the salts being taken up. The emulsions should then be kept in the dark for about twenty-four hours, shaking well at frequent intervals, and when ready for washing it should be poured into a glass dish, which should be large enough to contain the quautity of emulsion in a mass not thicker than one-eighth of an inch; as the solvents evaporate a skin forms on the surface, which should be broken up occasionally with a silver spoon or ivory paper knife. When the solvents are completely evaporated the pellicle should be washed in distilled water for half-an-hour or so, until all the soluble salts have been removed.

The pellicle should then be squeezed in pieces of clean calico until as much as possible of the water is removed, and it can then be dried by moderate heat over a water bath. The whole of the washing process should be done in a dark room, or at night time by the light of a candle placed at some distauce. When quite dry, the pellicle may be re-dissolved in three-quarters of an ounce of alcohol absolute (0·805) and three-quarters of an ounce of ether sulphuric pure (0·720), pouring the ether in first; and when all the pellicle is dissolved, the bottle (a four-ounce one) should be well shaken up, and, in about twenty minutes to half an hour, will be ready to coat plates, after being filtered. It will be a milky coloured solution resembling somewhat cream in consistency.

The filter for the emulsion may be merely a small funnel with a little tuft of cotton jammed in it, through which a little alcohol should first be run, or, what is better, the first portiou of emulsion running through may be returned to the filter. A friend of mine, Mr. A. S. Murray, advises the use of paper filters instead of cotton, for he found particles of cotton would find their way into the emulsion and cause specks on the plate.

Before coating a large number of plates, it is advisable to test the emulsion in the dark room, to see that it is free from fog by coating a plate. As soon as the film is set, wash it in clean water by soaking until all the ether and alcohol are removed, which will be observed as soon as the greasy lines disappear. Then pour over the plate a little developer of full strength. and, after letting it remain on the plate for a few minutes, wash well, aud fix it with a solution of cyanide of potassium. It should be absolutely free from fog aud stains. Stains may be due to the plates not being chemically clean; but if fog is present, a drop or two of an alcoholic solution of iodiue added to the emulsion will effect a speedy cure. The emulsion must then be well shaken up again and allowed to rest half an hour, re-filteriug aud coating plates.

Having thus prepared the emulsion, or purchased it already made, the next step is to coat the plates. These must, however, be first cleaned and prepared with a substratum, or edged with a rubber solution or some other substitute to hold the film firmly on to the glass. Mr. Dunsterville recommeuds soaking them in a dilute nitric acid solution (acid one part, water ten parts), then rinse them in plenty of clean water, drying them with a clean cloth. They should then be polished on both sides with a cleaning solution (say, Tripoli powder mixed with methylated alcohol and a little ammonia), care being taken to wipe off the edges that were clamped in the vice with a clean cloth. They should then be either edged all the way around one-eighth of an inch wide with a rubber solution, or they may be dipped in a hot solution of gelatine (twenty grains to twenty ounces of water), and dried with a clean cloth. Mr. Brooks advises that the plate be cleaned with a piece of clean rag moistened with methylated

* Read before the Society of Amateur Photographers of New York.

alcohol, and polished with a clean chamois leather kept for the purpose only. No substratum is recommended. He says, after cleaning the plate, holding it on a pneumatic holder, edge it with a rubber solution (this is to prevent the film from slipping during the after manipulation). The solution is best applied with a camel's hair brush cut down almost to a stump, with a piece of wire or a slip of glass tied on the side projecting below about one-eighth of an inch, to act as a gnide. I followed this method of cleaning, purchasing some new glass. I soaked it in nitric acid and water, then washed it and cleaned by placing the plate in an ordinary wood screw vice, pouring on a little alcohol, and polishing with soft paper called "Joseph paper." I then gave it an edging of the Eastman rubber solution, and coated the plate with the sensitive emulsion.

During development the film loosened from the glass and become entirely detached, which I could not save. The balance of the plates thus coated I edged with the rubber solution a second time, and these films in most cases stood the development and fixing without coming off. Some would loosen slightly at the corners where the edging had not adhered sufficiently. So far then as Mr. Brooks' directions relate to the preparation of the plate, they are insufficient, for it is evideut the collodion film will not adhere unless the edging solution is applied before and after coating. It was formerly my practice to first flow a substratum of albumen over the platc, then dry, and afterwards flow the collodion ; then the film would adhere perfectly. This I am iuformed is now the general practice in the preparation of wet plates.

Mr. Murray informed me that he prepared a solution of albumen by beating up the white of an egg with an egg beater, then allowing it to settle for twenty minutes, and re-beating a second time. It is theu filtered through a paper filter, a drop or two of ammonia added, and is ready for use. A glass plate that has been well soaked is washed off under the tap slightly, and drained. The albumen solutiou is poured on at one eud and gradually flows toward the other, driving what water there is on the plate before it. The surplus is drained off into tbe bottle. The plate is set up in a rack to dry. After this it is coated with the emulsion, and when again dry is edged with the rubber solution. Thus there is no chance for the film to slip. Several plates may be quickly albumenized and kept ready for use in a grooved box free from dust. Then when it is desired to prepare plates, they only have to be coated with the emulsion, and edged with the rubber solution, which takes very little time ; a dozen can easily be coated in twenty minutes.

Dr. J. J. Higgings recommends the use of gum toln as an edging solution in place of rubber ; it can be obtained at any drug store.

There are, doubtless, many amateurs that never saw a plate coated with collodiou ; it is very easy when you know how, but there is a slight knack or calculation about it that has to be acquired. Mr. Dunsterville thus clearly describes the process :— "After securely fixing a pneumatic holder to the back of the platc, dust the top surface with a flat camel's hair brusb, and pour on the centre of the plate a pool of emulsion that will cover about one-fourth of the whole area ; now tilt the plate slightly so the emulsion will run to the right hand far corner, theu the left hand far corner, then the left hand near corner, and finally pour off the surplus by the right hand near corner, into the filter ; the plate should then be raised to an almost vertical position and rocked vigorously to and fro, to prevent marking or lines ; when the emulsion is apparently set, aud no more drops from the plate, it may be put in a grooved rack to dry spontaneously, or laid upon a flat surface and dried by gentle heat, say 150° F."

Mr. Brooks states that care should be taken to remove any hard particles from the neck of the bottle before coating, and that the plates should be placed an inch and a-half apart on the drying rack, which may be set in any suitable cupboard ; if they are set closer they will not dry evenly. The plates will dry ordinarily in about two hours.

Coming to the matter of exposure, we find a great difference between these plates and the regular gelatine lantern plates—I should say they were from ten to twenty times slower, as, for example, in reducing by the camera. I used a Beusch and Lomb universal lens with nearly full aperture, and gave au exposure of six minutes at 3 p.m., with a fairly dense negative backed by a clear sky. Iu developing, I found the plate was very much underexposed. I then made another exposure of twelve miuutes on the same uegative—the latter being illumiuated by sunlight at 10 a.m.—and obtained a fair slide, which, though I used a very weak developer, came out rapidly—in fact, was considerably over-exposed ; probably six minutes in sunlight, and perhaps four, would have been enough.

I would have given about a minute's exposure on the same negative, using the same lens stopped down to *f*/40 upon an ordinary lantern slide gelatine plate. Mr. Brooks advises an exposure in the camera from one to ten minutes or more, using a quarter-plate portrait lens of short focus at nearly full aperture. A long full exposure gives warm toues, which can be chauged to other colours by toning baths ; but a short exposure gives cold tones, which cannot be altered by subsequent treatment. In the tropics, where the light is stronger, Mr. Duusterville reduces a 6½ by 4¾ negative to 3¼ inches square, using a Ross rap. sym. lens at full aperture, and a clear sky as background, at an exposure varying from two to six minutes. This emulsion is therefore better adapted for printing slides by contact than for reduciug, though the latter can be done easily enough if one has the time to spare. In contact work the exposure varies from one to six seconds in diffused daylight, or from two to four miuutes one foot away from a six-foot fish-tail gas jet, or the burning, about eighteeu inches from the printing frame, of one inch in length of ordinary magnesium ribbon held in a pair of pliers. During the exposure, the magnesium must be moved around in front of the frame to ensure even illumination of every portion of the negative. I tried the experiment of burning eighteen inches of magnesium in front of the negative. When I removed the platc, to my surprise a faint image of the picture was imprinted on it, which I successfully developed out by weakening the developer. Mr. Murray tells me he has brought such an image out by simply flowing the plate with the ordinary pyro solutiou. Sufficient ammonia was liberated from the plate to accclerate the action of the pyro.

Too much care cannot be exercised is handling these plates, as the surface is much more delicate than the gelatine plate. The negative must be carefully dusted with a flat camel's hair brush, and theu the plate must be laid directly on the negative in the printing-frame, taking care that while fastening the spring no sliding or rubbing action takes place.

The springs may be considerably lighter than is usual. The least movement of the plate over the surface of the negative is apt to cause scratches.

The developer advocated as the best is alkaline pyro. According to Mr. Brooks, it is prepared as follows :—

Solution P.

Pyrogallic acid	96 grains
Absolute alcohol	1 ounce

Solution A.

Saturated solution of carbonate ammonia ...	4 ounces
Potassium bromide	1 dram
Soda acetate	2 drams
Water	12 ounces

The carbonate of ammonia for the solution should be fresh aud hard, and smell strongly of ammonia, otherwise it is of no account.

Four ounces of the salt are broken up and put in a 24-ounce bottle, and eighteen ounces of cold water poured on it. The bottle is well corked, preferably with a rubber cork, and is then vigorously shaken. In twelve hours the water should be found to be completely saturated with ammonia and in prime condition, and if kept in a dark place will last for several weeks.

On mixing the developer take of—

Solution A	3 drams
Solution P	5 to 10 drops

It will be noticed that Solution P has a strength of twelve grains of pyro to the dram, so that ten drops, equivalent to ten minims, would represent two grains of pyro. The amount of Solutiou P is very importaut. If the negative is very intense, two or three drops will be found ample, and will give harmony, but the development will be somewhat slow. In extreme cases, the developer may be diluted to twice or thrice its bulk with water. With an ordinary negative the full amount of Solution P may be used. A glass dish is best to develop in, so Mr. Brooks advises, but I find it very easy to develop by holding the platc at one corner, or by a pneumatic holder or manipulator, and pouring on and off the developer, having a tray underneath to catch auy that may spill over. After exposure, pour over the platc from a bottle, common alcohol three parts, water one part, and allow it to soak on the film for about half-a-minute, theu immerse in a tray of clean water to soak out the alcohol. When

the water blends with the film, pour off and apply the developer as previously stated. If properly exposed, the image soon makes its appearance, and gradually, but surely, gains in intensity.

Mr. Dunsterville uses the same pyro solution, but substitutes for Mr. Brooks' alkaline or A Solution, the following, calling it No. 2 solution :—

No. 2.—Carbonate of ammonia	... ...	60 grains
Acetate of soda	... ...	10 „
Potassium bromide	... ...	3 grains
Distilled water	... ...	3 ounces

or instead of these the following :—

1 A.—Pyrogallic acid	... ...	1 ounce
Sulphite of soda	.. ..	4 ounces
Distilled water	... ...	9 „

Make faintly acid with citric acid.

2 A.—Liquor ammonia	... ...	1 ounce
Distilled water	... ...	9 ounces
Potassium bromide	... ...	2 „
Using solution P he takes	... ...	15 minims
Carbonate ammonia solution	... ...	2 drachms
Water	... ...	2 „

or instead :—

I A	... 40 minims, equal to 4 grains of pyro
2 A	... 10 mimims
Water	... 3 drachms

If the plate is fully exposed, the developer may be diluted with another drachm or two of water. When there is any sign of a veil coming over the high lights, at once wash off the developer, and fix the plate, which takes place in less than half a minute, with a solution of cyanide of potassium, strength twenty grains to each ounce of water; and wash well by placing the plate in a large dish of clean water for about a quarter of an hour.

The potassium cyanide, as is well known, is a most deadly poison (two grains being a fatal dose), and it is not necessary to keep the dish containing this solution in the dark room. If the plate is well washed after developing, it may be safely taken outside the dark room, and dropped into the fixing solution, or the latter may be poured upon it and off, the plate being held by a pneumatic holder.

In this connection I may as well state that hypo will fix just as well as cyanide, only takes longer, and also requires more time to eliminate it from the film by washing. Mr. Newton advises fixing with a solution of four ounces of hyposulphite soda dissolved in sixteen ounces of water.

(*To be continued.*)

DEVELOPMENT BY SEPARATE SOLUTIONS.

BY D. BACKRACH, JR., BALTIMORE.*

IN a foot-note in "Wilson's Quarter Century in Photography" I say, "It has for a long time been my opinion, both from theory and some experiments that I made, that the present method of mixing both the pyro and alkaline solutions when developing was neither the best nor most economical method, if, as I think, we can now mix up an aqueous solution of pyro that is stable and will not change. Those who understand the chemical action involved are aware that pyro occupies almost precisely the place of free nitrate of silver on a collodion plate, and that the sal soda or ammonia the place of the sulphate of iron or pyro, whichever was used. Acting on this theory, I developed a few plates by first immersing them in a strong pyro solution for a minute (which I then drained off again into the bottle), and then developing them with the sal soda solution, using the same quantity of water as if the solution had been mixed in the usual way. The result was as good as the best developed plates by the other methods. It will be seen that several advantages are gained. First, the immersion in the strong pyro causes a uniform absorption of it all over the plate; second, at two-thirds pyro is saved." The formulæ given in the foot note is as follows:—

Pyro Solution.

Sulphite of soda	... ... 4 ounces
Water	... ... 16 „

Add enough sulphuric acid to turn litmus paper decidedly red.

Pyrogallic acid	... ... 1 ounce
Bromide potassium	... ... ¼ „
Sulphate magnesium	... ... 1 „

Alkali Solution.

Sal soda, crystallized	... ... ½ pound
Water	... ... 1 quart
Sulphite of soda	... ... ¼ pound
Bromide potassium	... ... ½ ounce

Of this alkali take one-half of an ounce to two and one-half ounces of water.

When a plate is to be developed, it is dipped first in the pyro solution not over a minute, and taken out and drained, and then developed with the alkali.

The sulphate of magnesium is added to the first solution to prevent the softening of the gelatine which is likely to occur when the solution is either warm or tepid. A member of the Society of Amateur Photographers of New York wrote to me concerning this method of development. I replied to have been using it lately exclusively on 11 by 14 plates and less, and am as well pleased with it now as when I first introduced it and published it about three years ago, for its cleanliness and regularity of result, as well as rapidity of development.

The following is the formula I now use :—

Solution No. 1.

Pyrogallic acid...	... ... 1 ounce
Sulphite of soda (crystals)	... ... 4 ounces
Distilled water	... ... 1 quart
Oxalic acid	... ... 20 grains

Solution No. 2.

Sal soda (crystals)	... ... 2 ounces
Sulphite of soda (crystals)	... ... 2 „
Water	... ... 1 quart

I have two dishes, one for enough of No. 1 to cover the plates, and one of same dimensions for No. 2. Soaking for half a minute in No. 1, and then developing in No. 2, proceeds regularly right along until all the plates are developed. But I must caution the beginner to always have some old developer of the previous day at hand to start with by adding to the No. 2 solution, else the first plate or two will lack vigour. As the development proceeds, and, in case of a large batch, I find the solution of No. 2 to act a little slow or with more contrast than I wish, I pour off a little and add fresh solution. In this way I have developed thirty to forty negatives of all sizes, with one assistant, of a very uniform intensity, in less than a half hour. The plates used were Carbutt's and Cramer's. I do not see any advantage in this method to amateurs who have only a few plates to develop at a time and can watch each one carefully; but to the professional photographer who works with pretty uniform conditions of light and gets somewhere close to the proper exposure, it offers the most regular, cleanly, and rapid method of development I know of. In addition it is very economical, as not over one-third the amount of pyro is used as by the regular method of developing in one solution. Each plate absorbs sufficient pyro to produce the proper result, and hardness is avoided. For cases of extreme over-exposure, where "doctoring" is necessary, this method will not do, and a powerfully restrained developer in the usual style is necessary.

But I am indebted to the inquiry of the gentleman referred to in first part of this paper, for it induced me to try hydrochinon (which I had abandoned on account of its tendency to harsh results when development was prolonged) in the same manner, and I must say that I was surprised at the result. It gives me the best class of quick-printing negatives I have yet been able to obtain, and especially is it good for very rapid plates that have a tendency to fog. I use it now almost exactly as I have described for pyro; in fact, substitute, in the formula above given, hydrochinon for pyro (leaving out the oxalic acid), and will have a developer giving better results than any formula yet proposed for hydrochinon. All tendency to extreme hardness is avoided by the method of first soaking in the hydrochinon solution and then developing in the soda solution, and the action is also much more rapid than with the old formulæ. The dish in which the plates are developed (No. 2) must be kept rocking (with both the pyro and hydrochinon developers) until the image begins to assume strength, to prevent uneven development. In the first soaking (No. 1) this is not necessary. I have fully determined to adopt this method of development with hydrochinon in our establishment.

It will be observed that I have omitted in my second formula of developer both the bromide of potassium and the sulphate of magnesium, as they are unnecessary, because the weather now is cold enough, and the plates I am using do not seem liable to

* Read before the Society of Amateur Photographers of New York.

frill, and I believe in simple formulas. I have also tried the addition of phosphate of soda, as recommended by Mr. Gilder, an amateur of Baltimore, but fail to see any difference in the result. It may be there is virtue in it, but I have not the time to give a careful test. I am opposed, *apriori*, to compliciting formula with apparently inert substances, though perhaps I may be mistaken in this case.

I think this method of hydrochinon is of importance to the profession, as it is—as I have before stated—cleanly, regular in results, rapid in development, and economical, as both the pyro and hydrochinon solutions will keep until used up. The alkali solution also keeps well.

ON CERTAIN SURFACES FEEBLY SENSITIVE TO LIGHT.

BY J. W. OSBORNE.*

THE specimens which accompany this statement are suggestive, inasmuch as they tend to illustrate the widely-extended range of photo-chemical action, and the part it plays in every-day phenomena. In thinking and speaking of substances sensitive to light, photographers and others are apt to remember only the haloid salts of silver; chromic acid, under restraint, acting on organic matter; asphaltum, and a few salts of iron and platinum, which short catalogue does, in fact, include all the sensitive bodies used in practical photography. But, as everyone knows, this list may be indefinitely extended (if the degree of sensitiveness be disregarded), and the accompanying specimens serve to show such extensions in certain directions. Broadly, the results should not be regarded as new, though in the manner of their preparation and presentation some novelty may be claimed for them.

On sheets Nos. 1 and 2 three samples of coloured commercial paper will be found, which are bleached by light, and which give, therefore, a negative when exposed under a negative. On sheets 2 and 3, exposed papers, coloured for the purpose with cosine and methyl violet, are exhibited, which likewise establish the fact that these colours, under the luminous influence, give rise to colourless compounds. But, though a great number of colours used in the arts are bleached by light more or less rapidly, this is by no means a universal rule. On sheet No. 1 a small piece of commercial orange paper is shown, part of which has been darkened by exposure. Specimens of paper coloured with picric acid will also be found on sheet No. 4, in which the darkening to a brown is very marked.

The duration of the exposures required to produce these photographic effects is very considerable when the change is carried to its maximum, varying from twenty to thirty-five or forty hours in direct sunlight, which was the only kind of exposure employed in these experiments. Such substances are, perhaps, from four hundred to eight hundred times less sensitive than chloride of silver paper. Indications of photo-chemical action are, however, visible in much less time. On sheet No. 2 a piece of cosine paper, exposed under two strips of black lace, shows a faint positive after half an hour. Also, on sheet No. 3, a piece of methyl violet paper similarly exposed, shows the gradually increasing strength of the positive (by contrast) after one, two, or three hours.

The fact that printing and writing papers become brown by age is familiar to most persons; but that this change is essentially photographic is not a common belief. On sheet No. 5 will be found pieces of newspaper taken from the New York *Tribune*, the Baltimore *Sun*, and the Washington *Evening Star*, on which photographic images have been impressed by simp exposure under a dense negative. These papers were subjected to no preparatory treatment, establishing the fact that th newspapers we read daily are (probably) all printed on papers sensitive to light, and adapted for the production of positive pictures. On sheets Nos. 6, 7, 8. and 9 such pictures will be found on *Evening Star* paper, made by direct exposure to the sun's rays, under collodion negatives. A fact of some significance is, that some of the experiments on *Evening Star* paper were made on sheets which had been very carefully washed before exposure. The washing was done by causing a very rapid film of water to flow over and under the paper at the same time for two and a half-hours. The paper was then dried and exposed. This treatment did not seem to effect the sensitiveness of the paper to light, and the presumption would seem to be justifiable that the sensitive compounds present are not soluble in water. The time required to produce the maximum effect is about fifty hours, but this must often be exceeded if any part of the negative is in the least obscured by cloudiness. The colour produced by exposure on such papers is peculiar. When the paper is clean and in good condition, as in Nos. 6, 7, 8 and 9, a very pure golden bronzy colour is produced, which can be appreciated only in strong white light. I will not now discuss the nature of the resulting brown-yellow compound, except to say generally, that it is not easily acted on by chemical re-agents, and that it undergoes a very peculiar darkening by the application of heat alone; as by ironing the paper bearing such a photograph with a moderately hot flat iron. On sheet No. 8 a piece of paper is mounted with two tints on it longitudinally, half of which (divided across the tints), was heated in the way described, and which is, in consequence, much darkened. The print above it on the same sheet was also so developed or intensified.

Sheets Nos. 10, 11, and 12 have mounted upon them pieces of white pine, of different qualities, upon which photographs have been produced by exposures under stencil negatives, made by cutting openings in tinfoil, and pressing it into close contact with the surface of the wood by means of a plate of glass properly clamped thereto. The exposure required to produce those photographic images varies from thirty to fifty or sixty hours, On sheet No. 13 a piece of poplar is shown, the picture on which was produced in twenty hours, for it seems probable that of all the woods in common use, poplar is the most sensitive, and gives the darkest colour when fully exposed. In making these experiments it is important to obtain a fresh surface on the wood, to effect which, in the case of an old piece, a good deal of the outside has often to be removed by the plane, for the penetration of the light is often considerable.

It seems probable that this darkening of wood (which is very commonly, though rather vaguely attributed to the action of the air), is related to the photographic effect obtainable on printing papers. These are now hardly to be had without an admixture of wood pulp, and the present inquiry (inasmuch as it proves the phenomena to be strictly photographic) may have a practical bearing if it points to means which will keep printing papers white indefinitely.

On sheet No. 1, the bleaching action of light upon a dried leaf is exhibited, and on No. 5 a piece of parchment is mounted, which has also, though substantially white, become a little whiter where the light has acted. As far as it goes, this would tend to show that the "yellowing of parchments by age" is not a photo-chemical process. This parchment had a very long exposure.

As connected with this general subject, I would call to mind the investigations of Mr. Thomas Gaffield, of Boston, who established conclusively more than twenty years ago the slow effect of light on colourless glass, in gradually giving it colour; sometimes pinkish, and sometime) yellow; the former being apparently due to a re-oxidation of the reduced manganese employed to counteract the iron. These changes often required years for their completion.

Experiments only just completed tend to show that pure cellulose in the form of the finest filtering paper is not sensitive to light; at least a constant exposure in a horizontal position to diffused and direct sunlight, failed in two weeks to produce any perceptible change in colour. On the other hand, the same filtering paper, covered with picric acid and similarly exposed for the same time, about 140 hours of diffused and direct sunlight, gave a colouration as before, when sized and calendered paper of the best quality was the kind treated with the acid. On sheet No. 14, two pieces of the above filtering paper, prepared with picric acid, and exposed horizontally as stated, will be found, but one of them has been washed in hot water till all the soluble matter has been removed. This treatment of the exposed print tends to raise the contrast by letting the darkened parts appear as on white paper. It also shows the insolubility of the darkened portions in hot water, the production of which was effected by light alone.

Simultaneously with the above exposures, another was made of the same duration and in the same way. This was the presentation of a thin stratum of commercial picric acid on glass, to the same illumination as that already mentioned, under a stencil tin-foil negative and a plate of glass covering the same. The picric acid was darkened, as before, very decidedly, though it would be difficult to exhibit the results in a satisfactory way at a meeting of the Society.

In concluding this paper, and to account for its incomplete-

* Presented before the Society of Amateur Photographers of New York.

ness in certain ways, I may be permitted to explain that the investigation, the results of which are here given, was not undertaken with a practical purpose in view, but simply to determine the limits within which bodies may be properly described as sensitive or non-sensitive.

Notes.

The section of the PHOTOGRAPHIC NEWS devoted to "Answers to Correspondents" is now under the exclusive control of Mr. John Spiller, who, besides being an accomplished photographer, is an experienced scientific and analytical chemist. Mr. Spiller's experiments and analytical investigations have gone far to elucidate some of the chemical questions which nearly concern the interests of many of our readers, and we are sure that they will thoroughly appreciate the importance of the circumstance that so able an experimentalist is willing to place his varied experience in many branches of photography, and particularly in its scientific and technical aspects, at the disposal of our subscribers.

In handing over to Mr. Spiller the control of all which follows after the heading "Answers to Correspondents," the Editor may say that he feels assured that not only those asking questions will find matters of importance in Mr. Spiller's department, but that almost every reader will be able to gather something to interest him in this section of the PHOTOGRAPHIC NEWS.

The French detectives are turning photography to a novel use in the way of tracing criminals who are "wanted." It is stated that they now distribute the likeness of the man they are in search of among the showmen who make a living by exhibiting the portraits of celebrities. They think the crowds of people who flock to these galleries of notorieties will take note of the features of the person, and in this way he may be recognised and delivered up to justice.

This is not a bad idea, but we fancy it might be improved upon. Why, for instance, could not the magic lantern method of advertising be utilised? There are several houses in leading thoroughfares in London—the Strand, for instance—opposite which crowds stop nightly to stare at the changing pictorial advertisements thrown on a screen which takes the place of an upper window. If there are no facilities at the police stations for the exhibition of lantern portraits of persons wanted, the pictures might take their place among the advertisements referred to. It would also be a good way in which to find missing relatives. Judging from the agony columns, people are continually causing anxiety to their friends by disappearing.

The *Globe*, in discussing the various portraits of Mary Queen of Scots, now to be seen at the Stuart Exhibition, has come to the same conclusion as that advanced some time ago in these pages, namely, that "when a feature is exaggerated it will take care of itself; downright ugliness has, therefore, the best chance of being represented truthfully." Therefore, the extraordinary variations which exist in the portraits of Mary Stuart—variations which prevent the examiner from arriving at any distinct notion as to what she was really like—are, to some extent, evidence that she had regular features.

In order to be universally recognised, our contemporary counsels sitters not to change their artists, but to stick to one painter, for "if Mr. Burne-Jones, Mr. Millais, and Mr. Watts, went to work upon the portrait of the same beautiful woman, the betting is that we should have three portraits as unlike one another as any three of the most widely differing pictures of Queen Mary." This is very true, but we are not sure that the reason given by the *Globe* is the correct one—namely, that every artist has a single type, and that he adapts his sitters to it forcibly if they do not conform to it naturally. Court painters like Sir Peter Lely and Greuze, no doubt, had their types of beauty, and cared little for truth, but it is otherwise with modern artists of the first rank. The differences which one sees between Burne-Jones, Millais, and Watts, are not so much differences of form as of colour. It is notorious that Millais sees too much red in the flesh tint, as Pettie sees too much yellow, while Burne-Jones and Watts favour a dusky hue. These defects, if defects they are, arise from physical differences in what may be termed colour-vision, and not from a fancy for some particular type.

Photographic companies are somehow not associated with good luck. Many have been started, but few have succeeded. The latest addition to the list of failures appears to be the "Photographic and Electric Supply Association," which, according to a financial contemporary, was floated by a city promoter, and the object of which was to purchase the business of a novelty store keeper at the West-end, who had brought out a Jubilee camera at the absurd price of three-and-sixpence. The vendor, we are informed, acted with *bona fides*, but it remains to be seen if the promoter and the persons who constitute the "company" can be similarly complimented. So far, their proceedings are not encouraging. Provincial druggists, it appears, were specially appealed to to take shares in the company, and many did so, forwarding the application money. At this point the history of the company becomes lost in a fog, for the whole thing has simply vanished, and letters sent to the offices are returned through the Dead Letter Office marked "gone away." Up to the present moment, it certainly looks as if the money of the investors had followed the example of the company.

The paper read by Sir Howard Grubb, at the Institution of Mechanical Engineers, Dublin, on clock driving for telescopes, appears in the volume of "Transactions" just published. The method described by the author is of extreme interest and importance to astronomical photographers. To use Sir Howard Grubb's words, hitherto every successful photograph that has been taken with equatorials supplied with ordinary uniform motion clocks owes its excellence not to the accuracy of the clock driving, but wholly to the care and patience of

the operator. Now, however, thanks to the system of electrical control introduced by Sir Howard Grubb, the telescope can be fixed on a star with much certainty of following its movement for at least one hour, and therefore will allow, if necessary, of an exposure for that time. The paper elicited unanimous expressions of approval.

In the *Archiv* we have a sketch of Adt's mounting roller, and a testimony to its usefulness. The roller stock carries



a spring roller like that used for blinds, and on this is wound a long band of fine woollen cloth, the outer end of this cloth being attached to a wooden roller, which is attached to the table by means of end bearings. When the print has been pasted and laid in position on the mount, the roller is worked backwards and forwards a few times; of course, in time, the cloth in immediate use becomes soiled, so the dirty portion is then rolled up on the back rod, and a clean part of the band comes into use. When the whole band is dirty it is washed and dried: but the band lasts a long time. We have not heard of the arrangement being on the market yet.

The considerable growth of the oxygen industry is touched on in the *Pall Mall* Budget of last Friday, in an "interview with Mr. Ellice-Clark;" this gentleman being the manager of the Brin's Oxygen Company, in Horseferry Road, Westminster.

The method adopted at the Horseferry Road works is that in which heated baryta is made to absorb oxygen from the air, and to yield up this oxygen under a further application of heat.

When the company commenced operations the selling price of oxygen was, it appears, at the rate of £7 per thousand cubic feet, and prohibitive rates were charged by the railway companies for the transmission of the iron bottles containing the gas, owing to some notion of special danger; but now the price is only a little over double that of coal gas, and the railway companies accept the iron bottles at ordinary rates.

A bottle six feet long and five-and-a-half inches in diameter will, it appears, contain no less than a hundred cubic feet of oxygen, this involving a pressure of no less than a hundred and twenty atmospheres. Yet, it is said that when a bottle bursts it rips up like leather, causing no dangerous explosion.

The introduction of cheap oxygen into the market is revolutionizing many industries, and is greatly stimulating the use of the optical lantern.

The exhibition journal *L'Exposition de Paris* gives a print copied from a photograph by Mr. Godefroy, showing the present condition of the Eiffel tower; the tower being at present by a good deal the highest building in the world, and at present it affords such a sight of Paris and its surroundings as none but the aeronaut has hitherto seen.

Mr. Edward L. Wilson has run his excellent photographic publication for twenty-five years as the *Philadelphia Photographer*, but with the new year he changes the name to *Wilson's Photographic Magazine*, a change partly necessitated by the fact that Mr. Wilson has removed his headquarters from Philadelphia to New York.

Reviews.

PHOTOGRAPHIC MOSAICS for 1889. An Annual Record of Photographic Progress. Price one shilling. (*New York*: EDWARD L. WILSON.)

ONCE more Mr. Wilson's excellent annual is to hand; it being, as usual, crowded with useful items. A specially interesting article to the professional photographer, by Mr. D. Bachrach, is on the business policy of the photographer, in which he discusses such questions as payment in advance, proofs, and the desirability of issuing permanent prints, especially in the case of enlargements.

LIGHT AND COLOUR.

BY CAPTAIN W. DE ABNEY, C.B., F.R.S.*

I HOLD in my hand a series of colours of various hues and depths, some of them are fugitive and others are fast colours, and it is the object of the lectures I have been called upon to deliver to answer the questions as to what causes the colours, and what causes the fading of some by light. In four lectures this subject can by no means be treated exhaustively, and I can only endeavour to explain, in as familiar language as I can command, and by some plain experiments, what I desire to enforce upon your minds. A great deal has been written in the last two years on the subject of the fading of water-colours, and, from what I have gathered from the newspaper correspondence, it is not quite unnecessary that a few familiar discourses on the subject should be given, to prevent a repetition, at all events, of some of the blunders that have been made in physical phenomena. It may be known to some who are present here to-night that Dr. Russell and myself have carried on a series of experiments during two years on the subject of the fading of water-colours, and as our report to the Science and Art Department which was presented to Parliament pleases neither the party who cry out that water-colours are stable, nor yet the party who proclaim the contrary, we may presume that our results are not altogether wrong. To these experiments I shall refer later in the course of lectures.

Now, to commence with the elements of colour from the physicist's point of view. I wish to show you that the colour of an object depends on the composition of the light falling on it, on the material on which such light falls, and on the eye of the person. The screen which I have here is what we call white, when viewed by ordinary daylight ar artificial light, and such a screen not only will reflect white light, but also all coloured lights with the greatest brilliancy possible.

Let me throw a spectrum on the screen to serve as a text. If a brilliant spectrum be looked at, we see that it is really divided into three colours, blue, green, and red, with shades of other colours blending these colours into one another. I am

* First Lecture of a Course of Cantor Lectures delivered before the Society o Arts.

not going into the theory of the matter, but I would ask you to remember that the mean red light has a wave length of about 38,000 to the inch, the waves being in the luminiferous ether of whose existence we only know by circumstantial evidence, the green of about 50,000 to the inch, and the violet of about 64,000 to the inch. The other colours have intermediate wave lengths.

I would remind you of the old experiment that red, green, and blue, when combined together by means of rotation, give a grey light which can be matched by a combination of black and white. He we have such a combination forming a grey in the electric light. The reason assigned for this is, that in the eye there are three sets of nerves, one which responds to the red, one to the green, and the other set to the blue. When the disc is at rest, an image of these three coloured sectors is formed on the retina, and the nerves lying at the parts of the retina on which the image falls respond to these colours, and we see the sectors coloured. If there is astigmatism, or defects in the optical apparatus of the eye, the image is not sharp, then we have an image of part of the two colours adjacent blended into one another, or again if the discs rotate rapidly, so that the same part of the retina receives the coloured images in quick succession, all three sets of nerves are brought into use, and we have an impression of white, or rather grey, produced. But this subject I shall allude to again in one of my subsequent lectures.

(*To be continued.*)

Patent Intelligence.

Specifications Published.

5619. THOMAS RUDOLPH DALLMEYER, of 25, Newman Street, Oxford Street, London, Optician, and FRANCIS BEAUCHAMP, of High Cross, Tottenham, in the County of Middlesex, Engineer, for "Improvements in Photographic Lens Shutters."—Dated 16th April, 1888.

This invention relates to improvements in photographic lens shutters of the kind referred to in the specifications of Letters Patent granted to us bearing date respectively the 22nd day of April, 1887, No. 5903, and the 16th day of June, 1887, No. 8711.

The photographic lens shutters referred to in the specifications of the above-named patents are usually composed of several leaves or chopper shaped pieces turning simultaneously on centres or pins. When it is required to expose the prepared plate to the action of light, the shutter is opened and shut by hand, or by suitable mechanism, within the required time; but by the arrangements heretofore in use, the shutter has been opened to the full extent for each exposure, whether such exposure be long or short; and the amount of light admitted to the plate has been regulated by a diaphragm or stop having a hole of suitable size, and placed in front of the shutter. The object of our present invention is to obviate the necessity of employing a diaphragm or stop in front of the shutter, by so arranging the mechanism by which the shutter is opened and closed, that instead of the shutter being opened to the full extent for all exposures, the said mechanism can be so regulated that the shutter is opened only to an extent corresponding to the proper size of aperture that would be used if the ordinary diaphragm were employed, whereby such diaphragm is dispensed with, and the shutter serves the purpose not only of a shutter, but of a diaphragm as well.

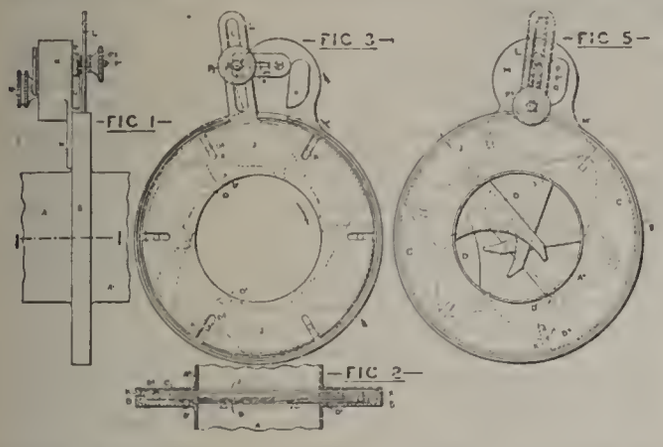
For this purpose we secure on the lens mount mechanism of the following character connected with and operating the lever arm by which the leaves or chopper-shaped pieces forming the shutters are actuated:—The aforesaid actuating lever arm is slotted in the usual way, and a crank pin, mounted on or connected with a spring barrel or with a spring-actuated axis takes into the slot in the said arm. The spring barrel or the spring-actuated axis with the crank pin can be adjusted on the lens mount, so that the said crank pin can impart a greater or lesser amount of motion to the actuating lever arm according as it is required to open the shutter more or less. Or the same effect may be obtained by making the crank pin adjustable radially in its crank, whereby its stroke or throw can be varied according to the required opening of the shutter.

The drawings hereto annexed illustrate these arrangements as applied to lens mounts having shutters of the kind described in the specifications of the above-mentioned patents Nos. 5903 and 8711. Figure 1 is a side view of part of such a lens mount, figure 2 is a longitudinal section of same taken on line 1—1 of figure 1, figure 3 is an elevation of the circular box containing the shutter-mechanism with the cover C and tube Ax, seen in figure 2, removed, the shutter being shown wide open. Figure 4 is an elevation with the cover C and tube Ax in place, the shutter being shown about midway between the full open and quite closed position; figure 5 is a similar view with the shutter completely closed. Figures 6, 7, and 8 are detail views, to a larger scale, of the mechanism for actuating the shutters.

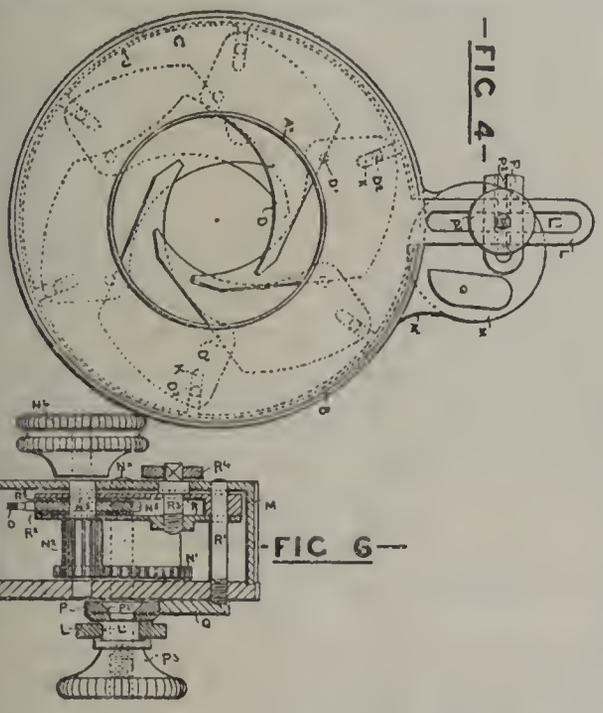
A represents part of the tube of the lens mount; B, a circular box or chamber at the end of the tube A, carrying the shutter. C is the cover of the said box B. Ax is a tube formed with or secured in the centre of the cover C, and forming a prolongation of the tube A. D D are the metallic leaves or chopper-shaped pieces which together form the shutter. These leaves turn respectively on fulcrum pins D^1, in the back of the box B, and carry pins D^2, which take into slots K, in a ring J, fitting easily into, and turning, to a limited extent, in the box B. L is a slotted lever arm projecting from the ring J through an opening in the side of the box B. By turning the ring J in the direction of the arrow in figure 3 by means of the arm L, the sides of the slots K, in the ring J, press against the pins D^2, causing the corresponding leaves D to turn inwards on their fulcrum pins D^1, so that the inner segmental edges of such leaves intersect each other in such a manner as to form an opening which gradually decreases in size as the arm L is moved, but which is always concentric or symmetrical with regard to the centre, and approximates more or less to the circular form. When the arm L is moved in the opposite direction the opposite sides of the slots K act on the pins D^2 so as to turn the leaves in the opposite direction, and thereby to form a gradually enlarging opening.

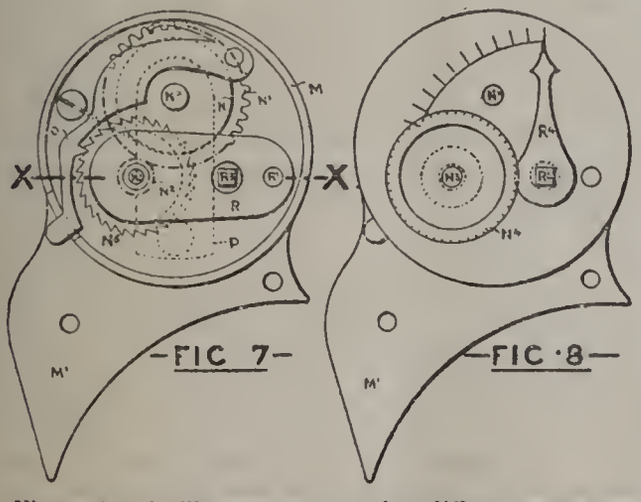
The apparatus so far described in reference to figures 1 to 5 is substantially similar to apparatus described in the specification of our above-mentioned patent, No. 5903, of 1887, and forms no part of our present invention, and is only shown and described in order to make clear the action of the automatic opening and closing apparatus shown at the upper part of figures 1, 3, 4, and 5, and detached, and to a scale twice as large in figures 6, 7, and 8. Figure 6 is a cross sectional elevation, figure 7 is an elevation with the cover of the containing case removed, and figure 8 is a front view. M is a case secured by a flange M^1 to the back of the box B. N is an ordinary spiral spring, one end of which is connected to the arbor Nx, and the other end to the case M. This arbor Nx carries a spur wheel N^1, gearing with a pinion N^2 on an arbor N^3, having a milled handle N^4 external to the case M. The arbor N^3 has secured on it the ratchet wheel N^5, which is prevented from turning by the spring pawl O. P is a crank arm external to the case M, and fixed on the arbor Nx. The crank pin P^1 of this crank takes into the slot L^1 of the arm L, and is adjustable into any position in the slot P^2 of the crank P by means of the clamping nut P^3, whereby its throw or stroke may be increased or reduced at pleasure, and thereby the distance to which the arm L is moved towards the left in figures 3, 4, and 5, and consequently the amount to which the shutter D is opened, while the complete closing of the shutter is effected whatever be the position of the crank pin P^1 in the crank arm P as shown in figure 5. By turning the milled handle N^4, the arbor Nx may be turned partly round, winding up the spring N, and turning the crank P and crank pin P^1 into the upper position shown in dotted lines in figure 5 diametrically opposite to the lower position shown partly in full lines in that figure, the shutter being closed as shown. The spring pawl O holds the arbor Nx and crank P in that position by means of the ratchet wheel N^5, until it is required to open and close the shutter to give the needful exposure. Then, by pressing the pawl O out of gear with the ratchet wheel N^5, the arbor Nx is released to the action of its spring N, which causes it to make a partial revolution, bringing the crank P back into the lower position shown in figure 5. When the crank pin P^1 is adjusted towards the outer end of the crank P, and passes from its upper position into that shown in figure 3, it causes the arm L to move from the position shown in figure 5 into that shown in figure 3, that is to open the shutter to its full extent. Then the further movement of the crank pin P^1 into the lower position, shown in figure 5, causes the arm L to move back from the position shown in figure 3 to that shown in figure 5, that is to close the shutter again. Q is a stop to prevent the crank P from going beyond the lower position shown in figure 5. Thus the half revolution of the crank P causes the shutter to open to its full extent, and then to close. When it is desired that the shutter shall not open to its full extent the crank pin P^1 is adjusted to such a position in the crank P that its half revolution will cause the lever L to

open the shutter to the required extent; for example, in fig. 4, the crank pin P^1 is shown adjusted so as to open the shutter to about one half its full opening. Whatever position the crank pin P^1 is adjusted to in the crank P, the latter always returns to its lower position as in full lines in figure 5, so as to effect the complete closure of the shutter. By these means the



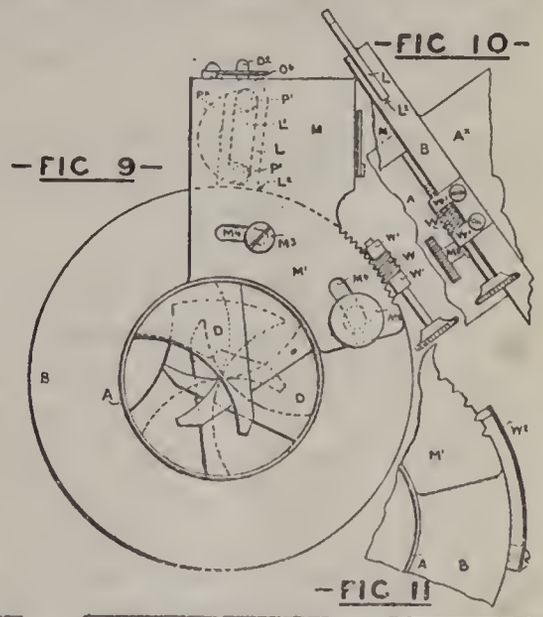
shutter is made to serve the double purpose of a shutter, and of a diaphragm or stop with variable size of aperture.

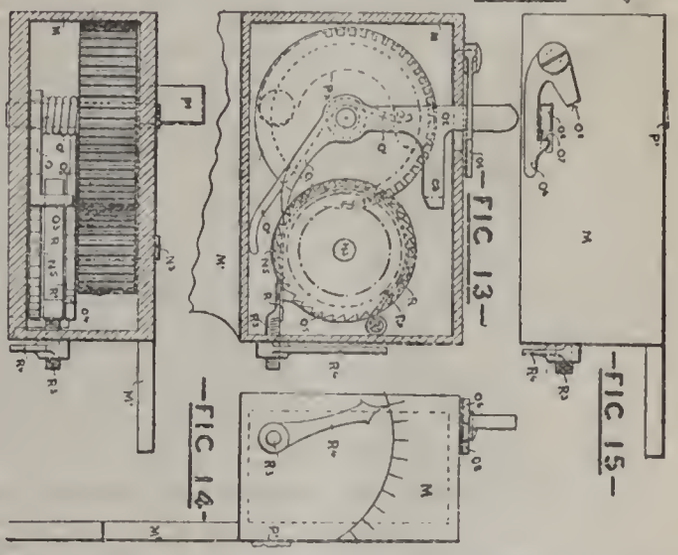




Figures 9 to 15 illustrate a somewhat different arrangement for effecting the same object. Figure 9 is an end view of a lens mount similar to that illustrated in figures 1 to 5 showing the shutter closed. Figure 1 is a partial plan of figure 9, and figures 12 to 15 inclusive are detail views, to a larger scale, of the apparatus for actuating the shutter, regulating the time of exposure, and for holding the shutter open when necessary. Similar letters of reference relate to like parts in all the figures of the drawings.

The extent to which the shutter is opened is regulated in the following way:—M is the case containing clockwork arrangements which actuate a crank pin^1 in a manner somewhat similar to that already described in reference to figures 1 to 8. This crank pin passes through the semicircular slot Px in the side of the case M, and takes into the slot L^1 in the arm L. The case M is adjustable circumferentially, to a limited extent, on the box B by means of the tangent screw W gearing into teeth on the edge of the flange M^1 of the case M, and turning in bearings W^1 fixed on the edge of the box B. The flange M^1 is guided by screws M^2 M^3 passing through slots M^4, and can be clamped in place by the milled screw M^2. In the position





shown in figure 9, the crank pin P^1 is free to make a complete half revolution in the slot Px, and therefore to move the arm L to the left in the figure sufficiently to open the shutter to its fullest extent; but if the case M be moved to the right in figure 9, the crank pin P^1 is no longer able to traverse the entire length of the slot Px, because it brings the arm L against a stop L^2 formed by the end of the slot in the side of the box B through which the said lever L passes into the position shown in figure 9, before it can itself reach either the upper or lower end of the slot Px. That is to say, the crank pin P^1 can only describe a segment of the half circle, the versine of which varies according to the position of the case M on the box B; consequently the arm L is only moved to the left in the same proportion, and therefore the shutter is only opened to a corresponding extent. Instead of the adjustment of the case M on the lens mount being effected to the tangent screw W, as shown in

figures 9 and 10, it may be adjusted by hand, and held in definite position by means of a spring catch W^2 taking into suitably placed notches on the edge of the flange M^1 of the case M as shown in figure 11.

In some cases it is required to open the shutter, and to hold it open a definite time in order to obtain a longer exposure than can be obtained by the opening and closing of the shutter by the unrestrained action of the crank pin operated by the spring barrel, or while focussing. For this purpose we connect directly or indirectly to the ratchet wheel by which the barrel is prevented from rotating, a disc or plate having in its edge a single notch, or if preferred a projection; a releasing lever or trigger is so arranged that a catch on the said lever or trigger is capable of engaging with the teeth of the ratchet wheel, and another catch on the said lever or trigger with the notch or projection on the edge of the disc or plate; but so that when the one catch is engaged in the teeth of the ratchet wheel the other catch is held away from and cannot engage with the notch or projection of the disc or plate, whilst when the one catch is disengaged from the teeth of the ratchet wheel the other catch bears against the edge of the disc or plate, and is free to engage with the notch or projection thereon.

These arrangements are shown in figures 12 to 15. O is a pawl held in gear with the teeth of the ratchet wheel N^5 by the spring O^1. O^2 is an arm extending from the said pawl, and terminating in a finger piece just outside the case M. O^3 is another arm extending from the arm O^2, and either shaped at its end to take into a notch on the edge of the disc O^5 secured on the ratchet wheel arbor N^3, or, as shown in figures 12 and 13, shaped so as to fall into the path of a stop O^4 on the said disc O^5. O^6 is a latch which prevents the arm O^2 moving beyond a certain distance when necessary as hereafter described. It will now be understood that if the latch O^6 be moved aside, and the arm O^2 be pressed by its projecting finger piece to the right in figure 13, so as to draw the pawl O out of gear with the ratchet wheel N^5, the front part of the arm O^3 will be brought into the path of the stop O^4, and the revolution of the arbor N^3 will be arrested when the said stop comes against the arm O^3. The portion of a revolution made, however, by the arbor N^3, before it is stopped by the arm O^3 is sufficient to allow the crank pin P^1 to revolve far enough to open the shutter to the extent defined by the adjustment of the case M on the box B, or of the crank pin in the slot of its crank (figures 3, 4, and 5) as the case may be, and as long as the arm O^3 is held forward so as to prevent the stop O^4 from passing, so long will the shutter be held open. If, however, the arm O^3 be moved back to the left in figure 13 far enough to release the stop O^4, but not far enough to place the pawl O in gear with the ratchet wheel N^5, the arbor N^3 will be free to continue its rotation, and to allow the crank pin P^1 to complete its partial rotation, and to close the shutter. The exact position of the arm O^2 to enable this to be done is defined by the face O^7 of the latch O^6, if the latch O^6 is closed back into the position shown in figure 15, or by the end of the moveable stop O^8 which will have been moved out into the path of the arm O^2 by the latch O^6, if the latter be left turned aside; so that whether the arm O^2 bears against the face O^7 of the latch O^6, or against the stop O^8, the arbor N^3 is free to revolve. This latch O^6 therefore serves also as a means of defining the proper position of the arm O^2, and consequently of the pawl O, and arm or catch O^3, when it is desired to allow the crank pin P^1 to effect the opening and closing of the shutter interruptedly.

In some cases it is sufficient, in order to obtain the necessary exposure, to retard the action of the barrel and crank pin by means of a friction brake connected either directly or indirectly with the spring barrel, somewhat as described in the specification of a patent for which we applied on the 12th day of October, 1887, No. 13,844. In figures 6, 7, 8, and 12, 13, 14, of the drawings are illustrated two improved arrangements of this brake apparatus suitable for the above described shutter-actuating mechanism. In the arrangement shown in figures 6, 7, and 8, R is a kind of pincer, the closed end of which is secured by the pin R^1, and the open end of which embraces between its branches the ratchet wheel N^5 or a disc mounted on the same axis, leather washers R^2 being preferably interposed between the branches of the pincers and the said ratchet wheel or disc. R^3 is a screw, the head of which extends to the outside of the case M, and has on it an index pointer R^4 moving over a graduated scale as shown in figure 8 for indicating the amount of tension put on the brake by the screw, and thereby inferentially, the speed at which the opening and closing of the shutter will be effected. By tightening up or slackening this screw R^3 more or less, by turning the index pointer R^4, frictional resistance is imparted to the ratchet wheel N^5 or the disc, and the speed of revolution thereof, and of the arbour Nx and crank P, and consequently the speed of opening and closing the shutter is thereby regulated to a certain extent.

In the arrangement shown in figures 12, 13, 14, and 15, R is a brake strap, preferably lined with leather, fixed to a pin R^1 at one end, passing partly round a brake drum Rx on the axis N^3 of the ratchet wheel N^5, and connected at the other end to a screw R^3 passing through the case M, and having an index pointer R^4 working as a nut thereon. This index moves over a graduated scale as shown in figure 14 in the same way as the index R^4 in figure 8; and by turning the said index the pressure of the brake strap R on the brake drum Rx may be varied so as to increase or decrease the time of exposure within certain limits.

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, we declare that what we claim is:—

First. Arranging the shutter-actuating mechanism so that it can be adjusted in order to effect a greater or lesser opening of the shutter at pleasure, substantially as hereinbefore described.

Second. Making the crank pin of the shutter-actuating apparatus adjustable radially in its crank, for the purpose of varying the effect of said crank pin upon the shutter, and thereby the extent of the opening of the said shutter, substantially as hereinbefore described, and illustrated in figs. 1, 3, 4, 5, and 6 of the drawings hereto annexed.

Third. Making the shutter-actuating mechanism adjustable on the lens mount for the purpose of varying the effect of the actuating crank pin upon the shutter, and thereby the extent of the opening of the said shutter, substantially as hereinbefore described, and illustrated in figs. 9, 10, and 11, of the drawings hereto annexed.

Fourth. The apparatus for holding the shutter open, consisting of the ratchet wheel N^5 and disc O^5 provided with a notch, or a projection O^4, the spring-actuated axis N^3, the spring-actuated pawl O connected with the lever arms O^2 and O^3, the latch O^6 and the stop O^8, arranged, combined, and operating substantially as hereinbefore described, and illustrated in figs. 12, 13, 14, and 15, of the drawings hereto annexed.

Fifth. The combination of an index finger and graduated scale, with the regulating screw of the friction brake device, for regulating the time of opening and closing photographic lens shutters, substantially as hereinbefore described, and illustrated in figs. 6, 8, 12, 13, and 14 of the drawings hereto annexed.

Correspondence.

PROPOSED PHOTOGRAPHERS' DEFENCE UNION.

SIR,—At no previous period in the history of photography has there been such need for a co-operation of professional photographers as at the present time. The decision of Mr. Justice North in *re* Pollard *versus* Photographic Company threatens to still further seriously interfere with the already much-handicapped profession. Unless a decisive step is unhesitatingly taken and generously supported by professional photographers, any one of our brethren may be proceeded against at any moment by some spitefully inclined person for simply exposing a specimen in his show case, or supplying a re-order to the wrong member of the family.

The case cited above will furnish a dangerous precedent if it be suffered to become law; therefore no stone should be left unturned to prevent this. If the facts of the case as revealed by the proceedings formed the only basis, there would of course be an end of the matter, as no respectable photographer would part with any copies otherwise than to the sitter or relatives, or with the former's permission; nor do I believe that he would hesitate one moment to remove any specimen from his window (or would never exhibit at all) after a request to that effect; but the case presents a slightly different aspect. The defendant, with whom I am acquainted, belongs to the first rank of the photographic profession, and is an artist of no mean order, and it must be a matter of regret that he allowed the case

to be conducted by affidavits, instead of witnesses being heard orally for or against; and furthermore, I must say that in my opinion it was a mistake on the part of the defendant's counsel to contend that the photographer could make what use he pleased of a negative. However, as that cannot now be remedied, I trust that an appeal may reverse the decision, when the case may be clearly stated as follows.

An exceedingly good and pleasing photograph of the plaintiff's wife was inserted into one of the usual Xmas designs (as was the custom of the trade from its infancy), and exposed in the shop window for a considerable time, during which the plaintiff's wife frequented the defendant's shop several times, and although knowing it to be there, never before objected to it. Then the plaintiff's clerk purchased one on the detective system, having previously and repeatedly been asked whether he had the lady's permission. The action was tried, with the result known.

It is easy to imagine the consequences if the decision is permitted to stand. First of all, every photographer, apart from being liable to be prosecuted from an unknown enemy, will probably have to part with a valuable negative to an amateur friend of the family, who will furnish all after-copies. Secondly, if he insists on retaining the negative, the materials of which clearly belong to the photographer, the necessary permission to supply after-copies will lead to no end of complication; as, for an instance, a group of twenty having been photographed, any one member's consent in writing will be required to supply the others with a copy, and it is truly appalling to contemplate what formalities will be requisite in the case of an after-order, supposing some of the company to have emigrated to the Cape of Good Hope, or elsewhere; or it may happen that an application for permission to sell photos. to members of the family cannot be entertained until a list of those relatives who may or may not be supplied, has been prepared. A gentleman engaged to be married accompanies his intended bride, and actually pays for her photograph. At an impending breach of promise action, the gentleman orders some more copies, and so may drag the unsuspecting photographer into his meshes. Examples like these might be drawn *ad infinitum*, and it would require an extra clerk to guard against the law, therefore it is clear something must be done. If we do not band together now, such omission will surely become a standing reproach to us. The defendant in the case of Pollard *v.* Photographic Company is inclined to pay the costs in the action, being afraid of incurring the risk of an unsuccessful appeal.

The chances are very much on the defendant's side if the case were carried into the higher court. All previous decisions have been in favour of the profession, and it has always been understood by photographers that the copyright is vested in the operator, and not in the sitter, as pronounced by the judge.

In view of the well-known and great interest you, Mr. Editor, take in all things photographic, I ask you to kindly lend your esteemed and valuable assistance to this cause, so that a society may at once be formed, or an appeal fund be started, to which I am pleased to contribute £2 2s. No time must be lost, as the term within which an appeal may be lodged expires in less than a fortnight; therefore please permit me, through your widely circulated News, to invite my colleagues to forward their names for membership immediately, whereupon an early meeting can be arranged, and the subscription be fixed, and other formalities settled. Let it be remembered that this important matter concerns every individual member of our noble profession, and, though it only affects a provincial colleague to-day, it is not at all unlikely that it may be our turn to-morrow.

As experience teaches that for the want of an organized beginning many good schemes fall through, I venture (even at the risk of appearing over-officious) to take it upon myself, if necessary, to act as secretary *pro. tem.*, until the ship is successfully launched within smooth waters, when I shall conceive it my duty to deliver it up to the guidance of abler hands, who I sincerely trust may steer it in grand style through the strongest currents.

That it may be quickly and powerfully manned, and accomplish its grand object, is the earnest wish of yours truly, J. Hubert.

[We have omitted one paragraph from Mr. Hubert's letter.—Ed. P.N.]

CAMERA CLUB EXHIBITIONS.

Sir,—Will you allow us to draw attention to the second of the series of "One Man" exhibitions of photographic pictures at the Camera Club? The exhibition now announced will be devoted to the work of Mr. Harry Tolley, of Nottingham. By the kind co-operation of Mr. Tolley, we shall be able to present a fully representative show of his work, and believe that the exhibition will prove of great interest to photographers and artists.

The exhibition will commence on Monday, Jan. 7, and will continue open for about six weeks.

Visitors will be admitted on presentation of card.—We are, yours, &c., G. Davison, E. G. Spiers } *Hon. Secs.*

Camera Club, 21, *Bedford Street, W.C.*, 31*st Dec.*, 1888.

CAMERA RACKS.

Dear Sir,—In your issue of the 21st inst. I note a description and illustration of a method of placing camera pinions out of gear with the racks, which was patented by me some two years ago, and therefore cannot form part of a new patent, nor be used by others without permission.

The arrangement is fully described in the specification No. 2,670, Feb. 24, 1886.

Trusting that you will kindly insert this in your next issue, I am, yours faithfully, J. E. Thornton.

New Lorne Street, Moss Side, Manchester, Dec. 29, 1888.

Proceedings of Societies.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 20th inst., Mr. E. Clifton in the chair.

Mr. W. Harrison gave particulars of his visit to the French Photographic Society while in Paris. The number of members was about 200. An international congress of photographers would be held in Paris some time during July next. He also gave some particulars of the construction of the Eiffel tower. Platinotype prints were fast coming into favour there.

In reply to a member, Mr. J. B. B. Wellington was not aware of any disadvantage from a roller-blind being next the plate. In his opinion it was an advantage, as the plate had the full benefit of the exposure, and the speed could be arranged from one-tenth of a second to almost any speed. His blind had a three-inch slit which could be used either vertically or horizontally. The opening could be of a pyramidal form, giving more exposure to the foreground than the sky.

Mr. J. Kar preferred the blind in front of the lens.

Mr. F. A. Bridge said Mr. English, when in Paris some years ago, had tried a roller blind in front of his lens. He did not find it answer so well when placed next to the plate

The Chairman remarked that Mr. J. Traill Taylor had exhibited at one of the meetings some remarkably sharp instantaneous photographs—the exposure had been made with a piece of tin acting as a drop shutter, and passing in front of the plate.

Mr. J. B. B. Wellington said there was no fear of dust with a roller-blind shutter in front of the plate, as the action of the shutter would be to blow any dust off the plate. The blind was quite light-tight at the edges.

Mr. Cooke asked if the Meisenbach process was a patent.

The Chairman believed not at the present time. He, however, thought that there was some secret in working the process. He remarked that some method of photography on wood blocks for engraving was much wanted. He had given considerable attention to the subject, and had made many experiments, but had not been successful. Any process requiring water to be applied caused the block to warp. Collotype was too expensive; other processes stained the block, so that the engraver was unable to tell the depth of his cut.

MR. A. COWAN suggested the powder process.

The CHAIRMAN believed this had been tried without success.

Messrs. J. Johnson and E. A. Whitlemore were elected members.

AT the meetiug on the 27th ult., Mr. J. J. BRIGINSHAW presided.

Mr. A. HADDON showed a negative recently developed ; it had beeu left in the dark slide for some twelve months. That part of the plate that had been immediately under the leather, forming the hinge of the slide, was reduced considerably more than the other part of the negative ; a peculiar feature also was noticeable with the affected part, that the high-lights of the picture were reversed. The negative was a very dark interior, and had received an hour's exposure.

Mr. W. H. HARRISON attributed it to an oxidising tendency in the leather, it beiug well known that oxidising agents favoured reversal of images.

Mr. A. HADDON thought it could not be due to atmospheric influence, as it was entirely free from iridescence.

The general opinion of the members seemed to favour the idea that the slide had been partly opened in a feeble light, and that the action on the plate was due to auxiliary exposure.

Mr. A. HADDON said in one of the journals he had seen recommended for a flash light a mixture of chlorate of potash and phosphorus in bisulphite of carbon. He considered this compound not at all suitable for the purpose. In the first place, it was a highly dangerous explosive ; and again, the detonation following combustion was very deafeuing. He then proceeded to prove his statements by demonstration, having brought down to the meeting a solution of phosphorus in bisulphide of carbou, and some finely powdered chlorate of potash for that purpose. An experiment was first made to show the action of phosphorus in bisulphite upon paper. A little of the solution was poured upon a sheet of writing paper, and placed on the top of a small wire tripod on the table ; in a few moments it took firo with a bright flash. The demonstrator drew attention to the fact that the paper was not burned. This was accounted for by the phosphoric acid oxidising and protecting the paper. A clean sheet of writing paper was then placed on the tripod, and some powdered over it ; a little of the phosphorus solution was then poured over it ; in a short time a very loud explosion followed. Mr. Haddon had very considerately, previous to the experiment, placed on the table some cottou wool for those members who might have some doubts as to the strength of the drums of their ears.

The subject announced for discussion was "Oil Lanterns," and for this purpose J. E. FRESHWATER brought a lanteru with a 4-wick lamp. This he lit up, and the lights of the room beiug lowered, he proceeded to test its luminosity on the screen. The exhibitor remarked upon the several points requiring attentiou in connection with the lighting up of oil lamps—a failure to comply with which had done so much to bring the oil lamp into ill-favour. In the first place, cleanliness must be strictly adhered to, any oil after filling the reservoir must be wiped off, and the other parts of the lamp kept scrupulously clean—care being takeu that the draught is not checked by particles of burnt wick or dirt. The lamp should be lighted some few minutes before being taken iuto the room where the projection is to take place, and only pure crystal oil should be used.

A. HADDON recommended that the lamp should only be filled at the time of using, as the oil crept over the sides by capillary attraction. This was proved to be the case with some lamps at Greenwich College, which were regularly filled some hours before lighting, the result being an unpleasant smell from the escape of the oil, proved beyond doubt by an experiment he made by way of testing this.

Mr. J. J. BRIGINSHAW said a great deal of the bad behaviour of an oil lamp was due to the wicks being unevenly cut. He knew from experience that to trim a lamp properly was frequently a trial of patience when ordinary scissors were used, the slightest unevenness in either of the wicks being sufficieut to cause the lamp to smoke. He preferred a 3-wick to either a 2 or a 4-wick lamp. In both of the last mentioned lamps a dark vertical band was always seen on the screen, which was not noticeable with a 3-wick lamp ; and the difference between a 3 aud 4-wick lamp, in his opiniou, was not justified when the large increase of heat caused was taken into consideration.

Mr. A. HADDON thought the black baud on the screen might be remedied by haviug the wicks at an angle, instead of end on.

Mr. F. E. FRESHWATER said this had been tried, the result being a loss of light from one flame partly interfering with the direct rays of the other.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

A STATED meeting of the Society was held Wednesday evening, Dec. 5, 1888, the President, Mr. FREDERICK GRAFF, in the chair.

The SECRETARY reported the receipt of a circular letter announcing the formation of the Photographic Club of Paris, composed of amateur photographers, who propose to celebrate the opening of their rooms by an exhibitiou ou December 15th, to which members of this Society were invited to contribute albums, prints, or negatives. An invitation was also extended to members visiting Paris, particularly during the Exposition of 1889, to make use of the Club's laboratories, dark rooms, &c.

The Joint Exhibition Committee reported that a meeting of Joint Exhibition Council was held in New York on November 10th, at which certain alterations and amendments were made in the rules, &c., which experience had indicated were desirable, and which it was thought would contribute greatly to the success of future exhibitions. Preparatious for the forthcoming exhibition in Philadelphia, during the Spring of 1889, were now in progress, and circulars with rules and other particulars would shortly be issued.

A paper was read by Mr. HENRY HARRISON SUPLEE on "The Largest Camera in the World," being a description, particularly in its application to astronomical photography, of the Lick Telescope. Mr. Suplee also presented to the Society, on behalf of Messrs. Warner and Swasey, of Cincinnati, the builders of the telescope, three fine photographs showing the instrument as mounted in the observatory.

Dr. CHARLES L. MITCHELL gave an interesting account of a photographic trip taken during the last summer in the White Mountain region of New Hampshire. A large number of excellent slides were shown as the result of the trip.

Mr. CARBUTT showed some transpareucies made on his new Flexible Negative Films, which were of great beauty. They were mounted between two sheets of plain glass, no ground glass being required. An excellent portrait negative, made on a film by Mr. Gutekunst, was also shown.

As a convenient method of using the films in ordinary holders, Mr. Carbutt showed some carriers made from sheets of ferrotype plate, the edges being bent over in such a manner that the films could be readily inserted, and firmly held so that the carriers could be placed in position in the holder.

He called attentiou to the absence of halatiou when films were used, the smallest twigs and branches of trees being perfectly sharp. Negatives taken in the building of the American Institute Fair in New York, a portion of the skylight being included in the view, were entirely free from halation when taken on the films, the reverse being the case when glass was used.

In reply to a question by Mr. Burroughs, it was stated that the tendency to curl in drying could be obviated by first placing the film for three or five minutes in a mixture of water 30 ounces, and glycerine 1 ouuce.

ALLAHABAD CAMERA CLUB.

THE first general meeting of the Allahabad Camera Club was held at 9, Albert Road, at 6 p.m., ou December 11th (President, the Hon. Mr. Justice STRAIGHT).

After the ordinary business of the Club had been disposed of, it was decided to form a class of instruction, commencing with the A B C of Photography, under the able supervision of the secretary ; classes to be held weekly ; open to all members ; camera, chemicals, and dark-room free of charge, being supplied at cost of Club.

Col. BROWN CONSTABLE then exhibited a short series of lantern transparencies, prepared in various manners, and showing practically the various results caused by the various developers used.

Afterwards a discussion was held on the Brown-Constable changing box, and a practical proof of its excellence was given by its inventor and patentee (whose name it bears) changing and re-charging with plates ; three double dark slides for 8¼ by 6½ plates. This work was done, though under difficulties, in ten minutes.

After a little general discussion the meeting closed. The next regular meeting of the A. C. C. will be held on Tuesday, January 8th, 1889. The Secretary of the Club is Mr. A. Wingrave, Allahabad Camera Club, 9, Albert Road, Allahabad.

CAMERA CLUB.

ON Thursday, December 27th, the slides sent in by members for the exchange with the New York and other American Photographic Societies were exhibited. In all about 200 were shown,

and from these 100 will be selected to send to the United States. Amongst those contributing were Messrs. Gale, Conway, Wainwright, Beasley, Greene, Howlett, Davison, Ferrero, Carnell, Sturmey, Shipton, Stroh, Elder, Robertson. After the Exhibition, a short discussion took place on the marking of lantern slides. On Jan. 10 another lantern show will take place.

Amateur Photographic Association.

A council meeting of this Society was held Friday, Dec. 28th, at 12, Old Bond Street; Right Hon. Lord de Ros in the chair.

The minutes of the last meeting having been read and confirmed, Messrs. E. A. Tower, S. A. Garnett, and Albert Norman were elected members.

The Secretary then laid before the meeting the prizes which had been awarded at the annual meeting, which were as follows:—For Mr. R. O. Milne (the first prize), a large silver goblet; for Mr. F. S. Schwabe, a silver goblet; for Mr. Hobson, a silver goblet; for Mr. W. Gaddum, a silver goblet; for Mr. R. Leventhorpe, a handsome landscape album; for Mr. W. S. Hobson, a silver goblet; for Mr. Maurice de Dechy, a handsome portrait album; for Dr. Drew, a small silver goblet; for Mr. R. Murray, a handsome landscape album; and for Mr. F. Gowan, a handsome portrait album.

These prizes were approved by the Council, and the Secretary was directed to forward them to the members to whom they had been awarded.

Any particulars can be had from the Hon. Secretary, Mr. Arthur J. Melhuish, 12, Old Bond Street, London.

West London Photographic Society.

The inaugural meeting of this Society was held at Addison Hall, on Friday, December 28th, when a large number of ladies and gentlemen attended to hear the inaugural address from the President.

After the disposal of the formal business, the president (Mr. William England) in the course of his address said:—A Photographic Society for West London was now actually in existence, but its success in the future would depend to a great extent on the hearty co-operation of every member. It was not to be forgotten that many societies were already in existence, and some of them had had a long start of the new Society; still he trusted it would never, after all the energy and trouble which had been expended, be said that the West London infant would not grow into manhood. It had been said in some quarters that another London Society was not required, but that was an opinion which he certainly could not endorse. Central and other parts of London were, undoubtedly, already provided for, but surely the western district, which probably contained more photographers, amateur and professional, and persons interested in art-culture, than any other portion of the metropolis, should be represented by a Photographic Society of its own. He reminded those present that ladies were eligible for membership, and probably in West London there were many lady amateurs who would fully appreciate the advantages to be derived from becoming members of such a Society. He therefore trusted that a large number of ladies would join, and honour the Society by their presence at its meetings. Photographers of the present time possessed great advantages over those who practised the art in its earlier days; at the time to which he referred there were no photographic journals to appeal to for help and guidance out of a difficulty, and photographic societies, of which there were now upwards of eighty established in Great Britain, were things unknown. The President also gave an interesting resumé of the Daguerreotype process, and to illustrate his remarks handed round for the inspection of the audience some valuable specimens of the process, including a portrait of Daguerre, a portrait of himself, a copy of a picture, and a fine instantaneous study.

Dr. Harrison Low said that the President, in the course of his remarks, mentioned that the real work of the Society had only just begun; but, with all respect, he ventured to disagree with him upon the point. They should not lose sight of the fact that they owed a debt of gratitude to four gentlemen—Messrs. Blackmore, Narch, Bennett, and Hodges—who were really the originators of the idea of forming a Society for West London; and that it was they who had undertaken all the trouble incident to and inseparable from the work of promoting such a Society as the present. Bearing those facts in mind, he thought it only fair to those gentlemen named, that the meeting should mark its sense of its appreciation of their services by according them a hearty vote of thanks for the expense and trouble to which they had been put. The motion having been seconded by Mr. Whiting and carried unanimously,

Mr. Hodges returned thanks on behalf of himself and those who had been associated with him in the formation of the Society, and said that the future success of the Society would rest in a great measure with each individual member and not alone with the executive. They might have the most capable president, and the most zealous officers, but such a desirable condition of tdings would not make the Society a success without the hearty co-operation of all the members. There was also another matter which he wished to impress upon them, and that was the necessity of regular attendance at meetings on the part of members. They must bear in mind that they were now an existing Society, and as such were open to public criticism, and it was unnecessary to remind them that photographic criticism was very keen.

The optical lantern, under the superintendance of Messrs. Hodges and Narch, was then called into requisition.

The Chairman announced that Mr. G. F. Blackmore would read a paper entitled "Notes on Ferrous Oxalate Development," on January 11th, and that Mr. Hodges would give an account of a visit to North Wales, with lantern illustrations, on January 28th.

The next meeting of the Society will be held at the Addison Hall, on Friday, January 11th, 1889, at eight o'clock.

Talk in the Studio.

Camera Club Fixtures for January, 1889.—Monday, Jan. 7th: Opening of the exhibition of Mr. Tolley's photographs (second of the series of "one man" exhibitions at the Club)—press and private view, 7.30 to 9 p.m.; 9 p.m., Smoking concert. Thursday, January 10th, 8 p.m.: Lantern evening (members are requested to bring new slides). Thursday, January 17th, 8 p.m.: Mr. Andrew Pringle on "Photo-micrography"; apparatus and illustrations on show. Thursday, January 24th, 8 p.m.: Mr. W. Marriott, of the Royal Meteorological Society, on "The Application of Photography to Meteorology"; illustrations on exhibition. Thursday, January 31st, 8 p.m.: Mr. Graham Balfour on "Figure in Landscape and Genre." Monday, Feb. 4th, 8 p.m.: Smoking concert. Thursday, Feb. 7th, 8 p.m.: Mr. J. E. Austin on "Enlarging," illustrated by enlargements on alpha paper.

The late Mr. Edward Anthony.—The *New York Tribune* says:—"Edward Anthony died at his home, No. 715, Madison Ave, yesterday morning, after a short illness, age seventy. The cause of his death was heart disease. Mr. Anthony was born in New York City. He received a liberal education, graduating from Columbia College in 1838, with an excellent record for scholarship in all departments. Beginning active life he chose the profession of civil engineering, and soon obtained employment in the corps engaged in building the Croton Aqueduct. Before the completion of the Aqueduct, however, he was called to accompany Professor James Renwick on the survey of the north-eastern boundary of the United States at the time of the dispute with Great Britain. When engaged in the construction of the Croton Aqueduct Mr. Anthony had amused himself as an amateur with the new art of making pictures by the aid of sunlight, then just introduced by the famous Daguerre. It occurred to Professor Renwick that Mr. Anthony's knowledge of this new discovery might be utilized on the survey, as England denied that there were any "high hands" on the line as claimed by the United States. The testimony of the Daguerreotype could not be controverted, however they might dispute that of the barometer and the spirit level. Mr. Anthony accordingly took with him the necessary apparatus and plates, and produced satisfactory images of the hills, which were forwarded to the State Department. This, it is said, is the first instance in which the art of photography was ever made use of by any Government. After finishing this survey, which occurred at a time of commercial depression, when most public works were stopped, Mr. Anthony took up the photographic business. Upon going to Washington the Committee on Military Affairs in the Senate, of which Thomas H. Benton was Chairman, gave him and his partner the use of their committee room for the practice of their business. After a short but successful career in the practice of photography Mr. Anthony abandoned it, and embarked in the business of supplying the materials, for which his practical knowledge of the art was an invaluable assistance. The new business grew with great rapidity, the annual sales doubling

those of the preceding year for more than six years, and soon placed the house of E. Anthony in the front rank of the mercantile and manufacturing establishments of New York. Henry T. Anthony, who was also a graduate of Columbia, joined his brother in the business, adding greatly to the success of the firm by his knowledge of chemistry and the details of manufacturing. As the business increased in volume, others were taken into the firm, notably Colonel V. M. Wilcox, now the senior member. In 1877 the firm was recognized as a Corporation, with Mr. Anthony as President, H. T. Anthony as Vice-President, and Colonel Wilcox as Manager and Secretary, and, since the death of H. T. Anthony, Vice-President."

PHOTOGRAPHING THE ECLIPSE.—Reports from the American statious show that on New Year's Day the weather was exceptionally favourable for photographic observations, and as many exposures were made we may reasonably expect useful results. The *Standard* correspondent, telegraphing from New York, says:—"During yesterday's eclipse of the sun, twenty-five negatives were taken at Willows, Californiia, to measure the brightness of the corona and its surroundings. Five of these were obtained to search for intra-Mercurial planets, and twenty to study the spectrum of the corona, in order to determine its composition. These negatives will reach from the yellow rays to the extreme ultra violet. The general illumination during the period of totality was found to be lighter than during the eclipses of 1878 and 1886. The corona was similar to those of 1868 and 1878, but showed much more detail than the latter, and was exceptionally fine, exteuding usually on one side to two solar diameters. A striking characteristic was two forked wings of light. The polar rays were well defined and considerably shorter. At Cloverdale the eclipse was observed with great accuracy, but shortly before totality some cirrus clouds passed over, all tinged with the most brilliant colours of the rainbow. Venus appeared during the early stages of the eclipse, while Mercury and the other planets were plainly in view during every phase that was photographed."

RICHMOND PHOTOGRAPHIC EXHIBITION.—This exhibition is likely to be a large one, and exhibits have been sent from many parts of the country, including Scotland and Ireland. Doubtless the numerous prizes offered, and the exhibition being held under royal patronage, have influenced exhibitors to send their photographs from long distances. We are informed that Princess Mary, Duchess of Teck, has signified her intention to open the exhibition on Tuesday next, the 8th inst., at 3 p.m., and afterwards to attend the show of lantern slides; when a prize comprising a 5-inch enlarging apparatus, offered by Messrs. Perken, Son, and Rayment, of Hattou Garden, for the best lantern transparency, will be awarded. The judges are—Mr. James Sant, R.A., Professor Glaisher, Mr. T. C. Hepworth, Mr. J. Traill Taylor, Mr. C. W. Hastiugs, Mr. S. B. Wollaston, and Mr. C. Hussey. The lantern show will take place each day, without extra charge, at 4.30 and 8.30.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Ordinary meeting, Tuesday next, January 8th, at the Gallery, 5A, Pall Mall East.

SELL'S PRESS GUIDE.—We have received the new edition of this work for notice (price 2s., Sell's Advertising Agency, 167, Fleet Street), and in the first place must refer to the very fine series of about sixty photo-block portraits of distiuguished press men which it contains; these portraits being printed on a suitable thick paper. There are also some excellent essays on subjects of interest to pressmen. Its least satisfactory side, however, is the press guide portion, which is professedly a complete directory to all newspapers and kindred publications. Three London weeklies which we first looked for when taking the book in hand are in no way mentioned or inserted in the lists. Similarly, we fouud no mention of some half dozen other British publications for which we sought. Such embellishments as portraits, and additions in the way of essays, are excellent in their way, but in a press guide their presence hardly compensates for incompleteness in the more essential parts.

PHOTOGRAPHIC CLUB.—The subject for discussion on Jauuary 9th will be "Hydrokinone as a Developer."

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Attention to these directions may prevent delay and disappointment.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

COLONIAL AMATEUR (Durban).—Even in your sunny clime, you could hardly expect to get street scenes (instantaneous stereoscopic) with the pair of American single lenses now in your possession. For this purpose you would require a couple of rapid rectilinears to permit of working with sufficiently wide aperture and shortened exposure. We have lately seen a capital series of stereoscopic views taken with a pair of five shilling lenses stopped down to about *f*/30, but they were not instantaneous.

R. S. (Elgin).—The bottle of toning solution duly received. There is so much black matter in suspension, that we are inclined to think that the prints may not have been sufficiently washed before immersion in the toning bath, and this might account for the spots and stains mentioned. Are you using tinted paper? For, if so, we have known the colour to come off in the toning bath and give just such a difficulty. It is a good plan, in cold weather, to use a tepid water for last wash before toning.

DA RO. (Dumbarton).—Fine wire gauze (copper or brass) may be procured from any sieve manufacturer in your neighbourhood. We are not very sanguine as to its successful use for giving "grain" in photo-lithography, but could you not try in the first instance a few experiments with fine cambric or muslin to see whether you can get over reticulations? Look up the details of Colonel Waterhouse's waxed sand process (PHOTOGRAPHIC NEWS, Nov. 26, 1880, and the YEAR-BOOK, page 114).

R. A. (Clitheroe).—The collotype process is beyond the resources of an amateur for successful employment, and necessitates a large plant of special apparatus. R. H. Courtenay's copper-plate process, patented in 1869 (specification No. 1965), or Husnik's gelatinotype (YEAR-BOOK, 1888), are perhaps more manageable, but even these require much patient skill in the working.

NATURAL COLOURS.—We seem to be as far off as ever from the practical realization of this seductive problem. The instance lately described by Mr. Jerome Harrison is, doubtless, that to which you refer, but this was only one of many plates taken which chanced to show *on the negative* some correspondence with the natural colours of the scene photographed. By transmitted light the tints were not apparent, nor could the colours be seen in the print. The skit in last week's NEWS (page 823) is hardly an exaggeration of the popular belief.

F. J. R. (Leeds).—The demand is quite unusual. Your giving the rector a *douceur* might increase the sale of your photographs of his church, but it will be impossible for him to guarantee you against the production of other views, *if taken from the highway*. The registration of your negative will only secure it from piracy: but neither of you can ever prevent another person from going on to the ground and taking the church from the self-same point of view, provided it can be done without trespass.

D. WINSTANLEY.—We share your opinion that the problem of photographing in natural colours is advancing one step nearer, but its realization by isochromatic media seems yet a very long way off. See the answer on this subject above. You are free to draw your own conclusions from the skit on page 823 of last week's NEWS; most readers would adopt your second suggestion as to the real purport of the article.

RECEPTION ROOM.—The quality of your dark brown mounting cards is anything but satisfactory. Try them for yourself, and you will find that a red colouring matter bleeds out freely. For method of testing, see the YEAR-BOOK, page 33. Received pink and yellow C.D.V. mounts, and one of cabinet size, without any letter of advice.

FIREWORKS.—(Clifton).—1. In a general way, there is no need to varnish your lantern transparencies before mounting; but if any of them appear too dense, it would be advisable to do so, using a light coat of Mawson's lantern slide varnish. 2. There is nothing better than glue for binding the edges and attaching the mounts. 3. The "phosphorescence" you speak of may be the result of a trace of eosine in the plates washing out into the alum bath; if so, it should be called "fluorescence."

COPYIST.—1. There is nothing better than a rapid rectilinear for copying maps, stopped down as you find necessary to get the requisite flatness of field. All three makers are about equally reliable. 2. The pellicle enclosed in your letter smells strongly of turpentine when put into warm water. It is not dried algin or gelatine alone. 3. Encaustic paste would be better than any varnish for giving a lustrous surface to your collotype prints.

Several correspondents in our next.

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RAPID HYDROKINONE DEVELOPMENT.

THE objection which we mostly hear raised against the hydrokinone developer is that its action, when it is used in conjunction with alkalis giving the best results, is slow. Slowness of development is objectionable for several reasons. In the first place, there is the obvious reproach that if as good results can be obtained by rapid development, it is loss of time to have to spend longer than necessary in watching the evolution of the image during its gradual production.

There is also an objection to slow development which is probably too often overlooked. The light of the dark room is not absolutely without effect upon the sensitive surface of the film, and although, when the medium used to filter out the more active rays of light is well chosen, there may not, in the short time necessary for putting the plate in and out of the dark slide, and for the development itself, be sufficient evidence of the action of the light to be detected in the image, yet, with a prolonged development, the conditions are altered, and a certain amount of fogging may supervene, which would have been avoided by a quicker process.

It is not unlikely that many cases have arisen in which the inexperienced—or those who do not realise the fact that all light, of whatever colour, has an action upon the sensitive film which may be made evident if only it is exerted for a sufficient length of time—have condemned either the plates in use, or a particular process of development, as one yielding a fogged result, when the true explanation would have been the fact that has just been referred to. It is obviously wise, in cases of prolonged development with a film of high sensitiveness, to adopt the precaution insisted upon by Mr. C. Bennett, when describing his method of working rapid gelatine plates, of covering the dish during the stay of the plate in the developing solution. Mr. Bennett's plan of development was, as it happens, a rapid one: but if such a precaution was desirable with a short development, it is certainly very much more needed when the process is lengthened.

Another objection to slow development, and probably that which is of most weight, is that, with professional portrait photographers, it is desirable to know as quickly as possible whether the result of the pose has been satisfactory, so that the sitter may be dismissed, or another plate exposed without unnecessary loss of time. On all these grounds, and in view of the fact of the increasing use that is made, and that seems likely to continue to be made, of hydrokinone as a developing agent, it is interesting to record that recent experiments with this substance in conjunction with a mixture of caustic and carbonated alkalis, have led to the publication of formulæ, in the use of which the good qualities of hydrokinone appear to be preserved, at the same time that the action of development is completed within a very short time—shorter, indeed, than it is customary to occupy with the pyrogallic method.

The last number of the *Photographische Mittheilungen* contains two articles on the employment of a small quantity of caustic alkali in conjunction with a larger amount of carbonated alkali for use with hydrokinone in development. The first of these articles is by Herr P. Baltin, to whose previous experiments with hydrokinone and potash we referred in a recent article. He sets out by remarking that the great general disinclination which exists amongst practical photographers to using caustic potash in the developer, and which, for the most part, appears to be perfectly justified, and has been recently much expressed, has induced him to call attention to what may be said in its favour. It can scarcely be disputed, he adds, that no variation of the hydrokinone developer works so rapidly and energetically as hydrokinone with caustic potash, whether the latter is employed only as an accelerator in conjunction with carbonate of soda or of potash, or whether it is used alone. The general application of the latter method has to contend with the vexatious frilling so apt to occur.

That this occurrence of frilling is not a necessary result of the method just mentioned, is evidenced by the fact that Herr Baltin for some months past, in the busy studios of Selle and Kuntze in Potsdam, has used no other developer than that of hydrokinone and potash, the work including negatives—on which, of course, no risk would be run—of the Imperial family; and, throughout, frilling did not arise.

It is advisable, Herr Baltin remarks, not to use the caustic potash in large proportion, and not to add it to the mixed developer until shortly before using. For some time past he has kept the hydrokinone mixture in a concentrated solution as follows:—

Hydrokinone	100 grains
Sulphite of soda	600 ,,
Carbonate of potash	1,200 ,,
Distilled water	6 ounces 3 drams

This solution is diluted for use, 1 part to 3 of water, and then to each ounce is added from 4 or 5 up to 8 or 10 minims, of a 40 per cent. solution of caustic potash.

With regard to the use of distilled water, we may remind our readers that water which has been boiled and allowed to cool in a closed vessel, say in the kettle in which it has been boiled, is as suitable for many purposes—this, amongst others—as distilled water. It is, indeed, preferable to distilled water that has been standing for some time in a vessel partly filled with air and not well stopped. Such boiled water may advantageously be used not merely for mixing the strong solution, but for diluting it for use. Where the ordinary tap water is highly charged with carbonic acid as well as oxygen, the precaution of boiling

before use is additionally desirable, otherwise an undefined amount of the caustic alkali is carbonated, and some uncertainty must result. It may be well to remind our readers of the necessity for seeing that the hydrokinone is perfectly dissolved in the sulphite of soda solution before adding the carbonate of potash.

The advantage of this formula consists, in the first place, in the rapidity of the development, which we are told is concluded, on an average, in the space of from one to two minutes. In this connection it is well to bear in mind the important influence that is exerted by temperature in regulating the time required for the action of development. The photographer who is not impressed with this fact, and whose dark room is not well warmed, would be liable at this time of the year either to remove the plate from the developing solution before the action is completed, or to find the time required for development so much longer than expected, that he might think there was something wrong with the formula, or that its rapidity of action has been greatly over stated.

A second advantage consists in the number of times for which the same solution may be used; as an example of this Herr Baltin has, in a quantity of about ten ounces of solution, developed one after the other twenty-one double cabinet plates, 7 by 9½ inches, and two cartes-de-visite plates 8 by 15; and this without any addition during the development of the whole of the series. All the negatives were taken in the ordinary course of the day's work, and some of them had received long and others short exposures, but all came out successfully. The developer had lost in volume by adhesion to the plates by more than half, and had become somewhat brown. It appeared, however, not to have lost its energy, and was only discontinued for want of more exposed plates to develop. According to the observations and experience of this writer, such a continuous use of a developer not containing caustic alkali would not have been possible.

It must, however, be freely admitted that it is not every plate which will bear to be developed with caustic potash. The plates used by Herr Baltin were almost exclusively those of Lomberg, and this make is prepared with a substratum of chrome gelatine. Such plates bear a considerable addition of caustic potash without the special precautions which are otherwise necessary; such precautions being the employment of a salt bath (solution of common kitchen salt) before fixing, and the use of a dilute hypo bath. This substratum of chrome gelatine appears to be the safest and best means of preventing frilling. Herr Baltin does not doubt that the use of caustic potash in the developer will, on account of its preponderating advantages, become general, and that there is no reason why the use of a substratum should not become general also, especially as there is no objection to it, whatever the developer employed.

Dr. H. W. Vogel, in a note upon Herr Baltin's paper, considers that in consequence of the frilling which he has experienced when using caustic potash, the formula described is not advisable when long development is in question, but may be recommended for portrait work, with which rapid development is the rule. It does not appear, however, that the same plates were used by the two experimentalists, and it may well happen that of two makes, although both prepared with a substratum, a difference in the substratum itself, if not in the sensitive emulsion, might be sufficient to account for frilling in the one case and not in the other. Some of our English brands are remarkably free from tendency to frill, and if the method described prove on all hands so advantageous as represented, those manufacturers whose plates do not possess sufficient resistance to a frilling action will doubtless see the necessity of complying with the requirement of any process which may be largely adopted, and for which a tendency to frill in the plates used is a fatal objection.

The consideration of Capt. Himly's paper, which follows that of Herr Baltin, must stand over till our next article.

PHOTOGRAPHIC EXHIBITIONS.

THE Photographic Exhibition at Richmond (Surrey), which was opened on Tuesday, and remains open to the end of the week, may be regarded as fairly representative, both as regards photographs and apparatus: one excellent feature being a large room set apart for the evening show with the optical lantern. The awards for photographs are as follows:—

Division A, Class 1.—Silver medal, series of Nos. 3, 16, 34, and 37 (F. M. Sutcliffe); Bronze medal, No. 85 (H. P. Robinson). Division B, Class 12.—Silver medal, series of Nos. 151, 153, 154, and 155 (J. Gale); Bronze medal, No. 171 (G. Davison). Division A, Class 3.—Silver medal, No. 186 (L. Sawyer); Bronze medal, No. 190 (W. W. Winter). Division A, Class 9.—Silver medal, No. 230 (T. G. Whaite). Division A, Class 8.—No award; both medals withheld by Judges. Division B, Class 14.—Silver medal, No. 275 (Rev. F. C. Lambert); Bronze medal, series of Nos. 273 and 274 (D. de L. Cohen). Division B, Class 15.—Silver medal, No. 319 (D. Barnett); Bronze medal, No. 312 (Miss F. A. Harvey). Division B, Class 16.—Silver medal, No. 378 (T. H. Morton, M.D.); Bronze medal, No. 362 (J. F. M. Clarke). Division B, Class 13.—Silver medal, No. 420 (F. P. Cembrano, Jun.); Bronze medal, series of Nos. 410 to 414 (E. J. Bedford). Division B, Class 17.—Silver medal, No. 462 (L. Meldon); Bronze medal, No. 466 (H. E. Allen). Division A, Class 11.—(No awards; medals withheld by judges.) Division B, Class 20.—(In this Class, on the recommendation of the judges, a silver and a brouze medal are awarded instead of one bronze medal); Silver medal, No. 488 (H. Little); Bronze medal, No. 491 (F. Crookes). Division A, Class 2.—Silver medal, No. 500 (W. Crooke); Bronze medal, No. 503 (Werner and Sons). Champion Division, Class 22.—Silver-gilt medal, No. 576 (F. Thurston); Silver medal, No. 590 (H. P. Robinson); Bronze medal, No. 586 (W. J. Byrne). Champion Division, Class 23.—Silver-gilt medal, No. 609, for second or centre picture (H. D. Arnott); Silver medal, No. 617 (J. Gale); Bronze medal, No. 614 (Surgeon-Major Mantell, M.D.). Division A, Class 4.—Silver medal, No. 648, for second or centre picture (L. Sawyer); Bronze medal, No. 643 (G. W. Wilson and Co.). Division B, Class 21.—(For the best picture in the exhibition by an amateur) The *Amateur Photographer* silver medal, No. 154 (J. Gale); The *Amateur Photographer* bronze medal, No. 462 (L. Meldon).

As announced, the so-called "Champion" Photographic Exhibition opened on Monday. It is held in a room behind a shop in New Bond Street (No. 148), and although we understand that all the exhibits are prize winners, there are not very many well-known or representative photographs.

PHOTOGRAPHY IN GERMANY.

BY HERMANN E. GUNTHER.

FRILLING WITH GELATINE PLATES—MICRO-PHOTOGRAPHY—NEW PHOTOGRAPHIC LENS—PHOTO-LITHOGRAPHS IN HALF-TONES.

On various ways of Preventing Frilling with Gelatine Plates.—In the *Amateur Photographer* I find a most interesting communication of Prof. W. K. Burton, now in Tokio (Japan), which he has directed to the editor of this journal. "I have now lived," says Mr. Burton, "and worked at photography for more than a year in Japan. The plates that I have worked have mostly been of my own make, and, no gelatine really suitable to emulsion work having been available, I have had plates which, though working well enough in cool weather, and well enough in all respects but one in hot weather, have given great trouble in that one. The plates have, some of them at least, shown the strongest inclination to frill. I have thus had an opportunity, which I would willingly have been without, of studying the nature of the frilling disease, and of investigating all the various ways of curing or preventing it. The trouble began to show itself with me when the thermometer in the dark-room rose above 80° F., and became really serious when it reached about 90°. Here I may say that these temperatures are

probably equivalent, in destructive effect, to temperatures considerably higher in countries where the climate is different from what it is in Japan. This is on account of the fact that the heat here is a damp one. The atmosphere is never very far from the saturation point, and therefore evaporation is very slight. Now in a dry atmosphere the rate of evaporation is so great that the developing solution never reaches nearly to the temperature of the dark-room. Here it comes within a degree or two of that temperature when it has been in the developing dish for a few minutes. Even apart from frilling, the use of a warm developer is not to be recommended, as the negative got by such is generally much inferior to one got by a cool developer. I therefore recommend the use of ice whenever it is likely that the temperature of the actual developer is likely to rise above 70° F. A large piece of ice may be placed in the developer in the measure, and, during development, the developer may be poured back into the measuring glass for a few seconds every minute or so. This will prevent frilling in the developer, unless the disease is present in the extreme degree, whatever be the nature of the solution, whether it be alkaline pyro, or whatever it be; and if once the development is over without any signs of frilling, the negative may always be saved by the simple plan of passing it directly to the alum solution without any previous washing. As Mr. Burton states, this may be done without the smallest danger of damaging the quality of the negative. It must be borne in mind, however, that, if the developer be alkaline, the alkali introduced into the alum solution from the developer will very soon destroy the hardening properties of the former, so that a fresh alum solution must be frequently mixed up. If the quantity of alum solution is such as to cover the plate to a depth of a quarter of an inch, it should be renewed after a dozen plates have passed through it. If the frilling begins before the plate is out of the developer, the case is a more difficult one, and there is, in fact, no way of getting over this difficulty but that of modifying the developer before we begin to work. If the potash developer is used, which is now a favourite with many, but which is the chief sinner in the matter of frilling, Mr. Burton recommends the following hint, which is due to Mr. W. B. Bolton. This is, that common salt should be mixed with this developer. Common salt has hardly any restraining effect in a developer, and it certainly has a marked effect in hardening the film. The use of salt in the developer makes the danger of frilling with the potash developer rather less than with the ammonia developer without salt, whilst, if salt be added to the latter developer, it is only in the case of the most inveterate frillers that frilling need be feared. It is possible to prevent frilling in plates, however, subjected to it, when the ferrous oxalate developer is used, as it is possible, when this developer is used, to treat the plate to a preliminary bath of chrome alum, without interfering with the subsequent development, and with the result that frilling is rendered impossible. Such a bath is not permissible with the alkaline developer. The plate is treated for five minutes with the alum solution (a saturated solution of chrome alum), and is then washed and afterwards developed in the usual way. It must, however, be a very bad plate that will frill with the oxalate developer, even without previous treatment with alum. It is frequently possible, after a plate has frilled, to remedy the effect by the free use of alcohol, the film being assisted by the fingers in taking its place, whilst it shrinks under the treatment with alcohol. It is only in the case of films in which the proportion of gelatine is high that this is possible, as Mr. Burton states. When the quantity of gelatine has been kept down, the film has not sufficient tenacity to stand the treatment.

Micro-Photography.—To the production of extremely small pictures of objects intended to be viewed by the microscope, M. Dagron, many years ago, has given a new impetus by substituting for the microscope a modified Stanhope lens, having one end a plain surface, to which the microscopic print was attached permanently by Canada balsam. These lenses are manufactured at a very low price in this country, and have become very popular indeed. A description how the microscopic prints are made will, perhaps, be of interest to your readers, though many of them will, no doubt, be acquainted with the process. A glass plate is well polished on both sides with a mixture of 1,000 c.c. of water, 50 grammes of whiting, and 200 c.c. of alcohol by the aid of a pad of cotton; then it is cleaned with a dry pad of cotton, and then with a piece of fine buck leather. The side of the glass destined to receive the micro-photograph is at last polished with old collodion. It is necessary that the collodion be a little more liquid for this purpose than for the ordinary wet collodion process. The following ingredients are dissolved:—

Ether	400 c.c.
Alcohol	100 „
Pyroxyline	3 grammes
Iodide of ammonium	4 „
Bromide of ammonium	1 „

The solution is allowed to settle, and decanted as usual. The glass plate coated with this solution is sensitized in a solution of 7 to 8 parts of silver nitrate to 100 parts of water; twelve to fifteen seconds are sufficient for floating. The glass is washed off in a dish with distilled water to remove the free silver nitrate. It is then placed on blotting paper to drain, and when still moist flowed over with the following mixture:—

Albumen	150 c.c.

To which is added—

Water	15 c.c.
Iodide of potassium	3 grammes
Ammonia	5 „
White sugar	2 „
Iodine, a small crystal.	

This is beaten to a froth with a wooden fork for ten minutes, allowed to settle for twelve hours, and the clear liquid decanted off for use. The albumen is poured on in the same way as collodion; the excess is filtered back. When dry the glass is placed for fifteen seconds in a silver bath consisting of—

Water	100 c.c.
Silver nitrate	10 grammes
Acetic acid	10 c.c.

It is then thoroughly washed, and allowed to dry. The second silver bath, if it acquires a dirty colour, is well shaken with 25 grammes of kaolin to each 100 c.c. of the bath, then filtered, and a little silver nitrate and acetic acid added to it. The exposure is done in the copying camera; it will take from one second to one minute, according to the light. The developer is the following:—

Water	1000 c.c.
Gallic acid	3 grammes
Pyrogallic acid	1 gramme
Alcohol	25 c.c.

The exposed plate is dipped into the solution. After ten to twenty seconds to each 250 c.c. of the developing solution, 3 to 4 drops of a 2 per cent. silver solution are added to make the image visable. As soon as it has appeared, with all details, it is washed out and fixed with a 20 per cent. solution of hypo; ten to fifteen seconds are generally sufficient for fixing. Finally the print is thoroughly washed. The prints are warmed, touched with Canada balsam, and pressed firmly on the Stanhope lens, through which they are intended to be viewed. The pictures being so exceedingly small, their development generally requires to be followed by the microscope.

A New Photographic Lens.—Herr A. Miethe, of Berlin, has lately constructed a photographic objective which is said to be almost free from astigmatism. Astigmatism

or astigmation, as is well known, is a defect which is produced where pencils of light fall obliquely upon a lens. It is due partly to the spherical form of the photographic lenses, from which vertical and horizontal lines near the margin of the lens cannot both be accurately focussed at the same time, so that only a very limited part of the picture is sharp at full opening. It is especially a defect in portrait lenses. Miethe's new lens has been ground of the new optical glass at present produced in Jena, in the optical institute of Professor Hartnack, of Potsdam, and the one made for trial has a focal length of 9·75 centimetres. It is said to have splendidly accomplished all theoretical expectations. The lens is essentially, as regards the diaphragm plane, symmetrical, and has a comparatively large aperture on account of the proportionately long distance of the lenses from each other. Each of the two achromatic lenses consists of a very thin cemented meniscus, in which the convex or condensing lens has a much higher index of refraction than the concave lens, by which it is corrected. The inner surfaces of the lenses are so curved that no flare spot will be produced by reflection. By some arrangement of the mounting the two components of the objective can be brought nearer together to about one-quarter of the total distance. For portraits and instantaneous pictures the lenses are separated from each other as much as possible. The largest aperture is then $\frac{1}{4}$, and the intensity of light accordingly very great. The field is said to be absolutely flat and free from distortion, the sharpness being exceptionally fine. As the astigmation is so greatly reduced, an even circle of sharp delineation of 50 degrees is obtained with full opening, while with a smaller stop the sharpness reaches to the edges of the picture-circle comprising 66 degrees. If the lenses in the mounting are brought together as near as possible, and the aperture reduced from $\frac{1}{20}$ to $\frac{1}{40}$, the circle of sharp delineation extends to 90 degrees, and is sharp to the edge and without flare spot. The focal length is shortened only inconsiderably by approaching the lenses. The price of the new objective has not yet been fixed, but it is said that it will not exceed the cost of the objectives of equal focal length already in use.

A New Method of Making Photo-lithographs in Half-tones.—By Mr. Johann Bartos and Mr. Hermann Kuhn a new and original process of producing grained photo-lithographs in half-tones has been patented in this country. The invention consists of the combination of two processes, to produce a new technical effect. The use of a soft sand-blast of particular construction has been combined with the use of a film of varnish, which latter rests below the image, serving to the lithographic stone, whilst it is etched, as a reserve. The working details of this new process are the following:—A well-ground lithographic stone is coated with a thin film of varnish, consisting of

Chloroform	...	...	...	200 grammes
Mastic...	...	...	...	5 ,,
Asphaltum	...	...	...	10 ,,
Benzole	...	...	...	300 ,,
Linseed oil	...	...	...	2 grammes

A photographic pigment print in half-tones, made in the usual manner, is transferred to the prepared stone. When dried, the pigment film is coated with the following mixture:—

Glycerine	...	...	...	35 grammes
Water...	...	...	...	25 ,,
Alum ...	...	...	...	2 ,,

The mixture is allowed to cool for about five minutes, when it is removed by the aid of blotting-paper. In this state the film possesses the property to be easily destroyable. The prepared pigment picture is now subjected to the action of a very soft sand-blast. The sand hereby strikes against the soft pigment relief picture, so as to destroy it gradually, and to damage also gradually the film of varnish below. When the destroyed photographic film is removed, the image becomes visible with all details, and grained on the varnished surface of the lithographic stone. It is now possible to etch the picture, which should be done by the aid of diluted phosphoric acid (4 parts of acid to 100 parts of water). After about two minutes the acid is washed off, and the stone coated with a gum solution, consisting of 5 parts of gum to 100 parts of water, and the coating allowed to dry. The film of varnish is now removed with a pad of dry cotton wool by the aid of turpentine, then the dry stone is inked in with lithographic ink, moistened, and the superfluous colour removed by rolling. The image will now be visible on the stone with the finest details, and may easily be printed, because it is etched into the stone itself. The process is said to be also employable for making letterpress blocks and photogravure plates.

LIGHT AND COLOUR.

BY CAPTAIN W. DE ABNEY, C.B., F.R.S.*

WE can recombine also the pure colours of the spectrum by several plans, the simplest to my prejudiced mind being that which I introduced. I take away the long focussed lens, and put a shorter focussed lens in its place attached to a camera, for reasons which I shall shortly explain (Fig. 1).

On a collimator, G, to which is attached the usual slit, is thrown, by means of a condensing lens, a beam of light, which emanates from the intensely white-hot carbon positive pole of

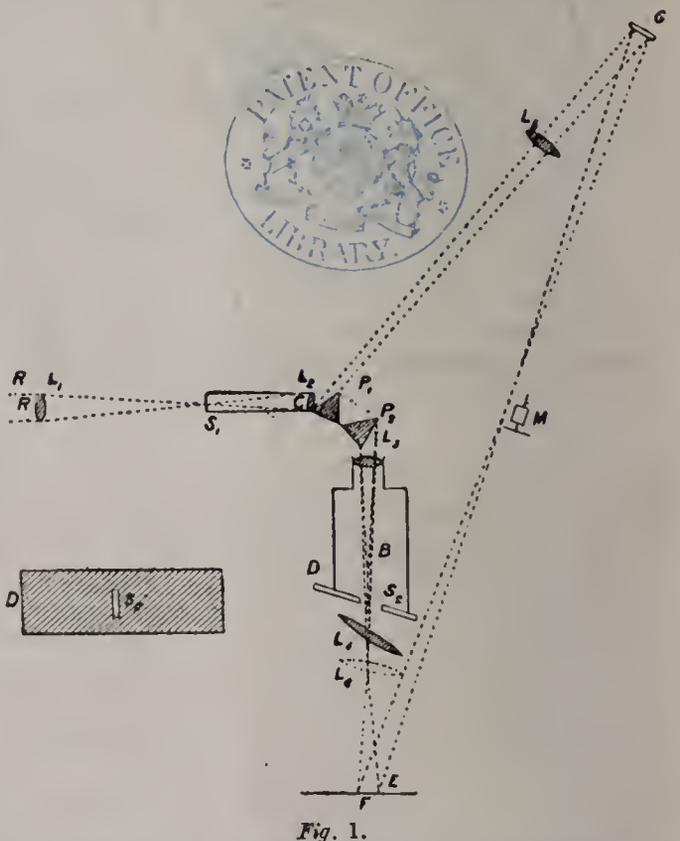


Fig. 1.

the electric light. The collimating lens L_2 is filled by this beam, and the rays issue parallel to one another and fall on the prisms P_1 and P_2, which disperses them. The dispersed beam falls on an ordinary camera lens, L_3, of slightly larger diameter than the height of the prisms, and a spectrum is formed on the focussing-screen, D, of a camera. When the focussing screen is withdrawn, the rays would form a confused patch of pink-coloured light on a white screen, F, placed some four feet off the camera. The rays, however, can be collected by a lens, L_4, of about two feet focus, placed near the position of the focussing screen, and slightly askew. This forms an image on the screen of the near surface of the last prism, P_2; and, if correctly ad-

* (Continued from page 10)

justed, the patch of light should be pure and without any fringes of colour. The card, D, is a strip which fits into the aperture left for the focussing-screen in the camera. In it will be seen a slit S_2, the utility of which will be explained later on.

It often happens that a second patch of white light, comparable to that formed, is required. Advantage is taken of the fact that from the first surface of the first prism P_1, a certain amount of light is reflected. Placing a lens, L_5, in the path of this reflected beam, and a mirror, G, another square patch of light can be thrown on the same screen as that on which the first is thrown, and this second patch can be made of the same size as the first patch if the lens K be of suitable focus, and it can be superposed over the first patch if required.

We have now a square white patch upon the screen, from the re-combination of the spectrum. If I wish to diminish the brightness of this patch, there are at least two ways in which I can accomplish it. First, by closing the slit of the collimator, and, second, by the introduction of rotating sectors, M, which can be opened and closed at pleasure during rotation in the path of the beam.

The annexed figure (Fig. 2) is a bird's-eye view of the instrument. A A are two sectors, one of which is capable of closing the open aperture by means of a lever arrangement, C, which moves a sleeve in which is fixed a pin working in a screw

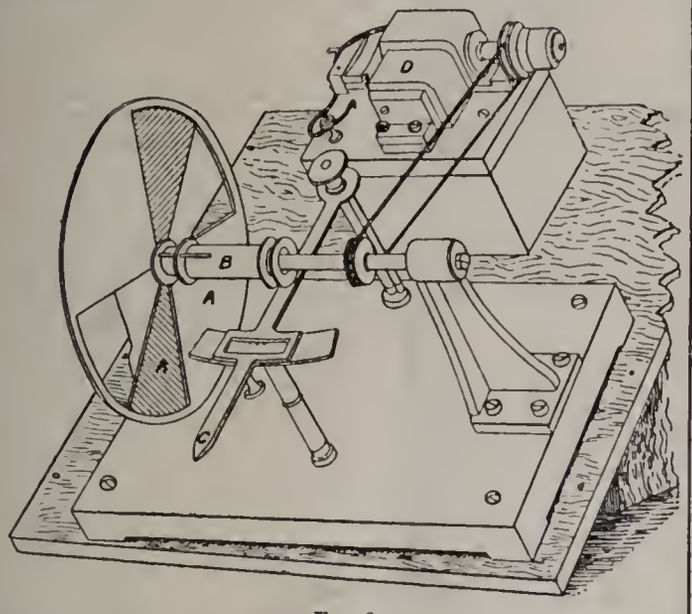


Fig. 2.

groove ; D is an electro-motor causing the sectors to rotate, and the aperture in the sectors can be opened and closed at pleasure during their revolution. To show you its efficiency, if I place two strips of paper, one black and the other white, on the screen, and cast a shadow from a rod, R, by the direct white light on the white strip, and a shadow from the same rod by the reflected light on the black strip of paper, and interpose the rotating sectors in the path of the reflected light, the aperture of the sectors can be closed till the white paper appears absolutely blacker than the black paper. White thus becomes darker than lamp-black, owing to want of illuminatiou on the former.

We all talk about white light ; we say that the electric light is white and that gas light is white. I wish to show you that the whiteness is a mere matter of judgment.

I throw the shadow, by the electric light, of a thick rod on white paper, and another shadow by gas light, on the same paper, and we at once see that the shadow illuminated by the electric light seems blue, whilst that illuminated by the gas light

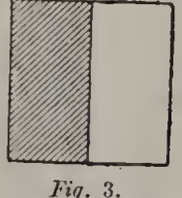


Fig. 3.

appears orange, yet we speak of both gas light and the electric light as white lights. Evidently, if these two differ so much in colour, pigments will take different hues when illuminated by them. Putting paper coloured with red, blue, and green pigments in the shadows, the change in hue is at once apparent. Placing in the shadow illuminated by the electric light a strip of paper coloured orange (fig. 3), by orange chromo and aureolin, we see that now the electric light reflected from it appears of very nearly the same hue as the light from the gas reflected from white paper. Gas light, we may say then, is orange rather than white, if we take the electric light as the standard.

We have seen that colours appear of different hue in the electric light to that which they appear in gas light, and I wish to enforce this more strongly upon you by an experiment which I introduced a year ago. In front of the condenser of the electric light lamp I place a circular aperture some inch in diameter, and by means of a lens throw an image of it on a white screen. We may suppose this to represent the sun, the colour of the light being very much the same as that which it has in England about midday in the middle of May. In front of the aperture I place a trough containing a solution of hyposulphite of soda, and then drop into it dilute hydrochloric acid, and stirring up the two together very fine particles of sulphur slowly separate, and the white light, owing to the law of scattering by small particles, loses some of its components, and we have a gradual reddening of the sun—first yellow, than orange, and finally a red—the series forming a very exact representation of the colours of a setting sun. If we place coloured pigments in this changing light, we see how, towards sunset, the blues become darker, whilst the red change but little in hue. It may have been remarked that in an evening the last colours in a picture to disappear are the reds. The colour of sunset light now imitated before you gives a clue to the reason of this.

We may as well trace the cause of this change in colour. Placing a cell containing hyposulphite of soda in front of the slit of the spectroscope, and throwing the spectrum on the screen, and then adding the dilute hydrochloric acid, we find that as the light from the reflected beam (which we throw just above the spectrum) becomes yellow, orange, and then red, so the spectrum loses the violet, then the blue, then the green, till finally the red alone remain.

Let me further exemplify that you cannot know what effect the colour of the light has upon a colour unless you know its composition.

The slit S_2 in the card D (fig. 1) can be passed through the spectrum, and as it cuts off all the colours of the spectrum, except that passing through the slit, we have different coloured square patches of light thrown by—what I will now call our patch-forming apparatus—the colour of the patch being that of the colour issuing through the slit.

Now sodium, when ignited, gives a peculiar yellow light, due to a line in the orange. If I send the light from this sodium line through the slit S_2, we have a square patch of sodium light on the screen. The rod casts a shadow as before, but instead of casting a second shadow by the reflected beam, I cast a shadow from gas light, when it will be seen that the two illuminated shadows have almost the same colour.

I now shall perform a common Christmas experiment, and ignite some spirits of wine in which salt has been dissolved, and illuminate with that light cards on which various blue, red, green, and yellow pigments have been placed, and we see that all the pigments partake of various shades of orange, instead of the colours seen by gas light. The reason of this is apparent ; in gas light we have all rays present, in the sodium light there is only orange present. We shall see that as the colour of a blue pigment depends principally on the reflection of blue rays, that of a green of the green rays, and so on, it is only to be expected that the colours of pigments, when illuminated by pure orange light alone, will only give different shades of orange.

This shows also that light or colour may to the eye appear to be the same, and yet be very different in optical composition. I cast two shadows of the rod in the patch-forming apparatus, one by the recombined spectrum and the other by the reflected beam, and pass the card D, with the slit, S_2, in it along the spectrum. One shadow will be illuminated by the white light, and the other by the light from the parts of the spectrum coming through the slit, S_2. If I place emerald green in the shadow illuminated by white light, I find that there is one point in the green of the spectrum which matches it in hue, and I can make them of the same depth of colour by the introduction of the rotating sectors. Evidently, then, the coloured light of this part of the spectrum and that of the emerald green might be mistaken for one another, and so with

other colours. There are some pigments, however, which cannot be matched by the spectrum colours.

That emerald green is a combination of colours I will at once show you. A strip of card is placed in the spectrum, on one-half of which is this pigment. Half of the breadth of the spectrum falls on the white card and half on the pigmented card.

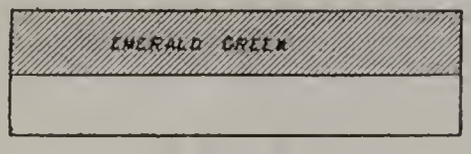


Fig. 4.

It will be seen that the emerald green reflects other colours of the spectrum besides that which it matched in the colour patch-forming apparatus. The combination of all these other colours in the proportions reflected from the pigment, form the colour which, in the simple colour of the spectrum, we should call emerald green. So if we pass other pigments through the spectrum we get similar results, though not all pigments can be so matched.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

FIFTEENTH ARTICLE.

BY W. M. ASHMAN.

As some degree of proficiency is attained in the treatment of such subjects as those we have been considering, attention may now be given to others requiring the assistance of some form of the rapidly working shutters referred to in the last chapter. The class of object to which so-called instantaneous photography is applicable is to be met with on every hand ; but it more often leads to the production of some doubtful curiosity in the way of a picture than of any really artistic effect. Such photographs, for instance, as those of a train in motion, a balloon ascending, and many others somewhat similar, are of only very fugitive interest ; whereas studies of cattle grazing, birds in flight, waves breaking, masses of clouds, yachts sailing, or even some street scenes have an element of poetry about them, suggestive of art rather than of mechanical trickery. The chief point to be noted in this sort of work is, of course, the capability for rapid action on the part of lens, plate, and shutter. With regard to the former, a rapid rectiliucar lens is generally employed, one working with as large an aperture as possible beiug preferred ; but recent improvements have placed in our hands a valuable instrument in the form of a single landscape combination, which answers admirably, as it admits much more light than the old form, and is suitable for such pictures as those taken close to, or on, the sea. Only in the matter of straight lines does it fail to be of service ; so, when architecture is included in the view, especially near the margins of the plate, such a lens is scarcely admissible. Great assistance is afforded by the arrangement of a second small simple lens—a bi-convex of short focus—and miniature ground glass screen, by means of which focussing can be effected in an instant while the plate is in position, and the right direction given to the camera just before exposing (see also description of view finder, fifth article, page 468). As to the plate, there are plenty of commercial articles suited to the purpose, only the beginner must remember that the quicker the plate the more care is required in development and protecting it from influence of extraneous light. The shutter to be used is a matter of consideration, but it should be stated that some of the best instantaneous effects have been obtained with very simple contrivances; and unless, in addition to quick plates and lenses, and the most perfect and costly mechanical arrangements for exposing, there is a fair amount of judgment, and ability to benefit by experience, no great success will be achieved. It very often happens that the amateur's best work is done by means of some shutter of his own make, even after a trial of those he can purchase. The first thing is to avoid any shaking or jarring of the camera, especially in the act of releasing the catch or trigger that allows the exposure to be made. Then the next desideratum is to provide for altering the duration of the exposure ; this is done either by altering the strength of the spring, or by varying the size of the opening which passes in front of the aperture. There are other methods, such as friction, or varying the size of an opening for the admission of air, or mechanical contrivances requiring clock work ; but such complications are of doubtful value. The next important point is to allow as much as possible of the lens opening to be exposed during the fraction of a second. When two discs or slides pass each other in opposite directions, the lens is uncovered from the centre and closed from the sides, therefore the lighting is unequal. When a circular hole the size of the lens passes downward in front of it, the whole of the lens is really altogether uncovered but a small fraction of the time ; but by making the opening in slide a long oval, or, better still, an adjustable elongated slot (as in fig. 20), this failing is nearly rectified, though the speed must be therefore increased. Such a shaped aperture in a brass plate passed through the centre of the lens mount would give a fairly even illumination, and being smaller in width and length than if working in front of the lens, it would go proportionately quicker.

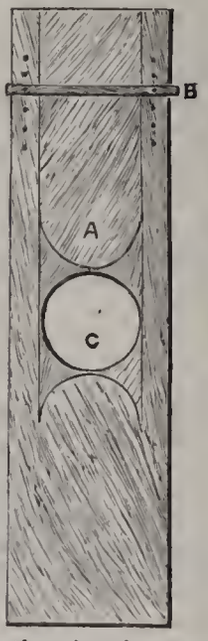


Fig. 20.

A. Opaque slide working in grooves for altering size of opening.

B. Punctured stop plate for securing position at fixed distances.

C. Lens aperture.

Shutters may be roughly divided into two classes—those which give an approximately even light over the plate, and those which give a much shorter exposure to the bottom or sky end of the plate, than to the top or foreground side. Of one of the latter class mention was made in the previous chapter, which, if used by hand, has often proved invaluable for views. Guerry's shutter is one of the most perfect as a type of the first class, and can be modified to effect the object of the second. It is supplied commercially with single and double flaps.

The double flap principle was first introduced in 1881 by R. Offord, who demonstrated its advantages at one of the Thursday evening meetings then held at Ashley's Hotel. The action was electrical, as were several other forms of shutter devised and exhibited by that gentleman about the period named, some of which have since become very much in favour. There are several shutters of the diaphragmatic type which work with great celerity—too quickly, indeed, for anything but the quickest of plates and lenses. The action is that of a plunger to and fro, in the shape of a thin plate that rises from the diaphragm slot, and enters again to close the lens. If placed behind the stop, and set to move with only moderate speed, this arrangement

suits some views by giving a somewhat shorter exposure to the sky. By a careful consideration of these general principles, it is not difficult to select a shutter, or even to contrive one, that will suit the picture in hand. Let us suppose we are looking at a slope of meadow land, backed by hedge-rows and trees, with rising ground beyond; that on one side is some picturesque object in the way of a cottage, or other building, half hidden in foliage, and that somewhat nearer to us on the other side is a fine group of trees; that all this is secondary to the chief point of interest in the centre of the field, a group of cattle, some standing, some grazing, and some reclining, all posed in that perfect way which only nature can arrange; the whole bathed in summer sunshine, and presenting to the artistically trained eye a complete picture of peaceful beauty, worth any effort to pourtray by means of photography. Let us further suppose that the sun is in the best position for our purpose, on the extreme right or left of the camera, and that the wind is scarcely moving the lightest leaves among the foliage: then with our single landscape lens, our camera level, and the rising front adjusted to bring the chief objects fairly into the lower part of view, with such a stop in as will give us sharpness on either side and in the centre, back to the middle distance, neglecting the background for fear we should have no impression of distance in our picture; with a moderately quick plate, and a shutter of the type that gives much less exposure to the sky than to the foreground, we may expect to succeed in obtaining a good negative. It does not take much knowledge of photography to enable any one to see the effect in many pictures produced by the use of a lens of too wide an angle or too short a focus. The perspective is often sadly defective, natural objects being dwarfed or exaggerated according to the distance from lens, until one hardly recognises some familiar view. But, in the above case, we shall be quite right in this respect with either lens mentioned, so long as the focus is no less than eight inches, though twelve would be better. If the light be not very strong, an instantaneous picture with much foliage is very difficult, unless in early summer, when the greens are pale and bright. Yet, if the animals in this instance were passing across the field the speed of the shutter would have to be increased, and the detail of the shadow would, consequently, be endangered. As a rule, it is inadvisable to select a point of view which includes much, if any, foliage, when moving objects are being taken, and the use of the largest possible stop is made peremptory.

Such a subject as birds in flight may be classed among the feats performed with the camera. Sea gulls from the edge of a cliff, or from a vessel's shrouds, or from a marine pier or other projection, or even from a bridge side on the Thames, or a few pigeons escaping from the cote, these have been done, but the precautions necessary are hardly within the compass of a beginner. Even though provided with every requisite, including, of course, a finder, and the skill needed to catch the right moment and judge of the probable motions of such erratic creatures, so as to know in which direction to point the instrument, nothing short of an extremely rapid shutter should be employed, and a pneumatic or electric release that can be actuated instantaneously.

Storm waves may often be taken with advantage when the source of light is rather more in front of the camera, though not enough to fog the resulting negative. Certain precautions in the way of a shield for the lens against the influence of extraneous light should be had recourse to, such as a blackened cardboard, or stout paper cone, which fits over the lens and projects some inches; but care must be taken to avoid intruding upon the field of view. The fulfilment of this condition, or the reverse, may readily be seen by a careful scrutiny of the image on the ground glass screen: any portion of the field obstructed would cause either darkness or feebleness of the image at some portion of the margins of the screen. When the shutter is attached to the lens, the cone must be fixed to it, but some forms of shutter are provided with means to screen the aperture from sunlight direct; so simple a thing as an umbrella held over the camera is by no means to be despised when no other arrangement is available. But the chief difficulty in connection with photographing breaking waves arises from the prevalence of an inshore breeze, and as a rule, only the most grand effects can be witnessed when a furious gale is concomitant.

More than ordinary determination is requisite to induce an attempt on such a boisterous subject; still, if a drenching spray is not objected to, and the outer surface of the lens can be kept tolerably free from salt water, then a good result may be achieved which will fully repay one for the inconveniences of such an adventure. But in addition to protecting lens and shutter—if the latter be employed—extra precaution will have to be taken to limit vibration of the camera by the force of the wind to a minimum. Nothing loose—as a focussing head-cloth—should remain, neither should there be any projections which are not absolutely necessary: the shutter of the dark slide, for instance, when pulled out, should be folded back. Suspending a heavy weight, such as a bag of pebbles, from the tripod head, is a plan frequently resorted to as a means of enhancing stability, but wherever possible it will be found advantageous to rely on a still more solid base, like that conferred by the edge of a projecting rock, the masonry of a breakwater, or other strong available position whereon to fasten a camera clip, and to this firmly secure the camera.

Some very fine and impressive cloud effects are often seen when the sun is immediately behind the clouds, but observable through them. Here, again, the exposure can scarcely be too brief; indeed, it is difficult to avoid the occurrence of a peculiar phenomenon which is attributed to the reversing action of light. The image on the plate representing the great luminary will appear bright when viewed by transmitted light, but when printed it will be nearly black, the energy of the light having been many times too strong to produce opacity.

This is not preventible with ordinary plates, but judging by the progress now made in orthochromatic photography, there is reason to regard the peculiarity as being avoidable. The remedy, when it appears, is the application of a little water-colour paint, such as burnt sienna, to bring up the opacity of the disc to proper printing density.

Thinness of some skies in landscape subjects which have been exposed with especial regard to the foliage or other dark objects, is attributable to partial reversal of the action of light; hence the desirability of using a shutter for this class of subject capable of curtailing exposure in the manner required.

Notes.

In spite of the Editorial Notice in our issue of last week, as to Mr. John Spiller having taken charge of, and responsibility for, the "Answers to Correspondents" department, several communications relating to the Answers have been forwarded to the Editor; these have, of course, been sent on to Mr. Spiller; but Correspondents will secure more prompt attention by sending direct to Mr. Spiller.

"Why does not the Photographic Society of Great Britain have an annual dinner like other Societies?" has often been asked. At any rate, the out-going council has resolved to organise a dinner—the first of a series of annual dinners—and the announcement of this resolve was received with cheers at the meeting on Tuesday last.

The first dinner is to be carried out in conjunction with the Solar Club dinner of February 11th next, at the Café Royal, Regent Street, and those members of the Photographic Society who wish to attend should send in their names to Mr. W. England, Chancellor of the Solar Club, 7, St. James's Square, Notting Hill

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Members of the Solar Club and members of the Photographic Society of Great Britain will be allowed to introduce visitors; and although ladies are not allowed at the ordinary meetings of the Solar Club, they may be present at the joint dinner, as there are several lady members of the Photographic Society.

Amateur photographers in Paris are probably not so nnmerous as in London, even when the difference in the populations of the two cities is taken into account. Certainly the photographic societies are far less numerous. The amateurs, however, have made a start in a social direction which, perhaps, will prove more to their taste than grave scientific discussions. They have established a club, and have installed it in sumptuous quarters at No. 40, Rue des Mathurins. It is called the "Photo. Club."

The rage which has sprung up for enumerating the more or less notable "Society" people who attend at "first nights" or "private views"—more prominence being given in many cases to the visitors than the entertainment visited—suggests the question, how does the unfortunate critic find out all the celebrities? Most people are, of course, photographed, and many photographs of persons quite unknown to the outside world, but possibly the centre of some select circle, find their way to the shop windows. Can we suppose that the modern critic is a collector of photographs, and never goes to the theatre or picture gallery without being provided with what we may call an "identity" album? If he does not, then we respectfully put forward the suggestion as a direct necessity for the criticism of to-day.

The following advertisement has an air of novelty about it:—"For sale, an order, value, 30s., on ——, photographers, for £1." What is the meaning of it? Have portrait club customers come to handing about their rights to be photographed as a species of currency? We do not know, of course, on what plan the club system in question is conducted, but supposing a specific name is mentioned in the first instance, is the photographer bound to photograph anybody else on the same order? If the order says definitely "Mr. Smith," cannot the photographer object to photograph Mr. Jones who presents himself with the order? We fancy that under some circumstances a difficulty might arise.

With reference to London portrait clubs, it may be said that there are only two classes of club canvassers who can make a steady living out of what is generally regarded as the refuge for the destitute: one class consists of those who have a connection among the girls employed in the numerous work rooms in the City, and the other who confine their efforts chiefly to the young ladies of the "buffets." The canvasser who works among the public houses has an advantage over the one who tackles the work-room. The young lady who condescends to serve you with refreshment has more liberty and more new dresses than the work girl, and it is much less trouble for her to be photographed, because she has certain times in the day when she is "off duty." There are also her admirers to be considered, and in this direction alone quite a small demand for photographs may spring up; so that she may belong to two or three clubs if she pleases. Under these circumstances the canvasser does pretty well.

It might be truly said that competition, like necessity, knows no law. What competition led the rival bankers to do is well known; and it would seem that in certain of what may be called the more enterprising parts of America, a similar irresistible force is driving rival photographers into an even more ill-advised struggle for public patronage. Space would fail us were we to attempt to chronicle all the steps in this protracted trade duel, and to detail how Photographer A having commenced by providing a free lunch for his sitters whilst waiting their turn, Photographer B retaliated by associating his free lunch with a specially engaged brass band to play to his patrons during the meal; a move to which A responded by engaging a still brassier brass band, supplemented by the performance of an eminent parlour wizard between the courses of the *menu*. Leaving out the numerous intermediate moves in this sensational game of "commerce," we will come at once to the existing state of affairs when our Yankee contemporary's special telegram, from which we have derived our details, left Poughskeepieville. At that time, it seems, the citizen who entrusted Mr. A with the eagerly-sought favour of taking his portrait, was not only free-lunched, and played to, and performed-at, and attired, free of charge, in any fancy dress he might select, but the taking of a successful negative was announced to his expectant fellow-citizens by the discharge of "salvoes of artillery,"—salvoes, as old Polonius would say, is a good word!—and the ringing of the bells at the Methodist Episcopal Church." And for a short time, it seems, victory appeared to rest with this masterful photographer. But only for a time, for at the end of the telegraphic despatch we have referred to, under the heading "Poughskeepieville—Later," came this important supplementary "wire."

"As I write, Photographer B is sending round the city crier to announce that in addition to all previous advantages promised, every citizen honouring him with his or her patronage will be conducted in a Roman chariot to and from the studio by a mounted escort of "Polish Lancers," and, in the event of successful negatives resulting, will be serenaded the same evening at any address within the city limits. N.B.—Parties ordering two-dozen likenesses or upwards will in addition be entitled to a first-class pyrotechnical display, concluding with a flight of not less than fifty rockets."

We fittingly conclude our account with this brief but pregnant extract from the American journal already quoted: "We stop the Press to state that, according to a despatch just received from our Poughskeepieville correspondent, A and B of that city have both hurriedly closed their establishments, and gone further west. The sheriff's officers are upon their track." It is hardly necessary for us to state how much reliance can be placed in the correctness of the above details. As a satire on the growing tendency to engage in ruinous rivalry, from which even photographers seemingly are not exempt, it is, however, sufficiently amusing, and—may we add?—instructive to merit its publication.

The efforts of a financial contemporary in regard to the Photographic and Electric Supply Company to which we alluded last week have been rewarded. The story is interesting, and not without a humorous side. The promoter has made a clean breast of the affair, and it now appears that the prospectuses which were sent to all the provincial chemists and druggists in the provinces met with a very meagre reponse; so meagre, indeed, that it is probably unique. Only two druggists were sanguine enough to place faith in the proposed Company, and in the usual way sent their application money to the bank which had its name on the prospectus. In the meantime the promotor had come to the conclusion that the Company would not float, and so he dropped the affair, not thinking it worth while to enquire at the bank whether any applications had been received. Of course, when the Company was dropped, the office was dropped also, and naturally the letters of the two would-be shareholders were returned through the Dead Letter Office. Now that an explanation has been furnished no doubt the bank will return the money to the owners, whose anxieties will be thus relieved. The history of the Photographic and Electric Supply Company is not encouraging to those who may have it in their minds to start other photographic companies.

It is worthy of note that one of the funniest of French farces, "Tricochet et Cacolet," which has just renewed its popularity at the New Royalty, owes all its fun to a photograph. A financier's wife disappears in company with a duke. The financier immediately puts the firm of Tricochet and Cacolet, private detectives, on the lady's track, and takes a photograph so that Tricochet may identify her. Tricochet and Cacolet work in rivalry, and a good deal of fun arises out of the way in which one tries to deceive the other. Eventually the original of the photograph is found, and taken in triumph to the financier, who discovers that she is not his wife, but a ballet dancer of his acquaintance whose photograph he had given in mistake for that of his wife. But as his only motive for seeking the latter was that she might be useful to him to obtain the consent of a certain Turkish Pacha to a financial concession, the ballet dancer answers the purpose quite as well, or perhaps better, and the blunder of the photograph turns out happily.

A tracing paper which does not become yellow with age has long been a thing needed by those who make tracings for photo-mechanical reproduction, and just a year ago we received from a Continental correspondent a sample of very thin and uniform tracing paper, which he stated to have stood the test of time against twenty other samples We set a portion of his sample in a window, and another portion was kept in the dark, with the result that we can find no sign of change in either.

The paper in question is sold as "Alkaline Tracing Paper," by Messrs. Hudson and Kearns, of 83, Southwark Street, and in reply to our question whether they still supply the paper in question, they sent us a specimen roll, 56 inches wide, and this appears to be precisely similar to the sample sent by our correspondent.

The paper in question does not, like ordinary tracing paper, contain resinous or fatty matter, and it takes gelatine emulsion excellently. Indeed, it seems likely to form a good basis for paper negatives.

PHOSPHORESCENCE AND PHOTOGRAPHY.

BY D. WINSTANLEY.

IT seems to me a pity that a whole evening of the Photographic Society of Great Britain should be occupied, as was the case recently with the discussion of a matter so simple as the question whether certain markings accidentally obtained on certain negatives were or were not the result of phosphorescence. Had the proprietor of the negatives, when he found the markings on them, and fancied they were the consequences of phosphorescence, exposed a few other plates—say, three—to some object strongly black and white for varied periods of time, each substantially more considerable than his faulty negative had received, and then placed these plates in a box, with an unexposed plate upon one side of each of them, and a blackened cardboard on the other, it is probable that, on the development of the series, he would have obtained conclusive evidence as to the value, or otherwise, of the surmises he had formed.

The phenomena of phosphorescence are highly interesting in any of their forms. It is a common superstition that diamonds shine with an inherent light, and are "visible in the dark," a superstition probably arising from the fact that some of them certainly do so shine, as, for instance, the one mentioned by Benvenuto Celini in his work on jewelry, which diamond was discovered in a vineyard near Naples by the light it emitted at night. The phenomenon of phosphorescence, far from being rare, is, in fact, extremely common, though most substances exhibit it only for very brief periods of time, or with much feebleness.

Some substances are phosphorescent after "insolation," that is, after exposure to the light, which seemingly they absorb and again gradually exhale. Conspicuous amongst these are the sulphides of the alkaline earths (prepared in a particular way); and inconspicuous amongst them, the radiated sulphate of baryta, sundry natural fluorides, rock salt, amber, and quartz, which become luminous for brief periods after exposure to the sun.

Some substances become phosphorescent after being heated to a certain temperature, as fluor spar, lime, and ordinary sulphuret of calcium. Fluor spar, when thrown in boiling water, becomes self-luminous, and a certain green variety of it—chlorophane—exhibits this phenomenon at temperatures as low as 70° on Fahrenheit's scale, and this luminosity may be rendered evident by the heat of the hand.

Some bodies are rendered self-luminous by cleavage, such as mica, boracic acid, vanadic acid, lump sugar, and nitrate of uranium. Chloride of calcium, when rubbed upon the sleeve, glows with a greenish light. Certain varieties of blend (Zn S) become self-luminous by percussion. Sulphur also becomes phosphorescent when rubbed in the dark. The friction of mercury in the "vacuum" of a barometer renders it self-luminous. Chlorate of potash, fluor spar, &c., when ground in a mortar, exhibit phosphorescent radiations. Vivid sparks are produced when water is frozen rapidly. The crystallization of arsenious acid is accompanied by luminescence. The phosphorescence of phosphorus is another matter, and results from slow combustion. Metallic potassium is phosphorescent in a similar way, as is also metallic sodium. Many of the gases are rendered luminous by the passage of electricity, and meteorites frequently leave a luminous train behind them in the sky, a train which often remains visible for some minutes, and occasionally for some hours, after the meteor itself has disappeared, and which is wafted away in varying forms upon the bosom of the air. Rain is sometimes phosphorescent; the branches of a tree have been seen to glow with a bluish light during a heavy snowfall, and hail-stones have been noticed emitting light at the moment of their impact with metallic surfaces. Waterspouts are sometimes luminous when they occur at night. During the eruption of Vesuvius in 1794, the fine dust which fell in Naples and its environs was self-luminous, and sensibly lighted up the sails of boats on which it dropped. Humboldt was of opinion that the earth itself is sometimes phosphorescent. Whole nights have occurred when, in the absence of the moon, it was easy to read small print, and it has long been a favourite idea of my own that the "old moon in the new moon's arms" partially owes its visibility to the phenomenon of phosphorescence after insolation. Humboldt also thought the aurora to be a result of terrestrial phosphorescence. I attribute it to another cause myself, but I certainly do not regard it as an electrical phenomenon, and I think the decrepitations which are heard in polar regions when it is visible (and when it is not) are merely the crackling of the ice. The penumbra of Venus certainly shines by phosphorescence, for "earth shine" can have nothing to do with that. Whitewashed cottages, when newly done, are luminous by insolation. Fogs are now and then self-luminous at night, and the phosphorescence of the sea, of crypto-gamic plants, of fishes, of various insects, and of decomposing organic matter, is too well-known to need more than mentioning.

"Invisible phosphorescence"—or "radiescence," as I apprehend it would be better called—is what is of more interest to photographers. Niepce discovered that if an engraving is exposed to sunshine, and then left in contact with chloride of silver paper, it will produce its impression in the dark by the radiescence of the paper, and I have myself traced the discolouration of silvered paper in some instances to this cause. Tartaric acid, uranium nitrate, porcelain, marble, wood, and linen also possess this property, whilst other substances, such as ferro-cyanide of iron, platinum bichloride, and sodium carbonate, seem to have the opposite power of preventing by invisible radiations the "spontaneous discolouration" of the paper, and uranium nitrate seems to have the very remarkable property, after insolation, of first discolouring silvered paper, and then bleaching it again, a circumstance which suggests that in its earlier stages the colouration of argentic chloride is a physical and not a chemical phenomenon, and that the latent image is a physical image when all is said and done.

There is little or nothing new in all I have stated here, but the facts are all of them of a very interesting kind, and, seemingly, not so well known as it is desirable they should be. Had Mr. Berry, of Aberdare, to whose marked negatives I have alluded, demonstrated that their markings were due to radiescence, and had he further traced out the particular body—the gelatine, the glass, or the argentic bromide—which emitted the radiant energy, he might have made a distinct contribution to existing knowledge, and would certainly have occupied the Society's time better than by setting its members to guess at the cause which had produced his markings.

I cordially agree with Dr. Norris, the president of the Birmingham Society, that the meetings of our photographic bodies should be made "a wee bit more scientific" than they are.

PROGRESS IN PHOTOGRAPHY IN 1888.

BY C. H. BOTHAMLEY, F.I.C, F.C.S.

IT is a matter of regret and of some surprise that notwithstanding the number of those now engaged in the pursuit of photography, and the amount of time which is devoted to it, so little advance is made in the improvement of processes, and especially in our knowledge of the fundamental reactions on which our processes depend. Time after time statements are made on evidence which is altogether insufficient to establish the truth of them, and statements which are directly contradictory are far too common in photographic literature. Questions of matters of fact, capable of demonstration or disproof by careful and properly made experiments, are frequently treated as if they were merely matters of opinion, about which everyone was entitled to make whatsoever speculations he pleased.

The explanation is not very far to seek, and possibly a useful purpose may be served if attention is drawn to the matter by one who at any rate has the interests of photography at heart. It is very rarely that a man is born with the faculty of making accurate experiments which shall constitute satisfactory proof of the existence of a given set of phenomena, or serve to establish their proper sequence and explain their relations to one another. Equally rare, if not indeed rarer, is an innate faculty of drawing correct conclusions from experimental data, of distinguishing between that which is actually established and that which is only rendered probable or possible. In most cases both these faculties—or, in a word, the scientific method—must be acquired by systematic and somewhat severe training, and it is beyond denial that many of those who make photographic experiments have had no such training. It follows as a natural consequence that a large proportion of the experiments which are described have very little value. In some cases they are incomplete, and the fundamental points are not attacked at all; in others, the sources of error have not been sufficiently considered and eliminated; in others, the conditions of the experiments have not been sufficiently exclusive, and the results may be ascribed to two or three different causes with equal probability. In many instances, too, the observations have not been repeated a sufficient number of times to establish the concordance of the results. Very frequently the conditions of the experiment, the manner of carrying it out, and the observations made, are insufficiently described. In reporting experiments for scientific purposes, it is essential to describe minutely and accurately all the conditions of the experiment, the means adopted to eliminate possible errors, the precautions taken to insure the purity of the reagents used, and the precise nature and sequence of the phenomena observed. Only when this is done can a reader form any adequate opinion as to the trustworthiness of the results obtained. A mere statement of conclusions, without the experimental evidence on which the conclusions are based, is of very little scientific value. Moreover, it is also essential to keep the description of the experiments and the results—*i.e.*, the facts—quite distinct from the conclusions which are drawn from them. An accurate record of facts always retains its value, whereas further investigation may show that the conclusions are untenable. Further, it is important to distinguish conclusions which are necessary deductions from the facts, assuming the latter to be established, and the theories or hypotheses

which are framed in order to explain the conclusions. In other words, a clearer distinction is required between what is known and what is merely supposed than is commonly met with in writings on photographic questions.

When it comes to be a question of the explanation of fundamental re-actions, a minute knowledge of many parts of chemistry and physics is indispensable, but it is perfectly obvious that many photographic experimenters do not possess it. Fortunately, however, in many lines of photographic research, practical experience, *provided that it is combined with the scientific method*, is sufficient, and we owe many invaluable processes and improvements to investigators who would be the last to claim possession of minute chemical and physical knowledge. On the other hand it would not be difficult to quote instances of decided and definite expression of opinion on difficult and complicated problems from those who would find it difficult to show any evidence of their competence to form a correct judgment upon the points in question.

Progress must necessarily be slow until a better knowledge of the art of experiment, and clearer conceptions of the essentials of the scientific method, become more widely diffused amongst those who have the time and the desire for photographic research. Guess-work is worse than useless, and mere speculation is of no value unless its leads to accurate and unbiassed experiment along definite lines. It is well for the future of photography that the evil of the existing state of things is beginning to be more widely recognised. "Unfortunately the bane of photography is that so many inexact experiments and inexact observations have been made, and the results put forward as if they were scientific facts. * * * * I do not think there is any science which has had so much of this kind of thing as photography. In other sciences only those who are trained scientific observers put forward fresh statements as facts, but in photography it is not so." *

Another thing much to be deplored is the want of acquaintance with facts already established, or observations already made, shown by some of those who enter upon the discussion of photographic problems, or even proceed to make experiments which they publish as new. In other branches of science it is fully recognised that the first duty of anyone who proposes to investigate a particular problem is to make himself acquainted with all the work that has been done in the same direction by previous experimenters, and that when he records an observation or experiment which agrees with or confirms a result obtained by an earlier investigator, he should draw attention to the fact, and give due credit to the original observer. In a word, it is required that nothing shall be published as new which has already been published by some other worker. In photography, on the other hand, it is not unusual to find men taking part in the discussion of difficult problems, and even going so far as to write papers, when they are obviously, from their own statements, not even acquainted with the facts recorded in standard text-books, to say nothing of periodical literature. How very rarely do we find in a paper on a photographic subject any references to the papers or results of previous workers on the same ground! To put the matter plainly, it cannot be denied that there are photographic experimenters who show a want of acquaintance with or disregard of photographic literature and of the work of previous investigators, which would not be tolerated for a moment in any other branch of science.

Anyone at all acquainted with the contents of photographic journals can call to mind not a few instances of the re-invention of a re-invention, the old device being brought out each time as if it were absolutely new. For example, the method of determining the speed of an exposure shutter by means of a tuning fork was published by Abney in 1882,† and since that time the method has been re-invented several times, with some alterations in the details of manipulation, it is true, but with no essential modification of the principle; and yet, as far as the writer is aware, none of the later papers even mentions the fact that the principle had previously been utilised by Abney for the same purpose. The monochromatic (sodium flame) lamp recently described by Gaedicke,* was described in all essential particulars by Stein in 1877,† and was described with an illustration in Eder's "Handbuch" in 1883, where also it is pointed out that the light from a Bunsen flame itself will produce an appreciable effect on a gelatino-bromide plate. The only point in any way novel in Gaedicke's arrangement is the yellow glass chimney surrounding the flame, which is a very obvious addition. Recently Ives has described a process of heliochromy,‡ of which he says, "I claimed for this process that unlike any similar process yet suggested, it was based upon a true conception of the nature of light and colour vision, and was a strictly scientific method of accomplishing the object sought after." Now as a matter of fact a strictly scientific process of the same character was described by Vogel in 1885.§ Moreover, Vogel's process does not differ very greatly from the later process of Ives.

Many of the inventions and improvements made during the past year have been described in detail in the columns of the PHOTOGRAPHIC NEWS; but a concise summary of the chief advances—a sort of condensed "Jahresbericht," in fact—may not be without interest and usefulness. So much of the matter which appears in photographic journals is merely a re-statement of known facts, that it seems desirable to make a selection of the chief facts and deductions which have really added something new to our knowledge of the principles and art of photography. It is obvious that many minor points must be passed over for want of space. The object of this article is, in fact, to direct attention to the chief papers in which the new matter is to be found, rather than to attempt a series of abstracts of the contents of the papers. In cases where the papers have appeared *in extenso* in the NEWS, a reference will be given only to the pages where they can be found; in other cases reference will be made to the original sources.

Little or no advance has been made in the determination of the nature of the latent image. There has been a considerable amount of speculation, but no further experimental evidence of a trustworthy character has been forthcoming. Vague suggestions have been made that the production of the latent image is in some way due to the action of electricity. It is desirable, therefore, to point out that the development of electricity simply indicates the liberation of a certain amount of energy, and that in all cases where the connection between the formation of a photographic image and the production of electricity has been investigated—as in the experiments of Becquerel, Minchin, and, quite recently, Moser—the production of the electrical current was subsequent to, and a result of, the formation of the image, and not *vice versa*. The observations recorded by Friese Greene (p. 709) are of great interest, but require confirmation and systematic investigation before they can form the basis of any useful deductions.

(*To be continued.*)

* W. E. Debenham. *Journal Photographic Society* xiii. 27.
† Cantor Lectures on "Recent Advances in Photography."

* PHOTOGRAPHIC NEWS, p. 433. † *Das Licht*, p. 98.
‡ *Journal of the Photographic Society*, xii., p. 154. PHOTOGRAPHIC NEWS, 1888; pp. 789 and 802.
§ *Annalen der Physik N.S.*, xxvii., p. 130. PHOTOGRAPHIC NEWS, 1887; p. 568. *Philadelphia Photographer*, 1887, p. 631.

Patent Intelligence.

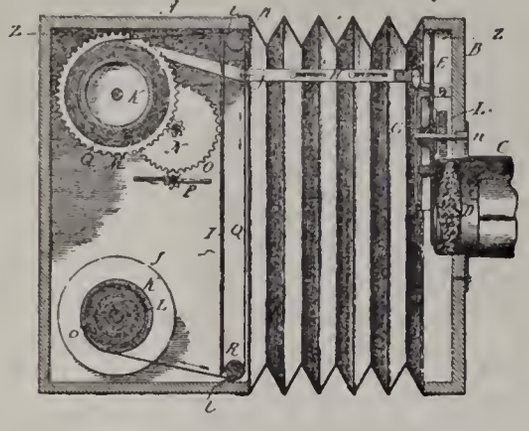
Patented in America.

394,221. MATHEW J. STEFFENS, Chicago, Ill., for "Photographic Apparatus."—Filed June 4th, 1887. Serial No. 240,313. (No model.)

Claim.—1. The cylinder K, having the flange M and pin *k*,

with the stop-lever H, and means for operating the same, substantially as described.

2. The combination of the disc E, having the pin *d* and stop *a*, with the dog T, magnet S, and spring U, substantially as specified.



3. The combination of the disc E, having the pin *d*, with the pivoted bar *h* and projection *g*, connection or link *i*, and lever H, substantially as described.

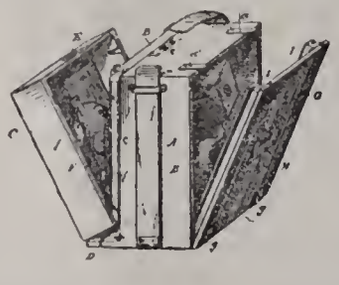
4. The combination of the paper-cylinders K, rollers R, lever H, link or connection *i*, bar *h*, and projection *g*, with the disc E, having the pin *d*, pawl T, and magnet S, substantially as specified.

394,353. WILLIAM C. GIBBS, Oakland, Cal., assignor of one-half to George W. Dorun, same place, for "Photographic Camera."—Filed April 18th, 1888. Serial No. 271,084. (No model.)

Claim.—1. In a photographic camera, a plate forming one end cover of the camera frame and hinged thereto, and adapted to be dropped down to expose the camera end, and turned under the camera frame to form a bed or support therefor, substantially as described.

2. In a photographic camera, a plate forming one end cover of the camera frame, in combination with a strip hinged to the base of the camera frame, and hinged also to the cover plate, whereby said plate is adapted to be dropped down to expose the camera end and turned under the camera frame to form a bed or support therefor, substantially as described.

3. In a photographic camera, an inclosing body frame, having an open back, in combination with a plate covering said open back and hinged to the body-frame, whereby said plate is



adapted to be dropped down to expose the camera back and turned under the body frame to form a bed or support therefor, substantially as described.

4. In a photographic camera, an inclosing body frame having an open back, and a strip hinged to the back of the base of said frame, in combination with a plate covering the open back of the body frame and hinged to the strip, whereby said plate is adapted to be dropped down to expose the camera back and turned under the body frame to form a bed or support therefor, substantially as described.

5. In a photographic camera, and in combination with an inclosing body frame having an open back, a plate covering the open back and hinged to the body frame, whereby it is adapted to be dropped down to expose the camera back and turned under the body-frame to form a bed or support therefor, and a fastening for holding the plate steady to and under the body-frame, substantially as described.

6. In a photographic camera, and in combination with an inclosing body frame having an open back, a plate covering the open back and hinged to the body frame, whereby it is adapted to be dropped down to expose the camera back and turned under the body frame to form a bed or support therefor, and the thumbscrew in the plate and socket in the body frame for clamping and holding the plate in place under the body frame, substantially as described.

7. In a photographic camera, and in combination with an inclosing body frame having an open back, a plate covering the open back and hinged to the body-frame, whereby it is adapted to be dropped down to expose the camera back and turned under the body-frame to form a bed or support therefor, a fastening for securing the plate to the body frame, and the tripod-securing plate of the inner or under surface of the hinged back plate, substantially as described.

8. In a photographic camera, an open-ended body frame, in combination with a plate forming one end of the body-frame and hinged thereto, whereby it is adapted to be turned down to expose the camera end and form a focussing platform for its adjustment, and a plate forming the other end of the body frame and hinged thereto, whereby it is adapted to be dropped down to expose that end of the camera, and turned under the body-frame to form a bed or support therefor and for the other end plate, substantially as described.

9. In a photographic camera, an open-ended body frame, in combination with a plate forming the front of the body frame and hinged thereto, whereby it is adapted to be turned down to expose the camera front and form a focussing platform for its adjustment, a plate forming the back of the body-frame and hinged thereto, whereby it is adapted to be dropped down to expose the camera back and turned under the body frame to form a bed or support therefor and for the front plate, and an automatic catch connection between the two plates to hold them firmly together, substantially as described.

10. In a photographic camera, an open-ended body frame, in combination with a plate forming the front of the body frame and hinged thereto, whereby it is adapted to be turned down to expose the camera front and form a focussing-platform for its adjustment, a plate forming the back of the body frame and hinged thereto, whereby it is adapted to be dropped down to expose the camera back and turned under the body-frame to form a bed or support therefor and for the front plate, a fastening for holding the back plate solid under the body frame, and a fastening for holding the two plates together, substantially as described.

11. In a photographic camera, the adjustable support for the finder, consisting of the plate secured to the finder and having opposing shoulders by which its movement is limited, and the arm pivoted to the front board of the camera and to the finder-plate, and having a pin for coming in contact with the shoulders of said finder plate, substantially as described.

12. In a photographic camera, the focussing or adjusting mechanism consisting of the carriage frame on which the camera front is mounted and adapted to slide, the fixed tracks on which the carriage-frame moves, the notches in the tracks and latches on the carriage frame for holding said frame to the position to which it is adjusted, and the pinion shaft on the camera front and racks on the carriage frame for adjusting the camera front on said carriage frame, substantially as described.

394,437. GUSTAVE BAY, Suresnes, near Paris, France, for "Photographing Copying Process."—Filed May 3rd, 1888. Serial No. 272,694. (No specimens). Patented in France, May 19th, 1885, No. 169,013; in Belgium, May 20th, 1886, No. 73,204; and in England, September 8th, 1887, No. 12,168.

Claim.—The method described of obtaining a direct, positive black-line copy on a white ground, said method consisting in exposing a paper sensitized by a solution of gum-arabic, tartaric acid, and iron perchloride to the action of light, said paper being covered by the tracing or drawing to be copied, then developing the copy upon a bath of water saturated with prussiate of potash, then placing it upon a bath consisting of a decoction or infusion of colouring matter, washing, and then dipping in a bath consisting of a neutral salt or salts having an acid action and an alkaline reaction, substantially as described.

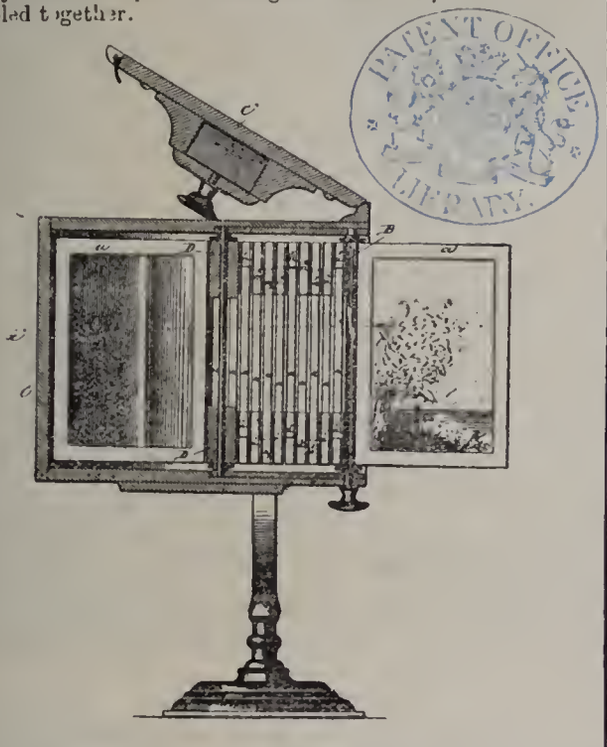
394,498. EDWARD S. MILLER, Chicago, Ill., for "Photograph-Exhibitor."—Filed April 18th, 1888. Serial No. 271,057. (No model).

Claim.—The combination, substantially as hereinbefore set forth, of a set of picture-holders hinged together in endless series and each provided along its back edges with a horizontally-arranged channel and a rotary shaft provided with a polygonal

portion adapted and arranged for engaging in said channels along the back edges of the picture-holders, for the purpose described.

2. The combination, substantially as hereinbefore set forth, with a set of picture-holders hinged together in endless series, of the hinge-joints by which said frames are connected together, consisting of pintle-bearings upon the back edges of the picture-holders and pintles by which inter-locking pintle-bearings of different picture-holders are coupled together.

3. The combination, substantially as hereinbefore set forth, with a set of picture-holders connected together in endless series, of plates held upon the back edges of the picture-holders, and provided with flanged portions bent to form pintle-bearings, and pintles by which the pintle-bearings on different picture-holders are coupled together.



4. The combination, substantially as hereinbefore set forth, with a set of picture-holders connected together in endless series, of plates secured to the back edges of the picture-holders, and bent to provide channels having pintle bearings at opposite sides of the channels, the pintle-bearings of the several picture-holders being connected together by pintles for the purpose described.

5. The combination, substantially as hereinbefore set forth, with the endless series of hinge-connected picture-holders, of the plates a^2 and a^3, respectively attached to the back edges of alternate picture-holders, and provided with pintle-bearings a^4 and a^5, arranged to alternate in position along the series of picture-holders, substantially in the manner and for the purpose set forth.

Correspondence.

PHOTOGRAPHERS' DEFENCE ASSOCIATION.

SIR,—It appears to me that photographers would be exceedingly ill advised to accede to the request made by Mr. J. Hubert in your last issue, that they should subscribe for the expense of an appeal in the recently decided case of Pollard *versus* the Photographic Company. Had such a course been proposed in the case of Marson and Barns, in which a County Court judge decreed that the negatives taken by the photographer had to be given up to the customer ordering the photographs—a proceeding at variance with the practice and understanding well settled in the profession, at variance also, I believe, with decisions that have been pronounced by other courts—there would have been much to say in its favour. In the present instance, however, the contention on behalf of the defendant was that a photographer is at liberty without the consent of the sitter, to make what use he pleased of a portrait negative of a lady customer. The case was fully gone into by an able judge, who, after postponing judgment for further consideration, decided that the photographer has no such right. I suppose that photographers, for the most part, will willingly admit that they do not desire to assert such a claim as that put forward; indeed, Mr. Hubert himself, in another part of his letter, says, "No respectable photographer would part with any copies other than to the sitter or relatives, or with the former's permission." Rather a severe comment upon the proceedings of his friend, for whose cause he now asks subscriptions. "Thrice armed is he who has his quarrel just." If photographers do band together to have some test case reheard, let it be one which vindicates a principle of which they can approve.

The customary proceeding and understanding amongst photographers with regard to possession and use of the negatives of private sitters is one which has the sanction of many years, and will, I believe, be found to be in accordance with common sense, and for the most part with such judicial decisions as have been given in the courts of law. It may be briefly stated as follows, of course supposing that no special arrangement has been made.

The negative is the property of the photographer, who has, however, no such copyright in the work as to prevent the sitter from having any kind of copy made from the prints with which he may have been supplied.

The use of the negative is joint. The sitter cannot, of course, print from it without the photographer's consent, and the photographer has no right to do so without the sitter's consent.

The case put by Mr. Hubert, that it will be necessary to obtain the consent of each individual in a group before supplying copies, is, I think, a little fanciful. The photographer, in the absence of notice to the contrary, would probably be held justified in supplying copies to any member of the group; at all events, the person who originally ordered and paid for the copies would be presumed to be entitled to order further copies.

The case of portraits printed as specimens merely, is a little different. There are many, probably most people, who do not object to such use being made of their portraits, but who yet would not give any written consent to it. They would fancy that the doing so would make them appear vain of their personal appearance. Moreover, whilst they have given no consent, they are at liberty, at any time, to request the removal of the specimen. Here, again, custom has established a common-sense proceeding, at all events, amongst the right-feeling. If any objection is made to the use of a portrait as a specimen, such objection is at once met by the withdrawal of the picture.

If it could be supposed—which appears to me exceedingly improbable—that the ruling of Mr. Justice North can be disturbed, and the contention of the defendant that a photographer is at liberty to make what use he pleases of his customer's portrait were to be established, there would, in all probability, arise such an outcry from the public, that legislation injuriously affecting the photographer's rights might be speedily looked for. In this view, the success of an appeal in the case of Pollard *v.* The Photographic Company would be the worst misfortune that could happen to photographers.

W. E. DEBENHAM.

SIR,—When I made a suggestion a few weeks back on the subject of a "Photographers' Defence Association," I did not suppose the idea would be taken up in the defence of such a cause. I do not think that Mr. Hubert has chosen a judicious course in his proposal.

It would be a disastrous beginning of such an undertaking to run a tilt against authority in favour of such a mistaken idea as he enunciates. If there is no direct case as to photographs, the case of Tuck *v.* Priester,

quoted by the judge in Pollard *v.* Photographic Company, is so strongly in point, that an appeal would, it seems to me, be hopeless. In the case Tuck *v.* Priester, the plaintiffs employed the defendant, a printer in Berlin, to make for them copies of a drawing of which they had the copyright. He executed the order, and without their knowledge or consent made other copies, and they were imported into England, where he sold them. It was held by all the judges of appeal that there was an implied contract not to make any copies of the drawing other than those ordered by the plaintiff, and that, independently of the Copyright Act, the plaintiffs were entitled to an injunction and damages. Where is the tangible distinction between this and the present case?

Mr. Hubert says photographers have always thought the copyright was the property of the photographer, and not of the sitter. Ever since the Copyright Act, 1862, this has been the contrary of the fact, and before this there was no copyright in photographs.—Yours obediently,

S. J. DEBENHAM.

35, *Southampton Buildings, Chancery Lane, W.C., January 7th*, 1889.

[Mr. Hubert sends us another letter on the above subject, in which he says he proposes to call upon the leading photographers with a view of enlisting their sympathies and hearing their opinions.]

THE RICHMOND EXHIBITS.

DEAR SIR,—I find my exhibit of collotypes at the Richmond Exhibition were left down in some lumber room during the judges' visit. In case you might therefore overlook them, I beg to draw your attention. They are at the end of the table in the small room.

They are by Husnik's method, and are the only photo-mechanical prints exhibited, as far as I can see.—Yours,

S. G. YERBURY.

2, *Jasmine Cottage, Chiswick Lane, Chiswick, Jan. 7th.*

Proceedings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

AT the ordinary meeting of this Society, held on Tuesday evening last, the 8th inst., the chair was occupied by Mr. JAMES GLAISHER, F.R.S., President.

A camera, called detective, was shown by Mr. F. NOLAN. The instrument consisted of a tin camera, at the back of which was a drum, also of tin, in the circumference of which six plates were ranged. By mechanism, an inner drum bearing these plates was made to revolve, presenting them in succession to the action of the lens.

Mr. JOHN SPILLER remarked that it was certainly an admirable instrument, containing novel features. He feared, however, that the police, and particularly the Custom House officials, would be inclined to regard it as some form of dynamite weapon.

Mr. S. G. B. WOLLASTON suggested that the drum might be arranged to go round the body of the photographer, and so be large enough to contain twenty-four plates, and would then be very much less conspicuous than in its present form.

Messrs. W. E. Debenham and G. Seamell were appointed auditors; and

The PRESIDENT announced that the nominations for the officers of the Society must be received by the 21st instant.

The following members were appointed scrutineers, it being understood that although only two were required, some of those named might be rendered ineligible by being nominated as officers:—Messrs. Cobb, J. D. England, J. R. Gotz, Friese Greene, T. Samuels, C. Sawyer, G. Seamell, and A. Spiller.

The PRESIDENT welcomed Mr. L. Warnerke on his return from Russia, and enquiring what news he could give to the Society, Mr. Warnerke replied that he had just received a telegram from Moscow, announcing the opening that day of a photographic exhibition, commemorating the jubilee of photography, inaugurated fifty years ago by Daguerre. The telegram included the following message:—"Observing the fifty years' jubilee of photography, the committee appointed for the organisation of the exhibition at the members' dinner, drink your health as the person whom the Moscow Society has to thank for its existence.—(Signed) Esutchewsky, Cl genon, Klatschko, Timia, Thiele, Samine, Reine, Eichenwald, Rodionoff, Melline, Gorlitzin, Knofp, Matterne." The Emperor took great interest in photography, and attended the exhibition of the St. Petersburg Society held early last year. Photography stood very high in Russia. A very convenient and successful lamp for photography with magnesium flash light had been contrived by a Russian gentleman.

The PRESIDENT enquired whether platinum printing was much practised in Russia.

Mr. WARNERKE replied that it was not. The paper prepared for the hot development process did not keep, and, having to be imported from England, but little was done with it. Now, however, the direct printing-out process, and that with cold development, were coming more into use.

Mr. J. W. Collings was elected a member of the Society.

CAMERA CLUB.

ON Thursday, January 3rd, a discussion on hydroquinone was opened by the reading of a paper by Mr. T. CHARTERS WHITE. Sir GEORGE PRESCOTT presided.

The lecturer referred to the chemical constitution of hydroquinone, and summed up the advantages which, in his opinion, were obtained from it as a developer. He also gave his experience with the several commercial samples obtainable, and handed round negatives of microscopic subjects in illustration of the use of hydroquinone as a developer.

Mr. A. MASKELL then read a short paper on the same subject, giving the view taken of this reagent in France, and alluding to the advantage accruing from its use in developing bromide papers. The discussion was continued by Messrs. Rodgers, Elder, Deed, Wilson, Noble, Orton, Graham, Balfour, Sturmey, Betjemann, Grimshaw, King, Clark, Davison, and the Chairman.

On Thursday, January 17th, Mr. Priugle will discourse on Photo-Micrography. Apparatus and illustrations will be on exhibition. Meeting at 8 p.m.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on the 3rd inst., Mr. A. L. HENDERSON in the chair.

Mr. A. HADDON said, since the last meeting, he had carefully compared the plate he had shown at the last meeting with the leather hinge of the dark slide in which the plate had been kept for some time previous to exposure, and had found that the reduction on the plate extended half-an-inch beyond the leather. This clearly proved that the marking could not have been due in any way to the leather of the slide. He agreed with the general opinion, expressed at the time by the members, that the slide had been, at some time or other, partly opened.

Some platinotype prints were passed round by Mr. J. B. B. WELLINGTON, printed by the new cold bath process. He drew attention to one badly marked, caused by not agitating the solution.

Mr. A. HADDON read a paper in reference to the amount of image received on a plate by only a partial opening of the lens. Mr. Haddon said unless a considerable portion of the lens was uncovered the whole of the image would not appear on the plate. He illustrated his remarks by passing round two prints, one taken from a negative, during the exposure of which the front lens had been covered with a piece of cardboard having a segment cut off; the other exposure had been made with a piece of vulcanised fibre in which an eccentric aperture had been made and inserted in the diaphragm slot. In each case a portion of the picture on the two prints exhibited was absent. The conclusion this led to was that the weak margins often seen in pictures were due to a shutter used in front of the lens. A shutter, to be thoroughly efficient, should either be between the lenses, or else work in front of the plate.

A question in the box asked:—"What percentage of gain of light is there by placing a roller-blind shutter in front of the lens?"

The CHAIRMAN remarked that the question had practically been answered by the previous discussion. He was of opinion that good would result from a trial of the various shutters in general use.

Mr. W. ENGLAND said, in using a shutter next the plate, he had experimented to see how small a horizontal slit could be used. He had found a slit less than quarter of an-inch to be quite effective.

The CHAIRMAN showed some samples of celluloid. The inflammable nature of the material was proved by burning a portion, a noticeable feature being that no residue was left, and that the flame after being blown out left no trace whatever of charring.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

AN ordinary meeting was held on January 1, at Myddelton Hall, Islington, Mr. E. CLIFTON, Vice-President, in the chair.

Mr. W. T. COVENTON showed some bromide prints and a mounted silver print covered with small spots which were thought to have been caused by bronze powder.

Mr. L. MEDLAND asked if any chemical could be added to the developer which would give a warm tone to lantern transparencies without a previous long exposure.

Mr. CLIFTON thought that warm tones could be obtained only by giving a long exposure and using a suitable developer.

Mr. B. B. FULLER asked how to remove a black margin round an opal caused by the rebate mark on the negative.

Mr. CLIFTON said that if the film were cut round with a sharp knife, and the opal soaked in water, the margin could be peeled off: this would not be noticed in the case of a vignette.

The ferrid-cyanide reducer and rubbing down with pumice stone were also recommended.

Mr. MEDLAND asked how he could obtain a good transparency from a cracked negative without showing the crack.

Mr. CLIFTON said that if two thicknesses of tissue paper were put over the printing frame, and the latter turned about in the hand before a gaslight turned down low, no trace of the crack should be seen.

The HON. SECRETARY said that the film could be stripped off the glass by means of hydrofluoric acid and a gelatine skin.

Tuesday, January 15, will be the annual dinner; Tuesday, February 5, a lantern evening; and Tuesday, February 19, an exhibition of members' work.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

ON Friday night, January 4th, at the ordinary fortnightly meeting of the above Society, held at the Institute, Bexley, Mr. PRINGLE presided.

The minutes of the previous meeting were read and confirmed.

Mr. RUSHTON exhibited a plate which had been given to him to develop. It had received a drop-shutter exposure in a room, late on a summer evening, the subject being a portrait. Upon development he obtained, instead of a negative, a positive of a rich red colour.

In the discussion which followed, it was stated the red colour was red fog, and that if a plate received so extremely short an exposure, a positive would be the usual result.

The PRESIDENT then introduced Mr. Dresser, who gave the members an address upon hand cameras, illustrating his remarks by showing his camera and prints, enlargements, and lantern slides made from negatives taken with his camera.

After a vote of thanks had been accorded to Mr. Dresser, the proceedings terminated.

The next meeting will be held on Friday, January 11th, on which occasion Mr. Rushton will read a paper entitled "Six Months in Switzerland."

OLDHAM PHOTOGRAPHIC SOCIETY.

ON Thursday evening last the annual supper in connection with the above Society was held in the Freemason's Hall, Union Street, when between thirty and forty members and friends sat down to the good things provided. After the removal of the cloth, the evening was spent in an agreeable manner; vocal and instrumental music, recitations, &c., were given by members and friends. Representatives of London and provincial societies were present.

This being the Society's 21st anniversary, the Hon. Secretary and Librarian decided to recognise the event by presenting to each member, as a surprise, a suitable card of a thoroughly unique character, the description of which is as follows:—The background is formed of the covers of twelve of the principal photographic journals and almanacs. In the centre is a photograph, in miniature, of the members of the present council, below which is the coat of arms of the borough of Oldham and the Society's presentation print for the year 1888. In the top left hand corner is a photograph of the first meeting-place of the Society. On the same side at the bottom is a list of the first council formed in 1867. In the top right hand corner is a photograph of the Lyceum, the present meeting place. In the corresponding corner below is a list of the present council for the year 1889. The whole is surmounted by a photograph of the president, Mr. Greaves.

The usual loyal toasts were proposed and accepted. "Success to the Oldham Photographic Society," coupled with the name of the President, was proposed by Mr. J. Chadwick and seconded by Mr. J. Wrigley. A hearty vote of thanks was proposed by Mr. W. E. Clegg, seconded by Mr. J. H. Prestwich, to the originators and donors of the presentation card.

Suitable replies were made to the above, and to other toasts which were proposed during the evening. Altogether a very pleasant evening was spent, the party reluctantly breaking up about 12 o'clock.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held on Jan. 2nd, Mr. Councillor ANDREWS in the chair.

Mr. F. W. DEW gave an interesting paper on his experiences with the carbonate of soda developer, pointing out its various merits and disadvantages. The paper was illustrated by some negative transparencies produced by the developer, which were much admired, and several members expressed their intention of trying the developer.

The customary vote of thanks was passed at the conclusion of the paper.

After the question-box had been opened and the queries replied to, the chair was vacated, and the discussion was continued in a conversational manner for some time.

HASTINGS AND ST. LEONARDS PHOTOGRAPHIC SOCIETY.

THE next meeting will be at the Brassey Institute, on Jan. 14th, when there will be an exhibition by lime light of lantern slides contributed by members. All members are invited to leave their slides with the Hon. Secs. before the date of the meeting.

SHEFFIELD CAMERA CLUB.

THE annual meeting of this Society was held on Jan. 5th at 8, Fitzalan Square; Dr. MORTON presided.

The minutes having been read and approved, Mr. W. Jenkinson was admitted a member.

The account of the past year, audited by Messrs. Yeoman and Harrop, showed a satisfactory balance in favour of the Society.

The following gentlemen were elected officers for 1889:—

President—Dr. Morton.

Vice-Presidents—Mr. B. W. Winder and Mr. G. E. Maleham.

Treasurer—Mr. W. Gilley.

Hon. Secretary—Mr. H. J. Hardy.

Committee—Mr. C. F. Combe, Mr. J. O. Arnold, Mr. E. Howarth, Mr. G. T. W. Newsome, Mr. J. H. Rawson, and Mr. C. Yeomans.

A vote of thanks was accorded to Mr. J. O. Arnold and the auditors for their services. The meeting then adjourned.

NOTTS AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual fortnightly meeting of the above Association was held on Monday evening, January 7th, at the Club Rooms, Cavendish Chambers, Market Street; the President, Mr. HENRY BLANDY, in the chair. Minutes of previous meeting were read and confirmed.

Mr. J. Henry Hardy, of Oak Lodge, Kimberley, was elected a member, and the following gentlemen were proposed for membership:—Messrs. T. Hammond, R. C. Armitage, J. Forrester, and J. Lupton.

The PRESIDENT, in his opening remarks, referred to the Monthly Circular issued for the first time this month, and congratulated the committee on the new departure they had taken in this matter, as he had no doubt it would be very beneficial to the Society's prosperity. He was also pleased to see that they were taking steps for the formation of a Reference Library on photographic subjects. He would not detain them any longer that evening upon Society business, but proceed at once to introduce to them Mr. H. S. Bellsmith, of the Eastman Dry Plate and Film Company, who would explain and demonstrate before them the processes for which this Company is famous.

Talk in the Studio.

GRAINING ZINC PLATES AND LITHOGRAPHIC STONE.—The following method, obviously suggested by a glass engraving process which was published a few months ago, is said to be in exteusive use in America, aud to give a decisive grain suited for photographic blocks. The method consists in producing the grain by covering the surface of the stone or zinc plate with sand, and rolling this sanded surface with spherical balls, which, having a limited point of contact, serve to press the sand against the plate without tendeucy to produce scratches or to wear the plate unevenly. A shaking bed is employed, upou which the zinc plate is secured by meaus of tacks at its edges. The bed is provided with raised sides and supporting wheels, which run upon two tracks; the shaft is held in stands and provided with a slotted crank disc, from which connectiou is made to the bed by meaus of a pitman. Upon the plate a quantity of sand is placed, aud a number of spherical balls, which are preferably made of glass. The rotary movement of the shaft will cause a reciprocating movement of the bed and the attached plate, which at the proper rate of speed and throw will impart a rolling movement to the spherical balls, thus serving to press the grains of sand against the plate, and producing the finely grained surfaec required for the purpose of surface-printing; in order to secure the best result there is also added a supply of water to the sand and spherical balls, which are preferably about the size of large marbles. In this case the desired effect upou the plato will be produced with great rapidity aud of fiue quality. Instead of the zinc plate, which is attached to the bed, a lithographic stoue plate may be grained by the same process, the stone being let into a recess in the bed, or otherwise arranged so that the sand and balls can have a surrounding level surface over which to move, iu order to be able to grain the surface of the stone to its extreme edges.

A PHOTOGRAPHIC DIARY.—From Messrs. Wyman aud Co., of 75, Great Queen Street, we receive a handy quarto diary interleaved with blotting paper, and inteuded specially for the use of photographers. The price is half-a-crowu.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—On Thursday, January 17th, Mr. Friese Greene will read a paper ou "Photographs by meaus of the Eye," also "The Effects of a Bromide Plate under Pressure, aud in a Vacuum."

ANNUAL DINNER OF MESSRS. WATSON AND SONS' STAFF.—Messrs Watson and Sons send us an account of a festive gathering of their workpeople and friends, which took place at the Holboru Restaurant on Saturday last.

THE CONVENTION.—We are iuformed that the St. James' Great Hall has been secured for the meeting of the Conventiou in August next.

SOCIETY OF ARTS.—The followiug arrangements have been made for the Wednesday evening meetings of the Society of Arts after Christmas. On the 16th January, a paper will be read by Colonel Hozier on the "Channel Tunnel;" on the 23rd one by Professor George Forbes, on "Electric Meters for Central Stations;" and on the 30th one by Mr. Conrad Beck, on the "Coustruction of Photographic Leuses." Papers for which dates have not yet been fixed, will also be read ou the "Status of the County Council," by Mr. G. L. Gomme; ou the "Forth Bridge," by Mr. B. Baker; on "Salt," by Mr. P. L. Simmonds; on the "Manufacture of Aluminium," by Mr. William Anderson; on "Secondary Batteries," by Mr. Preece; on "Automatic Selling Machines," by Mr. J. G. Lorrain; on "Arc Lamps aud their Mechanism," by Professor Silvanus Thompsou; on the "Irish Lace Industry," by Mr. Alau Cole; and on the "Use of Spirit as an Agent in Prime Movers," by Mr. A. F. Yarrow.

POTASSIUM META-BISULPHITE.—Dr. Eder, in the *Photographische Correspondenz*, points out that potassium metabisulphite, $K_2SO_3 . SO_2$, is prepared by saturating a solution of potassium carbonate with sulphurous anhydride and adding alcohol. The salt separates as a white crystalline powder, and is washed with alcohol. It loses sulphurous anhydride when exposed to the air. The systematic name of the salt would be potassium anhydro-sulphite.

PHOTOGRAPHIC CLUB.—The subject for discussion on January 16th will be "Hydrokinoue."

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Attention to these directions may prevent delay and disappointment.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

W. J. ANCKORN.—On enquiry of the London Agents, 64, Moorgate Street, they have no information as to the Bronze Medal awards, but refer us to Vienna; address, Secretär, Club der Amateur Photographen, I Wallfischstrasse 4, Wien, Austria.

A. W. L.—The gelatine went thick because you added too much chrome alum, and applied it in too concentrated a solution. Try a smaller quantity, and add acetic acid, which helps to thin the chromated gelatine. Common alum will prevent the tissue frilling.

E. E. B. (Croydon).—1. The mixed gelatines specified ought to work well with the addition of two or three drops of ammonia to the emulsion, to overcome the greasiness. 2. If you erect a studio in your garden of "portable" construction and quite detached, you are at liberty to remove it; but if you propose to put it on the house-top, you had better come to an understanding with your landlord, for the structural alterations will be considerable, and, should you pull it down again, you will have to make good the roof and replace everything in the original condition, to the satisfaction of both landlord and district surveyor.

H. E. W. (Pontypool).—Apply to Mr. E. Howard Farmer at the Polytechnic; or, for advauced, to Valentine Blanchard, or Robert Faulkner. Get a copy of H. P. Robinson's "Pictorial Effect in Photography," to be had of our publishers.

CHARLES ROWE.—The olive card received is about up to average quality; but a little of the green colour washes out, as you have probably noticed.

T. S. (Kilmarnock).—The demand for enlargements may just now be pretty brisk in consequence of the increased army of amateur photographers, but we should hesitate to advise you to throw up a learned profession in order to get into this as a matter of business. At any rate, push on with your experiments first.

ED. SMITH.—We will enquire and let you know later.

L. BERTRAM.—No license is now required for working the platinotype process; see advertisement, p. vi. of the YEAR-BOOK.

TEIGNBRIDGE.—So far as our enquiries go, Carbutt's "flexible films" are not yet procurable in England.

COPYIST.—Shellac with a minimum of borax solution is, we are told, the preparation commonly used for glazing collotype prints.

W. G. G.—Burton's "Modern Photography," or Captain Abney's "Instruction in Photography," will give you the information desired, and we envy you the satisfaction of returning to the art with all the convoniences of dry plates. Be careful not to overexpose. As to lens, be content with your Grubb's aplanatic; the new one you mention is well spoken of, but we have not worked with it.

B. JONES.—There is small probability of your namesake's proposed system of weights being adopted, for if the new Cheltenham pound is to consist of sixteen Troy ounces, its weight will exceed the Avoirdupois pound by about an ounce and a-half. Tons and hundredweights have still an interest for photographers, and here the deviation becomes very marked, being 46 lbs. and 2 lbs. 5 ozs. respectively below the proper standard weights of these denominations. The system is neither decimal nor duodecimal, and its translation to liquid measures becomes almost a matter of impossibility.

W MORRIS (Penzance).—We do not know whether the "Robert Hunt Memorial Fund" is yet closed. Write to Mr. Arthur G. Phillips (the Hon. Sec.) at 28, Jermyn Stroet.

DISORDERED BATH.—1. You might try first the effect of adding a little citrate of soda and filtering, but if this should not prove successful in restoring the bath to working order, you had better throw down the silver with hydrochloric acid, put it into the residues, and proceed to make a fresh printing bath. 2. No advantage is gained by making your own nitrate of silver from the standard alloy, since you will have to separate the copper by very careful fusion; repeated crystallization will not remove all the nitrate of copper, and the presence of this salt diminishes the sensitiveness. 3. The hydrometer is at best only a rough guide as to the amount of silver in solution; its indications are fairly correct for a time, but in old and nearly exhausted baths the accumulation of nitrate of soda raises the specific gravity, and thus gives you a false notion as to the actual amount of silver. For this reason we cannot construct a reliable table.

R. JUPP and HARRY BEALE.—Answered by post.

PATENT OFFICE LIBRARY

THE PHOTOGRAPHIC NEWS.

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THE FORTHCOMING EXHIBITION OF THE BOLTON PHOTOGRAPHIC SOCIETY.

From the Secretary of the Bolton Photographic Society we receive detailed particulars of the arrangements for the competition at the Exhibition which is to be opened on February 7th.

"*Competition No.* 1 (for members only.)—For the best six Photographs taken since last Exhibition, a 1st and 2nd Prize, consisting of—1st Prize—a silver medal, with gold centre; 2nd Prize—a silver medal.

"*Competition No.* 2 (for members only.)—Also a 1st and 2nd Prize for best six Photos. No print is eligible which has taken a prize previously. 1st Prize—a silver medal, with gold centre; 2nd Prize—a silver medal.

"*Competition No.* 3 (for members only.)—This prize is given by the Editor of the *Amateur Photographer*, and will be awarded by the judges for the best and most artistic photograph, which must be entirely the work of the competing amateur. Preference given to print from untouched negative. No pictures which have previously taken a prize are eligible.

"*Competition No.* 4 (for members only).—For the best series of six lantern transparencies; size, 3¼ square. No transparencies which have previously taken a prize are eligible. 1st Prize—a silver medal, with gold centre; 2nd Prize—a silver medal.

"*Competition No.* 5 (for members only.)—A gold medal. This prize is given by Mr. John Taylor, one of the oldest members of the Society, and will be awarded for the best six prints taken by members who have not practised photography more than three years.

"*Conditions for Professional Competition.*—A gold centre silver medal will be awarded by the judges, for what they may consider the best series of six portraits. Size, style, and process optional. Also a silver medal for the landscape or marine view which they may consider the best. Size, style, and process optional. All pictures to be sent in carriage paid, without any indication on packages, pictures, &c., as to who they are from. Inside, in envelopes supplied, must be the following: in envelope No. 1, the Competition Sheet and P. Order only—signed with a motto or number. In envelope No. 2 must be the full name and address of the person sending, and also his number or motto. This envelope will not be opened until after the judges' award. Accompanying the competition sheet, P. order for 2/6 for each class, to cover cost of hanging and packing. Pictures must be addressed to Mr. B. H. Abbatt, Mechanics' Institute, Bolton, and must arrive not later than Monday, February 4th. No picture which has previously taken a prize is eligible. If you forward in envelope No. 2 a card advertising your business, it will be affixed to your exhibit after the award.

"*Declaration to be signed.*—The above are *bona fide* entirely my own work, and I have received no assistance either in choice, development, printing, mounting, or finishing (rolling and burnishing excepted).

"Prints from negatives retouched, spotted, or prints enamelled, by other than the exhibitor, not allowed."

AN AUTOMATIC GOVERNOR FOR THE COMPRESSED GAS BOTTLE.

The main disadvantage felt by those using compressed gas in cylinders, when working with the lime light, has been the difficulty to adjust the flow of the gas; this difficulty being considerably increased by the fact that the pressure in the bottle steadily reduces during working. To meet this difficulty, several governors have been devised, by which the high tension of the gas can be reduced to a constant pressure suited for the lime jet used, one of the best known being Beard's form, in which the top of the expanding chamber of the regulator, when rising, turns a shaft which closes the ingress valve.

We now receive from Mr. J. H. Steward, of 406, Strand, a small regulator of an analogous kind, but smaller, but we find it to answer equally well. The regulator which we now receive for notice is represented by the subjoined cut, and, with the fittings as shown, weighs only



one pound six ounces. Like the large regulator, that before us consists essentially of a circular india-rubber bellows, which is contained in the outer brass cylinder that is shown in the cut. When the bellows or expanding chamber is full, the ingress valve is closed by a lazy tongs and eccentric arrangement; and when the bellows is partly full, the valve is open to a corresponding extent, thus keeping the working pressure equal, up to the last of the gas.

Our readers are aware that considerable improvements

have recently been made as regards the supply of compressed gas in iron cylinders, and Mr. Steward sends us the description of a compact travelling cabinet containing two gas cylinders (one for hydrogen), and two regulators, an arrangement which will enable the travelling lanternist to at once use his instrument in any place, irrespective of coal gas supply. The iron cylinder for holding ten feet of gas measures but 19½ inches by 4 inches, and weighs 11 pounds.

NOTES TAKEN AT THE RICHMOND PHOTOGRAPHIC EXHIBITION.

BY VALENTINE BLANCHARD.

IT has been my fortunate lot to have had two great picture treats, the remembrance of which will last a lifetime. One was the first of the triennial series held in Paris a few years ago, and the other the Manchester Jubilee Exhibition. This latter showed representative pictures of all the artists who have laboured for the progress of British art during the reign of Victoria. The educational value of such shows no one will, I am sure, gainsay, and I am reminded of them by the admirable exhibition of photographs held at Richmond last week, and regret extremely that, being held so near London, a longer time had not been given to the display; for, like a new play, it is only after the thing has been seen and well talked about that the public rush in great numbers to see the show.

To begin with, the exhibition in question is very unlike the annual display in Pall Mall, and is, undoubtedly, a great deal better; for as there is no restriction as to previous exhibitions of any of the pictures sent in, with very few exceptions, therefore only the pictures that have been seen at Pall Mall and elsewhere, and that have received awards, or favourable notices in the press, have been sent in competition for the large number of medals so liberally placed at the disposition of the judges by the committee of management.

The high character of the exhibition is strikingly felt on first entering the room, and was freely admitted by all those familiar with the Pall Mall annual displays. But this admission only the more strongly emphasized the importance of the rule that only new work should be eligible for entrance at Pall Mall; for without this rule, such a show as that at Richmond would be impossible.

So many of the pictures are well known, and have been reviewed from time to time, that it is not deemed necessary to refer to them; the great point therefore will be to use only those which may be considered representative, and capable therefore of serving as subject lessons.

In the two champion classes, professional and amateur, three degrees of merit were provided for, and a silver gilt medal was the highest award, while silver stood next, and bronze last.

Three very distinguished painters acted as judges for these awards, and were deputed to do so by the others, for it was felt that as all the pictures in these classes had been prize winners in other exhibitions, and had been already tried by several members of the committee of judges, the verdict of such a distinguised and representative trio—for there was James Sant, R.A., to represent portraiture, and H. Moore, A.R.A., and W. L. Whillie, R.I., to look after landscape and seascape—would be the more valued by those fortunate enough to secure the medals. Conflicting opinions will certainly result; as, for instance, that a mere bromide enlargement should take precedence of such a carefully thought out and artistic performance as H. P. Robinson's "Carolling;" but a great lesson may be learned from the third award, for it has gone to a simple and unaffected example of portraiture by W. J. Byrne. It is the portrait of an old man, and all the grandeur and dignity of age has been retained, for that vice of vices, which is destroying entirely the value of historical portraits, is conspicuous by its absence. Bravo, Mr. Byrne! After such an expression of opinion from such men, have the courage of your opinions, and become a reformer.

No one will be astonished that Mr. Gale has carried off two awards. The mantle of Mr. Manners Gordon has worthily fallen on him. But, besides the little landscape views, in which he so closely resembles the distinguished wet plate worker first mentioned, the possibilities of modern methods have enabled him to produce rustic scenes that at the present moment are almost unique. "Almost" is the right word to use, for he may be regarded as the founder of a modern school, and some of the most successful pictures in the exhibition under notice clearly demonstrate that he has many admirers among the amateurs. Every encouragement should be given to the workers in this direction; simple homely scenes are well within their powers. There is no clap-trap, no turning sunlight into moonlight, no straining after forced and over-striking effects; and when the exclamation comes, "What an unaffected natural little picture!" it has already won the laurel.

The portraits in the exhibition are unusually striking. There are a great number, and the dimensions unusually large. Several are heads the size of life, and the half-lengths are many of them twenty inches in the longest diameter. One of the life-size heads deserves special mention, for it is unlike any of the others. It looks like an old mezzotint, and would certainly be taken for an enlargement by most experts. It is stated to be taken direct, and there is no touching to mar its force. The subject is a grizzly old warrior with helmet and breastplate of the time of Prince Rupert, the texture of which is finely rendered. It is probably a platinotype print, and does not look at all photographic. The producer, Mr. W. Crook, has made a great success.

The number of snap shot efforts is considerable, and some of them very good. The studies of deer, sheep, swans, &c., by Mr. H. Little, as well as his jumping horses and others, are well exposed, and need no apology therefore for the difficulties of production.

Besides those pictures deserving praise, it need scarcely be said that there are many that serve more as beacon lights to point out what to avoid, than for any other useful purpose. Among these, unfortunately, there are many so striking that they attract the uneducated eye. Surely the time has come when truth should stand first, and this without a sacrifice of art. Clouds are an undoubted necessity in photographic landscape, but I would rather a thousand times go back to the old white paper sky, than have some of the modern impossibilities, the outcome of printed-in skies.

It scarcely needs to be said that if the photographer were to wait until a suitable sky accompanied his landscape his labours would be considerably limited, and he would lose half his pleasure; but clouds taken from an opposite point of the compass to that of the rest of the scene must be condemned, and unfortunately there are several such monstrosities in the present exhibition.

Another fault quite as glaring is the introduction of clouds taken at an entirely different angle to the rest of the picture. This defect is overlooked by the many, and one hears the exclamation, "What a pretty sky!" but to the trained eye it is like scarlet to a mad bull.

Here is another defect equally to be censured: light-tipped, rippling waves sparkling all over the sea, and a heavy, cloudy sky, with no suggestion of sun. But still these striking effects go down with the multitude, and the answer in defence is, "The public like strong effect as well as strong perfumes or strong drinks." No: sun-lit water and dark sky will not do. Of course, it is possible for the sun to shine from under a dark cloud and light up the sea in the distance; for instance, here is a beautiful example in the present exhibition. A calm sea; a steamer sending volumes of smoke that straggles across the entire picture; a heavy sky is over the top of the picture, but in the middle

distance the cloud has burst, for the otherwise grey calm sea is illuminated in one spot with dazzling light. The whole of the picture is more or less grey except where the sea is gladdened by the sun's radiance. Of course there is no double printing; it is true, honest photography, and yet a most artistic picture. There are several striking effects so puzzling that they can only be accounted for on the supposition that there were two suns. Now, as I am sure that for true pictorial effect one is sufficient, it is to be hoped that in future exhibitions this extravagant waste of sunshine will not be repeated.

There is a large increase in the number of platinum prints, and, in many cases, they are framed with taste. India tints and plate-marked mounts are evidently increasing in favour. One thing is quite clear, judging by an admirable half-plate portrait spoiled in the framing—gold will not do next to a platinum print. The depth and boldness of the silver print is needed, and then there is perfect marriage, as the French say.

I think it must be said, on the whole, that there is a marked improvement in taste in the matter of framing. There are a few maroon flock mounts, but not many, and they are perhaps useful to show what to avoid. At least, let us hope so.

There is still too much tendency to keep exactly to the regulation sizes. When will photographers have the courage to cut away every part of the picture not necessary, and thereby so immensely to enhance the effect of the whole? There are several instances where an inch taken away from the foreground would have completely changed the character of the picture, and, of course, to its advantage.

The object of the above remarks is the advancement of the art side of photography, and it is to be hoped they will be productive of good. That, at least, has been the aim and intention of the writer.

The following awards were made too late for publication last week:—Lantern Transparencies, Class 5.—Silver medal, 675 (G. W. Wilson & Co.); Bronze medal, 676 (Woodbury Printing Company). Class 10.—Silver medal, 683 (A. R. Dresser). Class 18.—Silver medal, also the "Optimus" prize of Enlarging Apparatus, 699 (B. G. Wilkinson, Junr.); Bronze medal, 689 (W. A. Greene); Bronze medal, 700* (F. Harolett). Class 9, Microscopic Photography.—Bronze medal, 762 (T. H. Morton, M.D.). Class 6, Stereoscopic Slides.—Silver medal, 705 (G. W. Wilson and Co.). Class 7, Transparencies not under half-plate.—Bronze medal, 706 (F. W. Edwards).

Apparatus.—Shew and Co., silver medal for changing box; W. Watson and Sons, silver medal for premier tourists' camera; W. Tyler, bronze medal for current producer; F. W. Hart, bronze medal for patent flash lamps; G. Houghton and Son, bronze medal for improved developing sink; Marion & Co., bronze medal for Dr. Krügener's patent book camera.

NOTES FROM NEW YORK.

SOCIETY OF AMATEUR PHOTOGRAPHERS—A PHOTOGRAPHER'S TRUNK—EXHIBITIONS—NEW DETECTIVE CAMERA—MISCELLANEOUS.

AT the November meeting of the New York Society, Mr. Newcombe demonstrated the harmless qualities of the magnesium flash light cartridge, by eating one before the audience, which caused considerable laughter; then he afterwards made a very good photograph by their aid, of the assembly, on one of the Allen and Rowell celluloid films.

A specially arranged steamship state room trunk fitted up for photographic manipulations was shown and explained by Mr. Chas. Simpson. He said: "The trunk is 22 inches long, 14 inches wide, and 15 inches high, taking a 5 by 8 view camera; also a 4 by 5 detective camera, with several boxes of plates, lamps, different kinds of chemicals, and also clothing, and a cloth cover for changing plates. And there is last, though not least, a tray arrangement, made of zinc, which, as you see, fits into the trunk, and has a sink, waste and supply tubes, and faucet for running water. It is a very fair, though plain, article altogether. There is nothing fancy about it. It is for my own use. Last summer I developed about two hundred and fifty plates with it. There is, also, room for a tripod in the tray holding the clothes. It should be stated that the trunk was in outward appearance about the size of a state-room trunk used on steamships. When the cover is opened there is exposed to view the clothes tray, in which is also stored the tripod and tripod head. When the tray is removed there is beneath a sheet of zinc, which is nearly level with the upper edge of the lower half of the trunk, and covers on a level the whole interior except in the centre, which has a box-like depression about eight inches deep, and large enough in size to hold the outer packing box of a 5 by 8 camera. When packed up this is where the camera is stored. The extended surface on each side of this improvised sink holds the lamp for developing, which in this case was a Tisdell candle-lamp (around which was thrown a pasteboard screen, having orange paper), the bottles of chemicals, and the trays for fixing and washing. Just to the rear of the sink a faucet of peculiar construction is screwed in and connected by a rubber tube to the water supply on a shelf above. The syphon is started by sucking the water over with the mouth, then the tube is quickly pushed over the faucet, which gives a supply of water on tap. From the bottom of the sink a waste pipe runs through the bottom of the trunk to a rubber tube, which terminates in a pail resting on the floor. In the space underneath the zinc tray and sink (the latter being removable) is packed the 4 by 5 detective camera, boxes of plates, bottles and chemicals, &c. To use the trunk, for changing plates, a thick satine black cloth, provided with arm-holes, is set over the upright top of the trunk and fastened around the edges. The trunk rests on two chairs, one at each end, and the operator simply sits down in a chair at the centre, and by putting his arms through the cloth changes plates by the sense of feeling without any trouble. While travelling we know how difficult it is to test a few plates by developing; sometimes it is to preserve a few plates. We don't know whether we have exposed our plates right or not, or whether things go right or wrong. In fact, until we get killed we don't know that fact. All you want when you are travelling with this trunk, is to stop at an hotel where you can get a couple of pitchers of water, and hotels which cannot supply you with a few quarts of water are not worth stopping at. These hotels will generally have shelving, clothes-closets, or clothes-press, where you can place your pail or water-pitcher, on the top, in this way. There is this faucet, which I now make fast here at the rear of the sink. Now, then, all you have to do is to make your attachments and fire away. The whole affair is home-made, but it answers my purpose. Anybody is welcome to copy it."

In answer to a question as to the construction of the faucet, Mr. Simpson said, "I got hold of a gasfitter, and he made this faucet for me out of gas fixtures. A specially made cast brass faucet would cost $15, while this was very cheap."

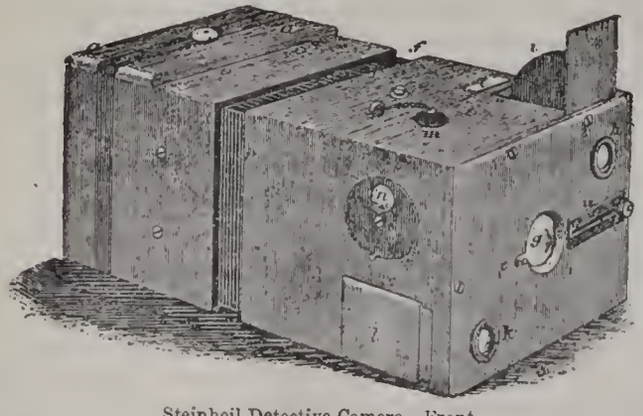
The trunk appeared to be a very practical affair, and was well adapted for its purpose.

The Chemical Committee reported that a new brand of American made hydrochinon was chemically pure. This agent appears to be used exclusively now at the Society's rooms by members in making lantern slides. It is used in combination with sulphite sodium, and potash or carbonate of sodium.

The 30th of November, a very successful lantern exhibition occurred, being the work of the Photographic Society of Philadelphia and the Pittsburgh Society. Following this for two weeks at the Rooms of the Society was an informal exhibition of prints by members, which attracted a large number of visitors. At the regular meeting in December several papers of interest were read, among them being a

paper on "Collodio-Bromide Emulsions," by Mr. F. C. Beach, followed by a demonstration. He worked Brook's emulsion, coated a plate, made an exposure, developed the plate, and afterwards, before the meeting was over, put it in the lantern, and threw it on the screen. A new Steinhiel detective camera with a special changing attachment for plates was shown, and was quite compact. The box was of the best French walnut, and the price stated to be $70, rather high for Americans. An interesting paper on "Observations on Substances Feebly Sensitive to Light," by J. W. Osborn, author of "Osborn's Photo-Lithographic Process," was read by President Canfield, and was accompanied by a number of interesting specimens.

Dr. J. J. Higgins exhibited his new detective camera, and in explaining it said, among other things, that there was nothing whatever on the outside of his apparatus that would attract attention; all could see that it was a plain simple box, having on the top side, not far from the leatherless handle, a name plate. This concealed the finder. In the lens section of the camera in front was a simple round knob, which served many purposes. A revolution one way unlocked the outer slides which uncovered the lens, another movement of it enabled one to focus, still another pulled the lens outside of the outer casing, so that diaphragms could be easily inserted or the lens cleaned; again, by rotating it, the shutter, which was of the disc pattern, could be wound up so as to go fast or slow. The speed was determined by the number of clicks one could hear when rotating the knob. Behind the shutter is a removable plate having different sized apertures in it. The rear portion of the camera is hinged at the bottom to the main body, and lets down below the bottom. It uncovers the back frame of the camera proper, behind which



Steinheil Detective Camera—Front.

is secured the plate-holder, held in position by a sliding pivoted strap clamp, something like the old-fashioned way of placing a bar behind doors. The front of the



Steinheil Detective Camera—Back.

plate-holder is recessed to fit rebates in the frame of camera, so that when the plate-holder is clamped in place there is not the least opportunity for the light to get in. The back frame of the camera is removable, and when taken out allows two plate-holders, each holding two plates, to be slid in each side of the interior of the camera. Another is stored in the bottom, and a fourth is held in the back when the ground glass is out, while a fifth can be clamped in position behind the camera. Thus ten plates may be easily carried. A short distance behind the lens a thin blackened wood frame, having a small rectangular aperture, is secured, and is intended to prevent any extraneous light coming from the lens from striking the plate. A concealed release button is provided for setting off the shutter. In working the apparatus, the back portion is lowered, the slide withdrawn and laid in the back, then the back is closed, completely covering and protecting the holder. The exposure is made in the usual way, then the slide is replaced, and the holder adjusted for the next picture.

The camera was very neatly and substantially made, and interested the audience more than anything that was exhibited during the evening. The doctor's lucid and excellent way of explaining the apparatus was very entertaining.

Several slides made some ten or fifteen years ago by Mr. Newton and Dr. Higgins on collodion bromide emulsion plates were thrown on the screen.

On December 16th Mr. Beach gave a special lantern exhibition before the Society, illustrating scenery along a carriage drive from Stratford to Putney. He had about eighty slides, and among the subjects was a series of views showing how a 100-ton frame house, having three chimneys, was moved a distance of fifteen miles by water without in the least injuring the chimneys. It was quite a novelty for an exhibition, and proved very entertaining. What he showed represented work that he had done at odd times during the summer. He also criticised his work technically, with a view of teaching others, by pointing out defects, that they might improve.

The last lantern exhibition of the Society was given on December 28th before a crowded house, and comprised the work of members of the Society and the New Orleans and Louisville Camera Clubs.

One of the recent events here has been the formation of an off-shoot of the Society of Amateur Photographers by a few discontented wealthy members called "New York Camera Club" in their circular, soliciting candidates for membership. They say: "It is believed that a Photographic Society composed of amateurs exclusively, and which would afford better facilities for mutual improvement, original investigation, and advanced work than are at present accessible, would meet with requisite support. To that end the New York Camera Club has been organized under the presidency of Mr. Daniel P. Read, with the following named gentlemen as its initial members:—Henry J. Newton, E. P. Fowler, C. Volney King, R. M. Fuller, Roosevelt Schuyler, E. N. Dickenson, jun., A. T. Gillender, H. M. Baldwin, H. G. Piffard, George Shorkley W. T. Colbron, James Stillman, Sydney Bishop, and J. H. Wainwright. The initiation fee is 10 dollars; annual dues 40 dollars, and the membership is limited to fifty. No permanent quarters have been secured, but the club holds monthly meetings at the Academy of Medicine in West 31st Street. Invitations have been issued for its first public meeting, to be held on January 5th, when it is expected Dr. H. G. Piffard, who is reported to be the real leader of the club, will read a paper on his recent experiments and researches on orthochromatic photography.

At the old society considerable work has been planned for the winter and spring, which includes an entertainment of some kind for nearly every week.

The interest in lantern slide making is growing rapidly, so that the committee in charge finds no difficulty in securing interesting slides for the frequent lantern exhibitions.

A new feature just inaugurated is the renting of the hall, for a nominal sum, to members who desire to give individual private lantern exhibitions to their friends.

They have the use of the society's lantern gratis, and are only required to pay for, besides the rent, the gas consumed. The idea appears to be an excellent one, since it furnishes a way for any member to entertain his friends at very little expense and trouble. Accessions to its membership have been very large of late, and with the new attractions proposed will doubtless largely increase.

"Modern Amateur Photography" is the title of an illustrated article in (January) *Harper's Monthly Magazine*, by Mr. F. C. Beach, which will doubtless excite some interest abroad, since it contains portraits of Mr. Charles Bennett and Dr. Monckhoven, never before published, and several new photographs by amateurs. The *Philadelphia Photographer*, with the new year, drops its old title, and now becomes instead, *Wilson's Photographic Magazine*. The "American Times Annual" is behind in publication, as it usually has been, but is said to be richer in interesting material. The *Photographic Times* itself is to supply photo-gravures each week, and at the same time, nearly doubles its subscription price. It would seem to be quite an undertaking to supply photographs or photogravures so frequently, but, if they represent high types of work, they will doubtless materially enhance the value of the journal to the general public. "The Detective Camera, and how to use it," is the general subject of discussion provided for the next meeting of the New York Amateur Society; a number of different styles of cameras are to be exhibited, hence it will probably be quite interesting. Celluloid films are coming more into general use, and give very satisfactory results. It now remains for the price of celluloid to be lowered to put it on a par with plates. SULPHITE.

New York, January 2nd, 1889.

THANKS TO PHOTOGRAPHY.

(AN ACTOR'S REMINISCENCE).

"YOU'D scarcely think," said a well-known actor the other day, "that I owe my first good engagement to my knowledge of photography. It came about in this way. I'd been going about the provinces for two or three years, and not doing much good. I'd had the usual luck of falling in with speculative managers who, after engaging a company, would take them on tour, and if the tour was unsuccessful, as it generally was, would leave them minus any salary, to pay their own expenses, and get home as best they could. It was very slow work, still I picked up a good deal of experience, and had studied three or four parts, which I flattered myself I did as well as London men who were drawing big salaries. One day my chance came. I'd been having worse luck than usual, and was looking hopelessly through the *Era*, when an advertisement caught my eye which I determined to answer at once. It was from a country manager who had a good reputation, and was for an actor who was well up in Offenbach's 'Blind Beggars.' Now one of the parts—there are only two characters in the operetta—was an especial favourite of mine, and it was this particular character that was wanted. Unfortunately the advertisement was coupled with a condition which nearly made me forego my determination. Applicants had to send their photographs in character, and I had neither the photograph nor the money to pay for one. But actors are used to borrowing, and after some difficulty I managed to get half-a-crown from a friend. With this I hastened, armed with my stage dress and 'make-up,' to the nearest photographer."

Well, I entered the reception room and told the young lady what I wanted, when she said in reply, "How strange! Another gentleman has come only five minutes ago for a similar purpose. He is in the dressing-room now."

My heart fell within me. Some other "mummer" had also seen the advertisement. I must know who it was at all hazards.

"Oh yes," I said coolly enough. "He is a friend of mine. We arranged we should meet here. Where is your dressing-room?"

Of course the unsuspecting girl showed me, and into the room I went.

"Hallo, Sockton!" was my ejaculation.

"What! Buskyn," was his reply.

There was more surprise than cordiality in our greeting, for we had always been rivals, and more particularly in the very part advertised for. However, we concealed our real feelings, and, addressing each other as "old man" and "dear boy," admitted—for the fact could not be denied—that we had come on the same errand.

Sockton was seated in front of a looking-glass making up his face with the greatest possible care, and looking round the room I saw that he was in possession of the only mirror.

"How long will you be dressing!" said I, carelessly.

"Oh, some little time," he rejoined. "Sorry to keep you waiting."

"Don't mention it," I retorted; "I'll see if I can't get another glass. I shan't be long, for I came away with very little 'make up.'"

"Sorry for that, Buskyn. I'd lend you some, only I've scarcely got enough for myself."

And he gave a little grin which he thought I didn't see.

I borrowed another glass, dressed in the beggar's habiliments, and proceeded to "make up," troubling only to put in the strong lines. I was ready before Sockton had finished putting in the blue for his unshaven chin. He was proceeding as if he was about to go in the glare of the footlights, and I chuckled when I saw his elaborate preparations.

"By jove, Sockton," I exclaimed, "I never saw you look more 'fit.' I'm afraid I haven't got a ghost of a chance. My photograph will look a poor thing beside yours. But I can't bother any more about my face."

"Ah, laddie, never spoil the ship for the want of the proverbial ha'porth. Look here, old man, have a bit of blue for your chin."

"Thanks, it doesn't matter," said I, in a tone of dejection. "I know it's useless to contend against you. I've half a mind to throw up the thing, but as I've come here—well, here goes."

And up I went to the studio; for, as Sockton said he should be another quarter of an hour, of what use was it keeping the operator waiting? And so I was photographed first.

Sockton eventually made his appearance, and so effectually had he made up his "complexion" that there was scarcely a bit of his natural skin showing. He posed, and three negatives were taken of him before the operator said he was—well, not satisfied, for all he remarked was that Sockton was rather a difficult subject, but that he thought it would do.

I received the proof and sent it to Ditchborough, and by return of post had a letter from the manager, asking me to come down at once, and saying that if my singing and acting were as good as the photo he would give me an engagement at a good salary.

Off I started, and on my way to the station who should I run against but Sockton. He button-holed me at once.

"I say old man, what ill fate sent us to that confounded photographer? I suppose your photo was as great a failure as mine. I call it disgraceful to send out such things. Look there. I couldn't send that thing away, could I"

And dragging a photograph from his pocket he thrust it into my hand. A most awful caricature it was. The chin looked as if it had been newly lathered, there were patches of black on each cheek, and as for the wrinkles in the forehead, they all came in the wrong place.

"You're right," I said. "It is a failure. Look at mine."

"Hang it!" he exclaimed, angrily. "There's nothing

the matter with yours. Why couldn't the fellow treat me as well as he did you? Great Scott! I see it all now. You arranged it with the photographer to sell me."

"Mr. Sockton," I replied, with dignity; "the profession of a photographer is an honourable one, and I repel the insinuation with scorn. The faults in the photograph lie with you, and not with the photographer."

"What do you mean?"

"Why you loaded up your countenance with just the colour which came out differently from what you expected. If you had been contented with a neutral brown, as I was, you would have been all right."

"By Jove! yes, of course. But how on earth did you know?"

"*Because I was once a photographer.* Ta, ta. I'm off to Ditchborough."

And I got the engagement into the bargain, and have had good luck ever since. "Blessings on photography," say I.

THE PORTRAITS AT BURLINGTON HOUSE.

BY WIDE ANGLE.

THE Exhibition now on view at Burlington House is a curious one. Gallery No. 1 fills one with astonishment at the badness of British art about the period of the fifties, Galleries No. 2 and 3 prove that the old masters have yet to be excelled, and Galleries No. 4 and 5 leave one in doubt as to the exact position which the late Frank Holl will finally occupy. As a portraitist, judged in comparison with his contemporaries, Holl, though not possessed of the versatility of Millais, and without the power of infusing that charm which Watts possesses, may take very high rank; but after looking at the magnificent Rembrandts in Gallery 3, Holl's work appears commonplace. It is, in fact, unfortunate that so many masterpieces of the Flemish painter are exhibited in juxta-position with the Holl collection, for the latter undoubtedly suffers. You admire the fine modelling in the portraits of the Duke of Cleveland and Earl Spencer, and the solid work in the head of Signor Piatti, but you pass rapidly over such pictures as the portraits of the Duke of Cambridge, the Prince of Wales, Sir Robert Fowler, and others. But when you have seen the two first mentioned—undoubtedly the best—it is enough. To the Rembrandts you may return again and again, and yet not be satisfied.

It is to be feared that the modern portraitist is spoiled by success. No matter how high his charges may be, commissions from the wealthy flow in, and he must possess an iron resolution if he can avoid rapid and superficial work. Rich people were far from numerous in the seventeenth century, and though the wealthy burgomaster might desire his portrait painted, or that of his wife, where there was one wealthy burgomaster in the Low Countries in those days, there are now five hundred wealthy merchants in Great Britain. How far the whims and fancies of the sitter influence the painter is difficult to say; but it is hard to imagine Rembrandt listening to any request to be taken in any particular manner, and obeying it. There is not a single portrait of Rembrandt's extant which can be said to remind one of any other, so great is his variety; but of what other painter can this be said? The interest which one feels in a portrait sometimes results from an interest in the original, but this is not the case with Rembrandt's pictures, for in nearly every case the originals are totally unknown to us, and possibly possess no claims upon our attention beyond those conferred on them by the painter. And yet these portraits fascinate by their wondrous power and truth. It is possibly the extraordinary accuracy of the observation of the painter which extorts at once the attention and admiration, for the most ignorant person could discriminate between the masterpieces of Rembrandt and the puerilities of Maclise, of which there are some choice examples in Gallery 1. There is no necessity to single out any particular portrait for comment out of the twelve exhibited; all are deserving of study, from the colossal and majestic portrait of himself, to the fresh simplicity of the picture of his mother. The picture of "The Shipbuilder and his Wife" should, however, not go without a remark, simply because in it the painter has triumphed over one of the greatest difficulties of facial expression. The lips here seem to be uttering real sounds, and the action is so admirably balanced that, look as long as one may, nothing strained or unnatural can be detected.

After Rembrandt, the portraits of Romney are best worth notice. Chief among them is the picture of Lady Hamilton. Looking at the large lustrous eyes and the full red lips, one can easily understand how the original was the favourite model of the painter, and how Nelson became enthralled by her charms. The picture is a wonderful bit of painting, and marvellously full of life. Of a different type is the portrait of Miss Mellon, yet one cannot help feeling that Romney has done justice to the sitter. Brightness and intelligence, and a lurking suspicion of satire, mark this expressive face. The portrait of a youth (No. 136) is evidently painted to order, and is spoilt by an affected pose. The portrait of Mrs. Freeman by Sir Joshua Reynolds is puzzling. Reynolds would not have given a lady a pronounced red nose, but here it is unmistakeably. Probably the reason is to be found in the fugitive pigments to which Sir Joshua was addicted. In this case the colour has fled from the cheeks, but has remained on the nose. Of Gainsborough's work the best is the picture of two youths (No. 142) in a landscape. The grouping is graceful and unaffected, and the colouring charmingly luminous and full of harmony. The examples of Zoffany are not particularly pleasing; they are stiff in arrangement and hard in colour. The heads by Greuze, though not avowedly portraits, ought not to be passed over. Heloise (No. 103), a face with the soft langour which Greuze delighted to paint, is particularly charming, and nearly as good as the head and bust of a Bacchante (No. 109).

On the whole, it must be repeated that the most interesting part of the exhibition is that which belongs to the old masters, and that the excellence of Mr. Holl's work is consequently overshadowed.

ON DEVELOPMENT.

BY J. CADETT.*

ORIGINALLY, I intended my paper to be an account of some exhaustive experiments on various developers for gelatino-bromido dry plates, and for this reason I asked for a postponement of my paper, but I am sorry to say that business matters of very pressing nature have prevented me from trying a single experiment during the last month with regard to my subject, and I must therefore prepare you for the disappointment which is sure to follow the little I have to say; however, if I can only indicate a line for experiment, there are many in this Club who would, no doubt, follow it up and settle any doubtful points.

To begin with. How often we hear the merits discussed of the various kinds of developers, with regard to the amount of detail which can be obtained with them individually, or rather, the sensitiveness of a plate with a certain developer. One man says he can get the most detail with ferrous oxalate, another with pyro-ammonia, another with pyro and potash carbonate, another with pyro-carbonate of soda, another with the use of caustic, potash, or soda, instead of the carbonates. Lately some have given the palm to hydroquinone, and so on. Seeing very great diversity of opinion, I tried some time ago to settle this question for myself, in hopes that some difference would be found considerably in favour of a particular developer, especially when we consider that in our choice we can actually deal with a total change in the chemistry of the materials. I therefore, as carefully as possible, began without prejudice, and during my experiments, when I thought there was any perceptible difference (I now only refer to sensitiveness), I tried, by alter-

* Read before the Camera Club.

nation of formula, to get the best results in all cases. To my great surprise I found all developers, including ferrous oxalate, all the modifications of pyrogallic acid with various alkalies and hydroquinone, exactly of equal value in the giving of detail. I must here state that the experiments were carried out with my own plates only, so that I cannot pretend to say that the results mentioned would occur under any circumstances; however, it certainly was remarkable that all kinds of developers gave the same results; and I should be inclined to gather from this, that any future increase in sensitiveness will be found in the plate rather in the developer.

I have often heard my friend, Mr. Payne Jennings, use the rather pretty argument that, no matter how short the exposure, the image must be "all there" if you could only develop it. The little "if," as usual, settles the question. It is not much consolation to tell anyone developing an under-exposed negative of an important subject that it is "all there"; his reply could scarcely be entered on the minutes of this Club.

With regard to density of image, I also found that, provided the formula was arranged, equal apparent density could be had with all kinds of developers. I say apparent, because colour has, of course, a great deal to do with this; however, as there was no difficulty in getting sufficient density with all kinds of developers, I could not make a great point in favour of any one kind.

Having mentioned colour, I will digress for a few minutes to consider a very important matter with regard to it. What I am going to say is not new, but, as far as I know, much attention has not been paid to colour of image, excepting in a wrong direction. So that I may be clearly understood, I may mention that on many occasions I have had to make special plates for photo-lithography and allied processes where great density of image is required. I happened to call on a gentleman using these plates for copying line drawings, and found him using mercury intensification with all his work. I asked whether he could not get sufficient density by development. "Yes, certainly," he replied, "but we find that when sufficient density is obtained by development, the fine lines of the drawing are blocked up and detail is lost, so we prefer to stop development, and intensify by change of colour without further deposit of silver to clog the negative." For line work the difference in the two methods is so remarkable as to place the matter out of question. I have still further evidence on this point. At one time I remember Mr. Payne Jennings being very anxious to have some quickly printing negatives for a very large order, and I suggested the ferrous oxalate developer to prevent the yellow stain of the film. He used the iron developer for some little time, and, without giving the reason, told me one day that he found a blocking of detail in the high lights, and so he returned to the use of pyrogallic acid. To my mind the cause of the difference is simple, it being that a greater deposit of the silver compound to get sufficient density is necessary where the image is not of such a non-actinic colour. Colour of image is, I think, a matter of very great importance, and I hope that the members of this Club will give it their earnest attention. It seems to me that we ought to strive for a red or orange colour, and perhaps some means may be found of altering the colour of a negative simply, and thus do away with mercury intensification, which has several well-known defects against its use. To sum up the matter briefly: the more non-actinic the colour of the negative, the better for its delicacy and good printing qualities.

The present general use of sulphites is no doubt mainly due to the desire for pretty-looking negatives. There is also an idea that sulphites in a measure prevent pyro stain to the film itself; this may be so when development is not pushed very far, but otherwise I think the remedy becomes worse than the disease, as the stain which occurs in instantaneous work when forcing development in the presence of sulphites seems less amenable to the action of clearing liquids such as solutions of alum and the various acids.

There is an objection to the use of sulphites, so far as I am personally concerned: it is the lengthening of the time of development, which takes place when sulphites are present in considerable quantity; this objection is also strongly complained of by professional portraitists. I confess to liking quick development, and I need scarcely say that when there are a gross or two of plates awaiting development, one gets rather tired of lovingly watching the slowly coming image.

Another substance, the meta-bisulphite of potash, has lately come into very extensive use as a substitute for the various sulphites. I would here mention that there is a very general mistake with regard to this salt, as it is confused with the bisulphite of potash. Even many of the large manufacturing chemists seem to be under the same mistake, as I have several times had the ordinary bisulphite given to me instead. The formula is quite different; the meta-bisulphite being $K_2S_2O_5$; the ordinary bisulphite being $KHSO_3$.

There is only one maker of the meta-bisulphite, the process being patented. According to the maker, it is a permanent salt, and does not change by exposure of the dry salt to the atmosphere. In my own experience I find it better to use than the ordinary sulphites, less of it being required, and in consequence there is not so much slowing action in development.

I dare say that many here have noticed with me that, with a given quantity of pyrogallic acid, the presence of sulphites has a destructive effect on the density of the image; it is perhaps for this reason that formulæ for development containing sulphites are generally large in the quantity of pyrogallic acid recommended.

No doubt you have all noticed that the various carbonates when used alone, without the presence of a caustic alkali, considerably lengthen the time of development as compared with caustic ammonia; it is no doubt for this reason that amongst professional portraitists the use of the ordinary pyro-ammonia is generally preferred.

Hydroquinone is now becoming a great favourite, and deservedly so, on account of its comparative freedom from staining the film. Until recently, its great drawback has been in the length of time required for development; but since the use of caustic potash with it, instead of the various carbonates, this trouble has been practically overcome. I tried a short time ago a formula by Mr. J. B. Payne, given by him in a communication to the Newcastle-on-Tyne and Northern Counties Photographic Association. It is as follows:—

Hydroquinone	4 grains	1
Meta-bisulphite of potash	4 ,,	
Bromide of potassium	1 grain	
Distilled water	1 ounce	
Potassium hydrate	10 grains	2
Distilled water	1 ounce	

Equal parts of 1 and 2.

This formula works very well; with some plates the bromide may be omitted.

I should like to say a few words on the development of landscape negatives, particularly with regard to obtaining cloud effects in the same plate as on which the picture is taken. We all know that, as a rule, the sky portion is over-exposed, and very much so in comparison with the rest of the negative, and also that in many negatives we find clouds develop, showing all their detail at an early stage of development, and then rapidly solarise away, leaving in the case of a thinly-coated plate a thin even sky portion, without detail, and evidence of solarisation and halation in the picture; and in the case of a thickly-coated plate, a dense even sky portion that cannot be printed through, but as regards the half tones a better negative. Now to get the best effects without double printing, development should be made as local as possible, the plate being washed along the sky-line as soon as the sky is considered sufficiently dense; development being farther carried on with the rest of the picture. Mr. Payne Jennings is very skilful with local development, and I pass round a few of his negatives to show what I mean with regard to it. A great deal may be done to help gradation in the extremes of light and shade in the make of the plate itself, and I may mention that I have to prepare a plate specially for Mr. Payne Jennings containing a very large amount of iodide of silver. We all know how persistently Captain Abney has recommended the use of iodides in emulsions, and no doubt he is right where the best work is to be obtained. As a plate-maker, however, I have to be chary in the use of large quantities of iodide, on account of the lengthened time of fixing, and the alteration of colour in the image. For studio work, especially where large trade at small prices is carried on, I am afraid that a thickly-coated, heavily-iodized plate would be voted a nuisance, though better results would be obtained; but for landscape work, undoubtedly, such a plate is by far superior, where latitude of exposure, better gradation, and freedom from halation are required.

I should like to say a few words with regard to the various acids for keeping pyrogallic acid in solution. The best, I think, is sulphuric acid, and I use 1 drachm of the strong acid diluted to 1 ounce of pyrogallic acid. Sulphurous

acid, I find, destroys part of the density-giving power. Next to sulphurie I should choose eitric acid, though it has the defect that the eitrates formed have a very softening effeet on the film.

The use of sulphites for the purpose of keeping pyrogallie acid I consider bad. I find that where large quantities of them are used, they ereate the very evil they are used to avoid, for instead of preserving the developer they destroy it—not that they may not prevent the oxidation of the pyrogallie aeid, but in beeoming oxidized themselves, the development is stopped by the large quantity of sulphates formed ; indeed, I have had over and over again solutions of pyrogallie acid rendered practieally inert when exposed any time to the atmosphere.

A word on single fluid developers, and I have done. I think them most unscientifie. We all know how very thirsty is alkaline pyrogallic aeid for oxygen, and therefore eoneentrated single fluid developers must soon spoil if in eontaet with air. All eoneentrated solutions of pyrogallie aeid will keep indefinitely, whether aeid or alkaline, provided the bottle be full, and well corked ; but the bottle eannot always be full, and then, of course, alkaline solutions must at onee suffer.

Notes.

Many visitors to the Stuart Exhibition have doubtless noticed a point which, on the day of the private view, furnished the crowds of fashionable people then present with a most interesting topic for gossip. We allude to the curiously close resemblance which one of the exhibited portraits of James I. bears to the late Lord Henry Lennox. The late Lord Henry Lennox, as most people are aware, was the Duke of Richmond's brother, and the Duke of Richmond, as is equally well known, is directly descended from Charles II. One has only to remember that James I. was Charles II.'s grandfather, to be able to understand how espeeially interesting the aforesaid resemblance between the former monarch and the late Lord Henry Lennox must be to believers in what may be called the Galtonian theory of heredity. That the resemblance is very striking cannot be doubted, and M.P.'s who may have sat with Lord Henry in the House of Commons can scarcely look at the portrait of James I. we allude to without recalling not only the face and figure of the former member for Chichester, but even the pose of his head and the peculiar position in which he used to place his hands when about to address the House.

Under these circumstances, it is not at all surprising that Mr. Francis Galton should regret that Daguerre was not a contemporary of Guido Faux ; for if only a reliable photographic likeness of King James existed, the results that might be obtained by a systematic comparison of it with one of Lord Henry Lennox would probably prove to be as useful as they would be interesting. As it is, however, the high priest of this science of hereditу has to be content with a photographic copy of King James's portrait in oils, though it is rumoured that even with this necessarily imperfect means of comparison, results have been obtained of exceptional value from a scientific point of view.

The account we gave last week of the Photographic Exhibition at Richmond is supplemented by an interesting signed article from the pen of Mr. Valentine Blanchard, which we publish this week.

In reference to the numerous exhibitions of the present time, it has been suggested that a better arrangement than the so-called Champion Exhibition now being held in Bond Street, would be a series of Challenge Exhibitions beginning with the works of photographers who have received, say, fifty medal awards, and ascending by stages as the public become educated. The second of the series might be for those who hold one hundred medals. As a climax, there might be a final exhibition of the series confined to the works of veterans of a thousand medals or over ; but, even in the present time of abundant awards, the latter class would hardly be a numerous one.

The professional competition of the Bolton Photographic Society, announced in another column, is an interesting development of the present system of numerous awards, and in the professional section there is a remarkable recognition of the current infusion of the trade element in matters relating to art, for in reference to the envelopes containing the names of competitors—envelopes not to be opened till after the competition—the Circular says : "If you forward in No. 2 a card advertising your business, it will be affixed to your exhibit after the award."

There appears to be no end to the uses to which photography may be put. We heard lately of a novel application—namely, that of an adjunct to the business of a life insurance agent. The life insurance business is one of vast ramifications, and the methods of persuasion to induce people to insure their lives are endless. The great thing is to get on as friendly terms as possible with a vast number of people, and the agent in question, who used to travel all over the kingdom, stopping for weeks together at the principal towns, found no better way than by a little amateur photography. In the summer months he never went out without his camera, and his friendly offers to take portraits "just for a lark" brought him into sufficiently close relations with the people to whom he was introduced.

Of course this was before the present rage for dabbling in photography, and the country people looked with great wonder upon the man who could take their portraits at their own houses. Our friend the agent made good use even of his failures. Only the very prudent are ready to insure ; the great majority have to be talked into it, and when they are in good health they require a very great deal of talking indeed. It happened more than once that a burly farmer, made a little uncomfortable by his appearance in an under-exposed over-toned photograph, was induced to insure simply by a judicious word thrown in by the agent that he really was not looking well, and that the photograph was a faithful representation of his state of health.

Once, however, the plan succeeded too well. In this case the sitter was really out of health, and the photograph, which was more than usually ghostly, had such an effect upon him, that he offered to pay the first premium amounting to £20, there and then. The agent did not

quite like this readiness to part, and as it was coupled with the man's ill looks he began to suspect that the "life" was not a good one, and that the medical officer would refuse to pass it. So he made an excuse in regard to the premium, and put off the matter for a few weeks. When he next saw the would-be insurer, the latter, to his disgust, refused to proceed any further. The fact was his health had much improved, he had made up his mind he was not going to die, and to satisfy himself had had his portrait taken by a professional photographer, who had turned him out hale and hearty, and in the very pink of condition.

The January number of *Harper's New Monthly Magazine* is well worth obtaining by photographers, as it not only contains an admirable illustrated article on Modern Amateur Photography, by Mr. F. C. Beach, of New York, but also excellent portraits of Captain Abney and Sir Howard Grubb; this latter being used as an illustration to a monograph on "Manufacturing Industry in Ireland," by Mr. Commissioner McCarthy.

If a correspondent was not very much mistaken, "at least one individual in the stalls of the Lyceum on the first night of 'Macbeth' was busily engaged during the evening in manipulating a detective camera, with the evident intention of securing by its aid portraits of the numerous celebrities around him." "This same individual was clearly an old photographic hand," our correspondent adds, "for it was only to trained eyes that the significance of his artful manual movements were apparent, there being evidently no suspicion in the breasts of the said celebrities that an audacious 'chiel' was amongst them taking photographic notes in the shape of their likenesses." It seems, too, this portrait-seeker was an habitual "first nighter," although it was impossible to fix his identity during the *entracte*; but this conclusion was finally arrived at after closely watching his proceedings—viz., that he must have attended the performance with a view to obtaining photographic notes of all the more striking and original of the costumes worn either on the stage or in the auditorium; and by this time, probably, not only have the more fashionable of the ladies present had their *toilettes* minutely described for the amusement of the readers of the *Boudoir Journal* and the *Backstairs Intelligencer*, but have doubtless also had the dissected details of their *modeste's* masterpiece published for the information of the country dressmakers who subscribe to the *Feuilleton of Fashion* or *Elizabeth Jane's Journal*. Meanwhile, yet another legal point is thus raised:—Has a lady any copyright in her new, and so to speak, just published costumes, or may cheap imperfect editions of it be produced with impunity? Perhaps the law, having decided that one has a kind of proprietary right to restrict the unauthorised publication of one's face, would also, if invoked, decide that the original works of art which a lady of fashion in effect publishes when she wears them at a "first night" cannot be re-published without her consent. In any case, we think the use of the detective camera in the manner described would undoubtedly be resented were it to become patent and palpable, and rightly so, we think; for surely of all inquisitive meddlers, a "Paul Pry" with a photographic camera in the place of his historical umbrella is the most annoying! Still, it may be asked, how could he expect to have sufficient light for his work? Certainly it would not do for one of the audience to work the magnesium flash at intervals during the performance.

It is time the itinerant vendors of photographs made themselves acquainted with the faces of the originals whose pictures they are supposed to sell. This precaution would prevent the awkward position in which one of them was placed a few days ago in the City. A meeting was announced in connection with the candidature of Lord Rosebery for the County Council, and a photograph hawker did a roaring business in selling photographs of the popular candidate. In an unfortunate moment, however, he approached a gentleman who was entering the hall accompanied by several friends. "Portrait of Lord Rosebery, sir, only a penny!" shouted the man, and thought he had got a customer, when the gentleman stopped and took the photograph in his hand. There was a titter while the gentleman examined the photograph, and returned it with the words, "That's about a hundred years old, my man, and not worth a penny." The man took the photograph, and was about to argue the point, when a twinkle in the eye of the speaker somehow revealed the truth. It was Lord Rosebery himself whom he had accosted, but the photograph had been taken when his lordship was at least twenty years younger.

Speaking of the County Councils, it may be said that full advantage has been taken of the facilities which are afforded by reproduction from photographs. It is now recognised that the best advertisement a man can have is the publication of his portrait, and this is rendered an easy matter, thanks to photography. But a good deal of ignorance as to the requirements is still displayed by the public, and it is quite time those newspapers who go in largely for portraits should fix upon some code of regulations. Thus, when a man has to be drawn without a hat, of what use is it sending to the artist a photograph wherein the hat is shown? How many men are there who, apparently well thatched when wearing their hats, are seen to be quite bald on the top of their heads when the hat is taken off? It is quite impossible for an artist to know by intuition on which side a man parts his hair, yet this is sometimes expected. As for sending a photograph with the intimation, "I have grown my"—whiskers, moustache, or beard as the case may be—"since this was taken," this is of every day occurrence. A little thought on these points would save the unfortunate artist much trouble.

The poor photographer is threatened with a new rival—the automatic portrait taker. The manager of the Automatic Box Company, which undertakes the supply of penny photos of celebrities, spoke of the difficulties which surround taking one's own portraits automatically. In fact, "the only difficulty is the delivery of the finished photo," but

even this the manager hoped soon to overcome. The interview furnished some scraps of information which photographers will be glad to know. For instance, "the cost of producing a photo—of the paper and chemicals used—is almost *nil*;" . . . . "the profits of a photographer are simply enormous;" . . . "our business (*i.e.*, the penny photos of celebrities) has played the deuce with the photographers with their high-priced copies . . . . The reproduction of the photos has hitherto been done by English firms, mostly by the Woodburytype process. Now, however, I can get them done in Germany by the colour-type (collotype?) process for one-third the cost."

All this is interesting, but not encouraging, to English photographers. At the same time, we should fancy these statements may be taken with a very considerable grain of salt. As to being photographed automatically, if the system be anything like that recently described in the NEWS, which occupied several pages, the matter is not nearly so simple a thing as the manager of the Automatic Box Company imagines. It will probably be long before the expectation that "if boxes are put at railway stations, in public houses, on the piers at the seaside, many people will be content with the penny photo, who would otherwise have gone to a cheap studio," will be realised.

It is very difficult for anyone who invents anything in photography to retain the credit of his invention. There are always ready people to seize upon anything new, and more or less "improve" upon it. In fact, it seems impossible for a photographer to take a thing just as he finds it; he must always introduce a "modification." This would not so much matter if the name of the original inventor were always kept in view. Unfortunately, careless scribes, in writing, often refer to the latest exponent, and so no end of confusion arises. For instance, a writer in the *Echo* this week gravely asks, "Has the reader ever heard of the Yankee composite photography—whereby from any number of diverse faces photographed one over the other, a single resultant face may be produced?" Mr. Francis Galton is here totally ignored, and "composite photography" is set down to the credit of the Americans. Of course it is the result of ignorance on the part of the *Echo*, but the blunder is on that account not the less to be deplored.

Patent Intelligence.

Applications for Letters Patent.

18,796. JAMES HEBER TAYLOR, 24, Southampton Buildings, London, W.C., for "Improvements in Heads for Camera Stands."—December 22nd, 1888.

18,805. WILLIAM TYLAR, 12, Cherry Street, Birmingham, for "Improvements in Photographic Lamps or Lanterns."—December 24th, 1888.

38. HENRY VAN DER WEYDE, 53, Chancery Lane, London, for "Improvements in the Production of certain novel Magic Lantern Effects."—January 1st, 1889.

56. OTTOMAR ANSCHUTZ, 47, Lincoln's Inn Fields, London, for "Improvements in Photographic Cameras."—January 2nd, 1889.

114. ARTHUR RICHARD WORMALD, Sutton, Surrey, for "An Apparatus for Enlarging Photographic Negatives by Daylight."—January 3rd, 1889.

207. JOSEPH H. WOODWORTH, 89, Booterstonn Avenue, Booterstoun, Dublin, for "An improved Arrangement for Photographic Cameras, whereby a clearer view is obtained of a portion of the image received on the ground glass focussing screen, and the use of a focussing cloth is rendered unnecessary."—January 2nd, 1889.

Specifications Published.

1291. CHARLES HENRY STANBURY, of 91, Fleet Street, in the City of London, for "Improvements in Dark Chambers for Photographic Purposes."—Dated January 27th, 1888.

The claim appeared to be for what is often known as a sleeve-tent, namely:—

1. A dark chamber for photographic purposes, having an opening or openings of sufficient size for the eyes of the operator so that he can see in, whilst his nose and mouth are outside, the edges of the opening or openings fitting closely to the face to exclude light, substantially as described.

2. A dark chamber for photographic purposes, having an opening which can be closed by a curtain or panel sliding in grooves formed between the two thicknesses of material forming the chamber, substantially as described.

3. A dark chamber for photographic purposes, having three of the sides hinged together, and each of the three sides formed of two pieces hinged together, substantially as described.

4. Dark chambers for photographic purposes, substantially as described.

1985. GEORGE CORPE WHITFIELD, The Woodbury, Ealing, for "Improvements in Woodburytype Printing."—Dated 7th of November, 1888.

The patentee says:—

My invention relates to the production of prints by the well-known Woodburytype process; and it has for its object to enable such prints to be directly produced with a broad, clean, white margin, suitable and ready for binding into books, and having all the appearance of prints which have been trimmed and mounted in the usual way heretofore practised.

In carrying out my invention, I may either mask the margin of the gelatine relief during the printing thereof from the negative, so as to sharply limit the outline of the area printed, or I may trim the finished relief to the intended size and shape of the picture.

I, however, prefer the first mode, as by that means the marginal portion of the collodion support of the gelatine relief from which the gelatine has been wholly washed off remains as a margin around the relief, and by its thickness interposed between the bed of the press and the plate of lead of which the matrix or mould is to be formed, reduces the extent to which the marginal portion of the lead plate will stand up above the level of the matrix proper from which the picture is to be printed.

From a relief treated in either of the above-mentioned ways, a matrix is produced by subjecting a plate of lead to pressure when in contact with the relief, in the ordinary and well-known way, the lead plate being, however, of so much larger dimensions than the picture, that a plain (and preferably broad) marginal surface will be formed at all four sides of the subject or intaglio portion of the matrix. This marginal surface being plain and standing up above the general level of the subject or intaglio portion, produces in printing a picture having a sharply-defined edge, but some of the ink squeezed out in the process of printing will remain on the marginal portion of the paper, and this superfluous ink is to be afterwards removed by washing away up to the edge of the picture with a cloth moistened with hot water, leaving the edges of the picture sharply defined and the margin quite clean.

The paper generally used for Woodburytype prints is unsuitable for binding into books, as it is too light of substance, and in consequence of the treatment it undergoes in the course of the Woodburytype process, it is liable to tear out very easily from the binding. It is necessary to use a paper of an even texture, sufficiently stout and tenacious to withstand the effect of the process and be held by the binding without liability to tear easily, and hard enough to receive on its surface without absorbing, the waterproofing preparation necessary for the Woodburytype printing, and for the removal of the superfluous ink from the margin by washing as above mentioned. I find paper of the kind and quality known as "Cream Wove tub sized drawing-paper 70 lb. Imp." to be a suitable paper for the

urpose, but I do not restrict myself to the employment of that aper alone.

Having now particularly described and ascertained the nature f the said invention, and in what manner the same is to be erformed, I declare that what I claim is :—

The production substantially in the manner herein described, f Woodburytype prints with sharply-defined edges and clean nargins, such prints having the appearance of mounted prints, nd being suitable for binding in a book without undergoing the perations of trimming and mounting.

,615. Sir DAVID LIONEL SALOMONS, Baronet, of Broomhill, Tunbridge Wells, in the County of Kent, for "A Slide Rule for Photographic Purposes."—Dated March 8th, 1883.

The claims are :—

1. A slide rule for photographic purposes having three ogarithmic scales (one of them a sliding scale) graduated espectively for focal lengths, apertures, and the ratio between he two, with or without other scales, substantially as described.

2. A slide rule for photographic purposes having one of the cales upon the bottom of the recess receiving the slide, substanially as described.

3. A slide rule for photographic purposes, substantially as lescribed.

4. A slide rule, substantially as described, for comparing one standard with another, and with ratios.

5. A slide rule, substantially as described, with which all the usual calculations required by a photographer in reference to comparing lenses, lens settings, equivalent values for setting lenses and their stops, can be accomplished without trouble, either at a glance, or by setting the slide suitably and observing the result.

3,076. CHARLES HENRY GALE, 38, Scarsdale Villas, Kensington, W., Civil Engineer, for "An Improved Camera."—Dated, 29th February, 1888.

The claim is :—

1. In a photographic camera, the improved means of supporting the rising front, consisting of slotted uprights and clamping screws, the uprights being hinged to the base board, so as to fold down when not in use, substantially as specified.

2. The focussing pinion mounted to slide longitudinally in its bearings, in combination with a recess in the base board to receive the head of the pinion, substantially as specified.

3. Supporting the camera-back on struts connected to the back by clamping screws adjustable in vertical slots, and pivoted to ears which project over the rebated guides of the tail board so as to be clear of the bellows body, substantially as specified.

Correspondence.

PHOTOGRAPHERS' DEFENCE ASSOCIATION.

SIR,—I am quite sure that when Mr. Debenham thinks fit to make a statement he knows what he is about, and taking into consideration the kind way in which he makes his attacks, one can scarcely fail to forgive him for a slight oversight, which, however, unfortunately tends to do me an injustice. To explain this to him thoroughly in these columns is, to my intense disappointment, impossible. Suffice it, then, to remind him that I stated distinctly that I thought it wrong to contend that the photographer could make what use he pleased of a negative ; and furthermore, I said that in the case cited an implied permission to exhibit existed on account of the plaintiff visiting the establishment for months, being fully aware of its being there. But why create a dispute about the matter, and endanger so important a project, which Mr. Debenham himself strongly advocates? But even if the case of Pollard *versus* Photographic Company seemed uppermost in my mind, a careful perusal of my original letter proves that I had other cases besides this one in view when I urged such a scheme. For instance, the sentence, "Photographers will probably have to part with a valuable negative to an amateur friend," &c., evidently refers to the case Marson *v.* Barns. I own that I ought to have expressed this more clearly, but pressure of business prevented me from going deeply into this matter, as it has prevented me from attending at our several society meetings, which I scarcely need say is a punishment to me.

No sacrifice, however, I shall deem too great to assist in bringing about the great work of a union amongst photographers, and I rejoice to think that, to conclude from the general tone of Mr. Debenham's letter, his valuable patronage will practically be assured ; whilst judging from the able exposition of the law as relating to photography, Mr. Debenham's brother (in the event of the establishment of the Union) ought to be respectfully prevailed upon to lend his estimable aid for the purposes of the Society's legal organisation.

Once more I earnestly ask my colleagues to co-operate heartily to bring about the early formation of the Society, which will then be prepared to meet a case when it is presented, besides acting as a caution to malicious and reckless litigants.—Yours truly, J. HUBERT.

258, *Mare Street, Hackney.*

PHOSPHORESCENCE AND PHOTOGRAPHY.

SIR,—Will you allow me to make a few remarks on a paper which appears in your columns of January 11th.

In that paper Mr. D. Winstanley appears to blame me for occupying the time of the Photographic Society of Great Britain by allowing them to make guesses at the cause of certain marks on the negatives I had submitted to their judgment, instead of making a few experiments for myself, and thus deciding the cause as to whether they were caused by phosphorescence or by something else.

Now at the time of submitting them to the Photographic Society I could think of no other manner than that they were produced by phosphorescence, but I did not expect that such a learned body as the Photographic Society of Great Britain would have to make guesses, as Mr. Winstanley puts it, in order to tell me what was the cause of the marks which I well knew were produced by no accident of manipulation.

Now Mr. D. Winstanley must not think the time consumed in the discussion to be all wasted, as it is plain to be seen by the paper that the discussion has produced from him, that although the effects of phosphorescence or radiation in and from different substances were well known to scientific men, still it is not so generally known as it ought to be.

Let us, then, be thankful, for Mr. Winstanley's paper gives a rather large list of those substances and their behaviour under different circumstances ; so that there will not be any excuse for ignorance on that subject for the future. But it is to Mr. Chapman Jones belongs the credit of making a suggestion as to the right way in which they were produced, viz., by deflecting the axial line of the lens away from the bright object, such as a gas flame.

Since reading his suggestion I have made a few trials in focussing with the same lens and camera under a light as nearly similar to that in which the marked negatives were made as possible, and although I had not time then to make a series of negatives, yet the result of my experiment has completely crushed the phosphorescent theory with me.

I placed a piece of white cardboard against the back of a chair in nearly the same position as the shirt front in the marked negative, and focussed for it with the top curtain well open, as the light was very dull. I found that when the image of the cardboard was kept well to the top of the camera, a reversed image of the cardboard was visible on the bottom of the focussing screen when looked at from a point not higher than the tail-board of the camera.

The secondary image possessed a want of sharpness at the edges in proportion as the primary was more or less in focus, but could be brought up into very sharp focus when the primary was entirely out of focus. I also found that

the quantity of light on the background affected the brillianey of the secondary image insomuch that when I placed a dead black background behind it, it appeared very much brighter than before.

When the camera was brought into more direct line with the cardboard the two images were merged more or less into one, so that the primary being the most brilliant and most sharply focussed, the secoudary would not be noticed unless they had both been observed during the motion of the camera; and seeing that such was the effect to be seen when focussing, I have no doubt now but that it was owing to the particular combination of circumstauces that was present in the making of the negatives that the secondary image was photcgraphed at the same time as the primary.

I intend to try, as soon as I can spare the time, to certify the results of my focussing experimeut by trying to produce the same markings on a fresh set of plates; but in the meantime I must thank the Photographie Society for their kindness in allowing such an apparently trivial subject to be so fully discussed, although it is good to remember that great knowledge often springs from small enquiries, aud that anything that differs from what was known before merits a careful examination.

43, *Cardiff Street, Aberdare.* J. LENDON BERRY.

NON-RETURN OF SPECIMENS.

DEAR SIR,—I wrote in reply to an advertisement in your paper respecting situation as retoucher, sending specimens which are of value to me and cannot be replaced, and which have never been returned or any notice taken whatever of my application. The advertiser went under the letter X. A. at your office. I write to know if you could give me any information concerning him and how he can be reached.—Yours truly, GEO. H. ROBINSON.

78, *Finch Road, Douglas, I. of M.*

[We have forwarded to our correspondent a statement, by our publishers, as to the source of the advertisement, and have advised him as to the steps usually taken. To send specimens to an unknown person who only gives initials involves considerable risk of loss. See the publishers' notice at end of second column of p. 48.—ED. P.N.]

POLLARD *v.* PHOTOGRAPHIC COMPANY.

SIR,—I am sure you will allow me a space in your valuable paper to explain the case "Pollard *versus* Photographic Company," being myself the defendant in the case, and because most of the reports about the case are entirely wrong.

Mrs. Pollard and family were photographed at our establishment, and according to her own statement received every satisfaction.

The photograph of herself was exhibited in the window in the usual way, also two of her children, all in cabinet size.

The two children were painted in oils for specimen purposes only, and during the time that those portraits were exhibited, the lady visited the establishment on several occasions. One day she called in and wanted to inspect the two cabinet portraits of her children, which were in the window, and between which was placed her own portrait. The photos were taken out and shown to her; she liked them so much that she ordered a couple of them, after which they were placed again in the window. Now although she must have seen her own portrait at the same time, she never gave us the slightest hint that she objected to its being exhibited; in fact, we had every reason to believe that she did not object. This was about September. In the beginning of November, I printed another copy of Mrs. Pollard with "A Merry Christmas and a Happy New Year," on it, from one of Marion & Co.'s paper negatives, and exhibited as an ordinary specimen in the window, certainly not thinking for one moment that this could in the slightest degree offend, knowing that she had not objected to being exhibited. One photo only was printed in the Christmas style, and certainly not offered for sale, nor ever intended for such. One evening a gentleman called to ask if he could buy the photograph in question, and was informed that the photo was not for sale. However, he particularly wanted to buy that portrait, and accordingly was asked if he had the right to do so. I asked him three times distinctly, "Are you sure you have the right to purchase?" and he declared, in an emphatic way, "Decidedly, I have." Taking his word as a gentleman, I sold it to him in good faith.

This was the only photo sold, and I consider was sold to the lady herself, because she really sent him to purchase same. Now tell me, where is the wrong done? I never for one moment gave our solicitors to understand that we claimed the right to do with the negative what we liked. On the contrary, we distinctly informed them that if she had given us the slightest hint of her objection we should have been too pleased to remove it at once. Our counsel simply said that we had the right of making use of the negative for specimen purposes as long as we did not do anything unlawful, and as long as no objection was raised by the person. Now I ask, is there a photographer in the United Kingdom who has not done the same thing over and over again? We wrote to our solicitors to ask why the plaintiffs applied for an injunction and put us to unnecessary expense, when they might have requested us to abstain from exhibiting the lady any more.

I hope that this explanation will be satisfactory to all your correspondents, and most particularly to the one signed "Debenham"; and surely it justifies the letter written in such a patriotic way by Mr. Hubert. There are other matters I could mention which would still more prove that our dealing was strictly honourable, but as the defence did not go deeply enough into these matters I am obliged to keep silent. I think the case concerns every photographer, and should be supported by all, as it is only what might happen tomorrow to anyone in the profession. I may add that an extension of time for the appeal has been granted. W. C. BAX, Manager.

Photographic Company, Rochester.

[If our correspondent admits he has no right to use the customer's negative, why should he wish to appeal?—ED. P. N.]

Proceedings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on the 10th inst., Mr. A. COWAN in the chair.

A question from the box was read: "Is there any method of decolourising a negative supposed to have become yellow through insufficient washing?"

Mr. J. B. B. WELLINGTON thought that the yellow stain was more frequently caused by the plate being insufficiently fixed.

The CHAIRMAN suggested bleaching the negative with bichloride of mercury, and then redeveloping with ferrous oxalate.

Mr. F. E. FRESHWATER exhibited a very rigid and light camera stand. It had no loose parts, and could be put up in a few seconds.

This being a lantern night, a large number of slides were projected on the screen by the optical lantern. The slides were contributed by Messrs. H. M. Hastings, H. D. Atkinson, J. B. B. Wellington, and L. Medland.

At the next lantern meeting, February 14th, a selection of views of Holland will be shown by Mr. F. E. Freshwater.

Mr. W. M. Ayres was elected an honorary member of the Association.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THE fourth general meeting of the session was held in the rooms, 207, Bath Street, on Thursday, the 10th instant. The President, Mr. WILLIAM LANG, jun., F.C.S., in the chair.

The minutes of last meetiug were approved, and Messrs. William A. Brown, William Gemmill, James G. Mainds, Fred. Mackenzie, and Matthew McKenzie, were elected members of the Association.

The PRESIDENT gave a short address, wishing the members success in 1889, which, he reminded them, was the Jubilee year of photography.

After some discussion, it was agreed to devote part of the fund left in trust by the old Glasgow and West of Scotland Photographic Society to the purchase of a first-rate optical lantern for the use of the Society.

Mr. JOHN ANNAN then exhibited prints from some reversed negatives, which he had obtained by exposing a plate under the original negative sufficently long to cause a complete reversal of the image. Some of the reversed prints shown were quite equal in quality to the originals. The exposure required was about three hundred and fifty times that necessary to obtain a positive. The developer used was weak in ammonia and bromide, and strong in pyro, and was composed approximately of six parts of ammonia, three parts of bromide of ammonium, and twelve parts of pyro, to one thousand parts of water. The exposure permitted considerable latitude, and, practically, was found to be from forty-five to sixty minutes at six inches from a No. 5 gas burner, or from fifty to eighty seconds to diffused daylight.

Messrs. T. N. ARMSTRONG and GEORGE BELL gave a joint demonstration of a flash light which they had worked out together. It consisted of an oxy-hydrogen limelight with an extra hydrogen flame, through which magnesium powder was blown from a wash-bottle. The whole was enclosed in a glass case, with a chimney to carry off the fumes. Several practical experiments were made with most satisfactory results.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

THE first annual general meeting of this Club was held on Monday evening, the 14th inst., when the following five gentlemen were elected members :—Messrs. H. Beckford, S. Bolton, F. Cherry, C. Raftery, and M. Sanderson.

The report and balance sheet were then read and adopted, the following being a copy of the former :—

First report, for the half-year ending December 31st, 1888. "The Council of the North Middlesex Photographic Club, in presenting this their first report, feel bound to congratulate the members upon the very marked success which has attended the Club's proceedings since its commencement in June last. The attendances have been exceedingly good, especially when the recent very inclement weather is taken into consideration ; the average number present at the meetings being, as shown by the attendance book, 22. The Club has now 45 members, a number which, of itself, reflects great credit upon the original members. During the half-year, papers and demonstrations have been given, as follows :—'Photography, Past and Present,' by the President ; 'The Flash Light,' by Mr. F. W. Hart, F.C.S. ; 'Lantern Slide Making,' by Mr E. T. Hiscock ; 'Toning and Fixing,' by Mr. F. W. Hart ; 'Microphotography,' by the President ; 'Platinotype,' by Mr. F. W. Cox ; 'Opal Contact Printing,' by Mr. E. T. Hiscock ; and 'Enlarging,' by Mr. J. Oakley. On November 19th, a most successful lantern night was given at the Iron Room, Stroud Green, before about 300 people. The outings, it is deeply regretted, have not been so successful as might have been hoped ; but in the coming season, with perhaps more favourable weather, it is sincerely trusted that these afternoons will be made use of by members, as a pleasant and instructive mode of meeting. In conclusion, the thanks of the Council are sincerely tendered to those gentlemen who have so kindly come forward with papers and demonstrations, and it is hoped that they will again help with others. To the Press (both photographic and local) are also due the thanks of the Club, for the publication of notices of the meetings. (Signed on behalf of the Council), Mr. John Humphries, President, Mr. Ernest J. C. Damant, Hon. Sec., 31st December, 1888."

The election of honorary officers for the ensuing year then took place, Messrs. Cherry and Oakley acting as scrutineers, who declared the result as follows :—

President.—Mr. J. Humphries, F.S.A. (unopposed.)

Vice-Presidents :—Messrs. H. Beckett and E. T. Hiscock (unopposed).

Curator.—Mr. G. R. Martin.

Council.—Messrs. F. W. Hart, F.C.S., T. C. Lathbridge, W. A. Lavanchy, J. Saville, J. Stanart, and H. Walker.

Treasurer.—Mr. E. Seymour Paul (unopposed).

Secretary.—Mr. Ernest F. C. Damant, 25, Granville Road Stroud Green (unopposed).

Votes of thanks were then accorded to the President, the Vice-Presidents, the Council, and the Secretary.

This Club will hold their first annual dinner on Monday next, the 21st inst. The next meeting will be on Monday, the 28th, at the Iron Room, Granville Road, Stroud Green, N.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.

THE annual meeting was held on the 8th inst., Mr. H. R. PROCTER in the chair.

The annual report of the Hon. Secretary stated that outdoor meetings had been held at Barnard Castle, Tynemouth, Bellingham, and Chollerford. Ten new members were elected during 1888 ; on the other hand, several had been lost through removal and resignation.

The Treasurer's report showed a balance of £3 19s. 5d. in hand.

The election of officers for the current year resulted as follows :—

President.—Mr. A. S. Stevenson.

Vice-Presidents.—Messrs. J. P. Gibson and H. R. Procter.

Council.—Messrs. M. Auty, J. Brown, T. Galloway, J. E. Goold, H. C. Hemy, P. M. Laws, W. Parry, H. G. Ridgway, E. Schumann, and L. Williamson.

Hon. Treasurer.—Mr. J. W. Robson.

Hon. Secretary.—Mr. Edgar G. Lee, 3, Woodbine Road, Gosforth, near Newcastle-on-Tyne.

Six new members were elected, and a vote of thanks was passed to the Treasurer and Secretary for their services during the past year.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

Fixtures.—January 21st, "On Making Backgrounds (Practical)," Mons. M. Tuquet ; February 4th, "Lantern Exhibition, A Visit to the Land of the Midnight Sun," Professor Clowes, D.Sc. ; February 11th, Smoking Concert ; February 18th, "Photo-Mierography," Mr. W. N. Pratt, F.R.M.S., and Mr. F. W. Cave, F.R.M.S. ; March 4th, "Experiments in Printing Processes," Mr. W. J. Collings ; March 18th, "Magic of Science, A Night's Amusement with Photographic Chemistry," Mr. J. C. Lancaster ; March 25th, Smoking Concert ; April 1st, Subject to follow, Mr. T. Bourne.

CAMERA CLUB.

ON Thursday, January 10th, the one hundred lantern slides just received from America, in connection with the International Exchange, were exhibited for the first time.

Sir GEORGE PRESCOTT presided, and prior to the lantern exhibition called for any objects of interest which might have been brought.

The SECRETARY handed round some prints on ivory films, and also specimen of a one-bottle developer in powder form, introduced by Mr. Oldham, of Eton, for development whilst travelling.

The circumstances of the lantern-slide exchange were then referred to, and the names of the societies included in the exchange were given. They are as follows :—Photographic Society of Philadelphia, the Cincinnati Camera Club, the New York Society of Amateur Photographers, the Philadelphia Amateur Photographic Club, the St. Louis Camera Club, the Pittsburgh Amateur Photographic Society, and the Chicago Lantern-Slide Club. The pictures shown on the screen were received with much admiration, and the work proved to be finer than any yet received in the Exchange. The average is high throughout, and some of the slides are extraordinarily effective in colour and general technique. "Elephanta Caves," and "A Moonlight Effect," are gems of transparency work.

Subsequently other slides by Messrs. Brownrigg, Lambert, Leventhorpe, Charters White, Elder, Orton, and Hansard, were shown.

Mr. BROWNRIGG enlivened the exhibition of a very fine and varied set by humorous description. Some of Mr. Leventhorpe's slides were of exquisite colour and quality.

The subject at the Club on Thursday, January 24th, will be "The Application of Photography to Meteorology," when Mr. MARRIOTT, of the Royal Meteorological Society, will give an address, and illustrations will be shown.

WEST LONDON PHOTOGRAPHIC SOCIETY.

AN ordinary meeting of this Society was held on the 11th inst. at the Addison Hall, the PRESIDENT occupying the chair.

Mr. G. F. BLACKMORE read a paper entitled "Notes on Ferrous Oxalate Development." The Lecturer said, with regard to the materials necessary for compounding the ferrous oxalate developer, he considered it was highly desirable that they should be procured from a reliable source, and he hoped to show that the ability to compound the solutions was not exclusively vested in the dealers in photographic requisites. If the worker was without an accurate knowledge of the strength of the solutions, it was impossible to develop a plate intelligently. Notwithstanding the fact that high authorities had recommended various additions to the ferrous oxalate developer, he found that simple solutions of neutral oxalate of potash, pure re-crystallized protosulphate of iron, and bromide of potassium were all the chemicals that were really essential. He recommended that a pound of neutral oxalate of potash should be put into a 20-ounce bottle, and boiling water added to nearly fill it. When the solution was cold it should be tested with litmus paper, in order to see whether it was really neutral, because commercial samples were frequently alkaline, or in some cases highly acid. If neutral, half a drachm of sulphuric acid should be added; the solution was then ready for use. He had found that if left alkaline the solution appeared to deteriorate rapidly, and throw down a white precipitate. If it were found to be acid it would be unwise to make further addition of acid, as that would cause an increased tendency to frilling; in that case it should be neutralized by the addition of carbonate of potash, a few grains at a time, and then the known quantity of acid should be put in. It was said that oxalic acid might be substituted for the sulphuric, but he had never used it. The iron solution should be prepared by putting half a pound of protosulphate of iron into a ten-ounce bottle, to which half a pint of water should be added; the bottle should be immediately shaken up vigorously, and the water poured away, the object being to remove all trace of a possible yellowish powdery crust frequently found on some of the crystals. A slight loss might take place, but it was more than compensated for by the superior results obtained. The water having been poured off, sufficient boiling water was to be added to nearly fill the bottle, the solution being then allowed to cool, half a drachm of sulphuric acid should be added. With solutions prepared in this way a deposition of crystals would take place when the solution cooled, which showed that they were separated. An ordinary ten per cent. solution of bromide of potassium would complete the list of solutions necessary for compounding the mixed developer. The deterioration of the ferrous oxalate solutions appeared to the lecturer to be principally due, as was the case with other developers, to the oxegenising effect of the atmosphere upon them—to impure water—to the use of impure or oxydised crystals, or to their being in an alkaline state when made. The visible indication of deterioration in the potash solution was a cloudy or murky appearance, and with the iron solution a yellow, rusty, turbid colour instead of a brilliant emerald green. The first case of deterioration might be effectually surmounted by keeping the iron solution in a bottle with an orifice near the bottom (which might be purchased at the philosophical instrument makers), and drawing off the solution from below. In lieu of a cork, a layer of pure colza oil should be employed, which would prevent the action of the atmosphere on the solution. The potash solution was less liable to deterioration, but if any appeared it could be removed by filtration. The functions of the three constituents of the ferrous oxalic developer were perfectly well known, but he might state briefly that the potash was the density giver, the iron the accelerator, and the bromide performed the same duty as in other developers—namely, that of a restrainer. His own practice was to use very little bromide; he preferred to rely upon adding iron in small doses, and in no case should the iron exceed one-fifth of the potash; if more were added, there was great risk of turning the developer muddy. Another fertile source of muddy developer was the dilution of the potash solution with water before adding the iron; if such addition was imperative, the water should be distilled. It had recently been recommended in the photographic periodicals to shake the bottles before using. This, he had no hesitation in asserting, was exactly what should be avoided. The lecturer was sorry to have to fall foul of authorities, yet, having tested the matter, he felt bound to lay his conclusions before the members. It was particularly necessary to add bromide with rapid plates containing iodide. With regard to the development of under-exposed plates, he was bound to confess that the ferrous oxalate developer appeared less tractable than pyro. The difficulty appeared to be in getting minute details out before the blocking of the high lights and distances. The only remedy for such a case was the addition of a small quantity of hyposulphite of soda. The amount of hypo must be very small—for instance, one drachm of a mixture composed of one drop of saturated solution of hypo in half an ounce of water. An effective method of coaxing up details was by applying two or three fresh solutions to the same plate; this, however, was apt to cause a green fog. The lecturer was bound to make this statement deliberately, in spite of the fact that no less an authority than Captain Abney had stated in the seventh edition of his "Instruction" that "green fog is never seen when using ferrous oxalate, which has not an alkali reaction." [The lecturer handed round a negative developed with ferrous oxalate exhibiting a green fog.] The treatment of plates having received correct exposure was much the same as when using other developers, and the same expedient might be resorted to. A slight acceleration of the shadows might be obtained by gently rubbing the part with the finger whilst in the tray, or by removing the plate and breathing on the backward parts. He sometimes applied the back of the hand to the glass side of the negative in order to slightly increase the temperature; this, however, involved the danger of frilling, unless carefully performed. Another point in development was the question of the utility of rocking the dish or tray. Although that matter had been freely discussed, in his opinion the root of the matter had not yet been reached, it appeared to him to be correct both to rock the tray, and not to rock it. The process of developing the negative had the effect of slowing the developer; that is, a chemical action was going on, and the solution was making an exchange with the chemicals in the film. If this were considered, it would be evident that the parts of the plates most acted on by light would be most active in making the exchange; consequently, if the tray were left still, the developer overlying the most active portions of the film would be acted upon most, and that portion of the solution would become slowed or restrained. At the same time the less exposed parts of the plate were also acted upon by the solutions overlying them, and not having been contaminated, through rocking the tray, with the slowed part of the developer, would be in the best condition to bring up density on those parts of the plate. The converse was also true, that continually rocking the tray very much helped to increase contrasts. It was in cases of over-exposure that the ferrous oxalate developer seemed specially valuable, as it was possible to restrain it to an almost unlimited extent without fogging. In regard to cost, it had often been objected that this developer was an expensive one, and he was inclined to agree with that opinion, if the usual practice of throwing the used developer away was followed; but if a bottle was filled to the stopper with used solution, it might be with a further addition of iron used over and over again. Finally, he hoped that if his observations did not have the effect of causing the ferrous oxalate developer to be more extensively used, they would at least be useful to those who wanted occasionally to make use of the developer in keeping.

Mr. J. D. ENGLAND said that he did not think Mr. Blackmore had sufficiently impressed upon the members the necessity of using distilled water. He had found that the air imprisoned in ordinary tap water quickly caused the iron solution to deteriorate.

Mr. FOXLEE stated that, on the introduction of gelatine bromide plates, he at first used the ferrous-oxalate developer on account of the wet plate character of the negatives produced by it, but he quickly came to the conclusion that pyro was a better all-round developer, on account of the greater latitude of exposure permissible with it. A professional friend of his having an extensive business in South America employed, until quite recently, the ferrous-oxalate developer for all his work. If any of the plates were very long in coming up he dipped a piece of paper in the hypo bath and stirred up the developer with it, which was a practical, though certainly not very scientific, mode of working. The developer after use was bottled off and a little tartaric acid added. The old solution could then, when added to a small quantity of fresh developer, be used over again and worked well. Worked in this way, it was an economical developer.

Mr. WHITNEY said the great charm of ferrous-oxalate was its cleanliness in use, and its non-liability to give green fog, although in that respect Mr. Blackmore had been unfortunate. He also thought, in the matter of simplicity, it could hold its own against pyro, and with correctly exposed plates would give good results. He much wondered at the disproportion of the various components

of the developer in formulas given by different plate makers, and thought it would be better if they discontinued issuing formulæ with the plates, it being understood that any standard formulæ would produce good results.

Mr. J. D. ENGLAND called attention to the fact that a very strong ferrous oxalate developer could be formed by dissolving precipitated ferrous oxalate in a saturated solution of oxalate of potassium.

The PRESIDENT remarked that there could be no question that ferrous oxalate was a very valuable developer for transpareney work, but with regard to its use for developing negatives much would depend on the character of the plates used. With some plates (whatever might be the cause) he had found it impossible to get density with ferrous oxalate, but pyro gave good results. With a suitable plate and correct exposure no doubt ferrous oxalate would produce a technically perfect negative, but those conditions were essential. He knew that one of the largest portraitists in London used the ferrous oxalate developer. His plan was to put all the negatives in a large tray and develop them together; the progress of development was watched, and the plates were taken out as soon as they had acquired sufficient density. But that was certainly not a mode of working which he should recommend anyone to adopt. He reminded them that the late Jabez Hughes, when asked what developer he was in the habit of using, replied "Brains."

Mr. J. A. HODGES was of opinion that although the ferrous oxalate developer was valuable for certain special purposes, it could not compare, for general work, with the pyro developer, which he recommended to be used in 10 per cent. solutions. He thought the powdery deposit occurring in the oxalato solution would not occur if distilled water were used in making the solution. Although he gave Mr. Blackmore credit for the ingenuity of his mode of the iron solution, he thought if the solution were made freely acid with sulphuric acid it would keep well in an ordinary stoppered bottle. He considered it an imperative condition that the developer should show an acid reaction with red litmus paper. Plates of his own manufacture which both frilled and gave green fog with pyro, gave clear bright negatives when developed with ferrous oxalate.

Mr. STEIN mentioned that he had tried a system of redevelopment with ferrous oxalate after bleaching with mercury, which had been recently advocated, but without the success which the author claimed for the process. He thought the idea a good one, as the process of redevelopment was a slow one, and could be checked at any moment.

Mr. BLACKMORE having replied, the proceedings terminated.

The next meeting will be held on Friday, 25th inst., when Mr. Hodges will give an account of a visit to North Wales with the camera, illustrated by views in the optical lantern. Visitors are invited.

DEVON AND CORNWALL CAMERA CLUB.

THE members held a *conversazione* at the Freemasons' Hall, Cornwall Street, Plymouth, on Wednesday evening. The weather probably deterred many of the members from attending, but in spite of the storm there was a fair muster of ladies and gentlemen.

The rooms were tastefully and comfortably arranged under the superintendence of Mrs. Caruell and Mrs. Barrington Baker, to whom a vote of thanks was given with enthusiasm by the company.

Cameras and stands of various patterns and by different makers were placed here and there for inspection, and on a long table were shown shutters, lenses, roll-holders, &c. Particular attention was given to a very handsome 8 by 5 stereoscopic camera, built by Perken, Son, and Rayment, for one of the members, and fitted with a pair of optimus lenses.

Mr. A. A. Caruell explained the mode of using the Eastman roll-holder, some dummy spools having been kindly given by the Eastman Company for the purpose.

Tylar's metal dark slides were also noted by many as being both serviceable and cheap.

Some excellent framed photographs, presented by Mr. J. B. Edwards, adorned the walls, and were much admired, especially a large direct full-length portrait of a lady in Court dress, taken on one of his XL plates. The difference in photographs of flowers, taken by an ordinary and by an isochromatic plate, was much commented on; these latter plates were strongly recommended for portraits in dull weather, some of the members stating that they had tried them for that purpose, and that they were most useful when the person to be taken had a yellow or red tint in the hair.

An album of photographs in platinotype, from paper negatives of views in Cashmir, and an enlargement of a cat on Ilford paper from an Eastman stripping film, were objects of great admiration, and the latter, which was almost life-size, was quite equal to any direct print. Some prints on Ilford slow bromide, Alpha, and Edwards' sensitized paper were also shown and favourably commented upon.

Mr. Carnell then photographed several groups by magnesium flash-light. This new process excited much interest and amusement, the brilliant flash causing some of the ladies, who were engaged in conversation, to give a considerable start, but of course after the exposure had been made.

Messrs. Henry G. Phillips, R. A. Penrose, and F. Popplestone, were elected members.

The next meeting will be held on the 23rd inst., when Mr. R. Murray will give "A retrospect by an old photographer, with a few hints to the new generation."

DERBY PHOTOGRAPHIC SOCIETY.

THE annual meeting of this Society was held on Tuesday evening, Jan. 8th, in the Restaurant, 33, Victoria Street; Mr. J. A. COPE presiding.

The Hon. Sec. presented his annual report and balance sheet, which showed the Society to be still in a flourishing condition.

Eight new members were elected.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE usual fortnightly meeting of the above Society was held in the Priory Rooms, Old Square, on Thursday, the 10th inst. There was a large attendance of members and friends; Mr. W. J. HARRISON, F.G.S., in the chair.

Messrs. T. Coud, H. A. Dugard, R. Folland, T. W. Lloyd, Herbert Miller, A. W. Wills, J.P., and W. L. Wills, B.S., were nominated for election as members.

The remainder of the evening was devoted to a lantern display and paper by Mr. A. W. Pumphrey on a "Tour in Italy and Switzerland." Some 150 slides were passed through the lantern illustrating the same, and Mrs Pumphrey kindly read her descriptive diary explanatory of the slides and places visited; the pictures of Rome, Naples, Florence, Venice, and Pompeii, being exceptionally interesting.

LEWES PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting was held on Tuesday, the 8th inst., at the Glee Room, Cliffe.

In the absence of the President, through the recent death of his wife, the Vice-President, Mr. J. TUNKS, occupied the chair.

Special reference was made by the Chairman to a vote of condolence to the President which had been passed by the committee, and which he felt sure would meet with the sincere approval of all the members.

One new member was elected.

The subject for discussion—"Toning, Fixing, and Mounting Prints"—was then opened by Mr. G. Foxall, and carried on by Mr. P. Morris, Mr. C. Corder, and others.

At the close of the discussion some micro-photographs were shown by Mr. P. Morris; some prints toned with borax by Mr. E. Fuller; and some negatives developed with hydroquinone and prints toned with borax by the Hon. Secretary.

It was decided that "The Making of Lantern Slides" should form the subject for discussion and demonstration at the next meeting, to be held on Feb. 5th, after which the meeting was brought to a close by a vote of thanks to the Chairman.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

AN ordinary meeting was held on January 11th at the Institute, Bexley; Mr. DRESSER, Vice-President, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. Rushton was duly elected a member of the Society.

Mr. HAWKINS exhibited a number of 10 by 12 stripping film negatives. He pointed out one great advantage in using films, viz., the frequency with which natural clouds are secured.

The SECRETARY showed a bromide print, developed with hydrokinone, from which he could not eliminate a slight yellowness,

although several acid baths had been tried. It was stated that this yellowness was caused by over-exposure, and could not be removed by any known method.

Mr. REFFELL showed the monthly album of the "Argosy" Postal Club. Several of the prints were much admired.

Mr. DRESSER then introduced Mr. Rushton, who gave the members a short account of "Six Months in Switzerland," illustrating his remarks by showing a fine collection of views he had taken. He recommended tourists to suspend camera, &c., from the shoulders, only carrying the tripod in the hand; it could be used as an alpenstock. He also advocated the use of a half-plate camera, as it was possible to obtain plates on the Continent which would fit an English half-plate slide.

The next meeting will be held on Friday, Jan. 25th, on which occasion the President, Mr. Pringle, will read a paper entitled "Practical Photography."

Talk in the Studio.

MR. A. A. COMMONON PHOTOGRAPHING NEBULÆ.—This paper—recently read before the Camera Club—stands over till next week.

RESISTANCE TO LIGHT OF COLOURING MATTERS FIXED IN TISSUES.—By J. Joffre (*Bull. Soc. Chim.*, 49, 860—862).—In examining the influence of light on coloured materials, certain precautions must be taken to render the experiments trustworthy. For example, a sample of material dyed with a very unstable colour, the fibres being completely saturated with the dye, might attain a shade which would offer a certain resistance to sunlight; in such a case it would be inferred that the dye was stable. If, however, the sample is compared with a material dyed by some other colouring matter, the proportion of dye in the fibre being the same in both, and transparent shades being employed, the instability of the sample would be at once perceptible. It is equally essential that the two exposures should be simultaneous, not only because sunlight varies in intensity, but also because the condition of the atmosphere may influence the results. Of two samples of material exposed to the same light, one of which is placed in moist, the other in dry air, the former will lose its colour far more quickly than the latter.

METALLIC SPECTRA.—By J. Trowbridge and W. C. Sabine (*Phil. Mag.* [5], 26, 342—353). The authors have undertaken the re-examination of metallic spectra with a view to determine wave-lengths with greater accuracy. The apparatus used consisted of Rowland's grating, with accessories, arranged as previously described (*Phil. Mag.* [5], 16, 197). Spectra of all orders are in focus at the same time, thus allowing a comparison of the different spectra and diminution of error. The photographic plate was also curved, so that the distances between the lines were closely proportional. Solar and spark spectra were taken on different halves of the plate, the wave-lengths of the metallic lines being obtained by interpolation with the assistance of Rowland's tables of wave-lengths. In order to correct displacement due to vibration, the violet of the third spectrum was photographed along with the solar spectrum, and the wave-lengths obtained as before; the correction, in some cases, was as much as twenty millimetres. The noise of the spark discharge was found to be the cause of the vibration. A table of results is given.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN. — Technical meeting, Tuesday, January 22, at 5, Pall Mall East, at 8 p.m. "Effect of the Green Band of the Spectrum on a Bromide and Chloride Plate," Friese Greene.

PHOTOGRAPHIC CLUB.—The subject for discussion on January 23rd will be "Development." On January 23rd, all lantern slides intended for exhibition on the special lantern evening on January 30, 1889, must be sent in.

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor in the "Answers to Correspondents" column, should now be sent to Mr. Spiller in accordance with that gentleman's own notice in the column which he controls.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn. E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

W. A. BRICE.—Your letter has been given to the publishers, to whom it should have been addressed in the first instance. We have taken note of the line which refers to us. Thanks. A copy was duly posted; if not received, enquire of your London agent.

RETOUCHER.—Before parting with your specimens, it would have been well to test the *bona fides* of the advertiser by sending a preliminary note to the address given, besides if possible making enquiries in the locality. The furnishing of a show-case at the expense of professional applicants may have happened in this instance, but is not a common occurrence.

205.—Answered by post. We will go and see the patent specification as soon as published, and let you know how far it bears upon your proposed operations.

MESSRS. MORGAN (Aberdeen).—A new list of members has come out this week, in which the address is given as Shootup Hill, Brondesbury, London, N.W.

ED. SMITH.—We have not been able to hear of anybody specially well qualified, so should recommend you to advertise.

PHOTO-TINT.—There are many houses doing this class of work, and we cannot undertake to select for you, but give you a list by post. Harper's "Monthly Magazine" has a very good historical statement from the pen of Mr. F. C. Beach, illustrated by portraits and amateurs' photographs, some of which are very well reproduced. See also the later numbers of the *Illustrated News*.

M. P. S.—The last day for nominating is 21st instant. The members elect all the officers except the two secretaries.

T. W. D.—The ancient canoe found at Brigg, Lincolnshire, was photographed soon after its discovery by Messrs. T. Smith and Sons, of that town. Write to them; or, failing this, get the reproduction which appeared in the *Illustrated London News* or *Graphic* some time in 1886.

PHOTOCHROMIE.—We have seen the illustrations to which you refer in the Belgian *Bulletin* for November. They certainly point to the utility of employing orthochromatic plates for distant views, but we should have thought it possible to get some indication of the mountains across the Lake of Geneva with an ordinary plate at 5 p.m. in June. M. Boissonnas' second (orthochromatic) plate is perfect, with admirable rendering of foreground and distance, all in due relation. His colour-scale (the frontispiece) and accompanying photographs carry conviction, as do likewise the admirable plates in Dr. H. W. Vogel's "La Photographie des Objets Colorés" (Paris, Gauthier-Villars), which we should advise you to see. Then, again, the little Obernetter landscapes shown at the last Pall Mall Exhibition tell the same tale, showing clear advantage in favour of the orthochromatic plates. These were all taken behind a yellow glass screen, but Capt. Abney has recently shown that this troublesome adjunct is not always necessary.

E. J. STONE.—Much depends upon the nature of the enamel as to whether your new mounting cards are superior to the ordinary qualities of white Bristol board. Test one for lead by holding it over a sulphuretted hydrogen bottle. Zinc white is sometimes used, and sulphate of baryta, which is even better.

The Photographic News.

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For Advertisement Scale see page v.

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THE PHOTOGRAPHIC NEWS.

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ADJUSTMENT AND DISTURBANCE OF THE CAMERA.

IT is very vexatious when we find some defect that mars the beauty of an otherwise good picture, which defect a very small additional trouble or care, devoted at the proper time, would have prevented. One cause of such a blemish which strikes most critical observers, on looking over any large mixed collection of photographs, is the want of that careful adjustment of the camera, which to some few appears to come almost naturally; whilst others, eager to catch the representation of the objects of interest that may present themselves, and realising vividly the result which is to ensue, rather than laboriously going over all the details necessary to produce that result in perfection, are too apt to overlook some apparently trivial minutiæ, the neglect of which will, however, undoubtedly impress itself unfavourably upon the picture.

Amongst the apparently smaller matters the neglect of which is so often a cause of imperfection in the result, the adjustment of the camera is one that will strike most observers as of only too common occurrence. Without now going into the question of whether the lens in use is of too long or too short focus to yield the most satisfactory picture upon the plate of the size that is to be exposed, there yet remains in this direction a good deal that can be done in many cases by advancing or retiring with the camera, so as to obtain some selected object of a larger or smaller size upon the plate. In many cases, of course, this simple plan is not available, either from the inaccessibility of the particular spot on which to plant the camera in order to get an image of some particular size; from the ground at such spot not being of the proper height; or more frequently from the fact that shifting the position of the camera, although merely by advancing or retiring in a direct line, will so alter the character of the near surroundings, as to give quite a different style of picture from that which would have resulted from one taken by a lens of a suitable length of focus placed at another point. In order, therefore, to be always prepared to take photographs of any given size, and including any proportion of the view that may be desired, a battery of lenses of varying length of focus is necessary; but to go more fully into this matter is beyond the scope of the present article.

One of the adjustments of the camera that it is rather surprising should even now be sometimes neglected, is that of having the back vertical, to ensure uprightness of any lines of buildings that may appear in the picture. Of course it is only when architectural subjects are included in the picture that this failing becomes evident. It may, indeed, exist, and cause objects such as trees at the margin of the photograph to appear at a different angle to the surface from that at which they actually stand; but as tree trunks are, with many species, not necessarily fixed at any precise angle, the eye does not in a photograph of an ordinary landscape readily distinguish the displacement that has taken place when the camera is tilted, and a misrepresentation by the camera which, in a photograph of a building, would strike the eye offensively, is passed over in a view undetected. When it is recognised that whatever the tilt or position of the camera itself, it is only necessary, in order to preserve the uprightness of the lines, that the back should be perpendicular, there should be no difficulty in ensuring correctness in this particular. Even if there is no appliance to secure the vertical position of the camera back, most people can judge by careful inspection pretty nearly the true upright position. We do not, however, advise trusting to the eye to obtain this accuracy, although so many photographs convey evidence that the back has been so much out of the vertical position that it must, if looked for, have been very evident to an observer of ordinary capacity. A very simple contrivance we remember to have seen shown by the late Professor Donkin at one of the meetings of the Photographic Society of Great Britain, of which he was the Honorary Secretary. It consisted of a thick wire suspended at the side of the camera-back, and a loop or ring of wire in which the bottom of the suspended wire hung loosely when it was upright. Spirit levels have been added to the camera for the same purpose by some, but these, when the camera has a swing-back, must be attached to the back—which is oftentimes too narrow from back to front to carry a level of moderate size—and not to the body of the camera itself. Some careful workers, however, do not use a swing-back, but prefer to have a very wide angle lens and a high rising front. In this case the level may be attached to any convenient part of the camera body. Failing other means, a piece of string with a weight attached—a pocket knife, for instance—has often served to secure the desired uprightness of the camera-back.

Another failing in camera adjustment that sometimes occurs in landscape or architectural photography is caused by a slight shifting of the camera when inserting the dark slide or drawing the shutter. With studio work, where the stand is heavy and the floor solid, this sort of derangement of adjustment is not likely to happen; but it is otherwise with the light stands that are in request for outdoor work. If the ground is soft, it not infrequently happens that one of the legs gets a little further driven into the ground by the pressure used in placing the dark slide in position, and in drawing out the shutter. In addition to this, the camera itself is sometimes caused to revolve slightly upon the stand by the same pressure. With an accurate finder attached, the camera can, of course, be readjusted without the necessity for re closing the slide. A ready method of achieving the same result is regularly practised by one photographer at least with whom

we are acquainted. Before inserting the slide the eye is placed at one of the angles of the back of the camera, and carrying it along the side, a point in the view is noted at which the line of the side appears to be directed. If there is any suspicion of a movement of the camera having taken place, owing to the causes to which we have referred, the eye is, after all the arrangements of inserting the dark slide and withdrawing the shutter have been made, replaced at the same spot as when taking the observation. It is then easily seen whether the point in the view which has been previously noted comes in the line of sight, and if not, it is generally practicable to replace the camera in its original position without the necessity for closing and withdrawing the dark slide, the return of which, under the conditions existing, would be very likely to renew the displacement of image, and entail further trouble and vexation.

JOHN ROBERT SAWYER.

ON Monday last, John Robert Sawyer, the Technical Partner in the Autotype Company, expired at Naples in the sixty-first year of his age.

The deceased gentleman during the latter years of his life suffered a good deal, but he never complained; and his indomitable energy in work made his sufferings but little obvious to an outsider.

To Sawyer belongs the credit of introducing Collotype as a steady and commercially working process in Great Britain, for while projectors were describing before learned societies their newest improved collotype processes, and endeavouring to sell patents, Sawyer was working the process, and his Company was regularly executing orders.

Sawyer was a most laborious and constant worker, night and day being equally seasonable to him when he was experimenting to overcome some practical difficulty, and the present organisation of the Autotype Works at Ealing Dean is a monument to his energy, persistency, and skill.

Mr. Sawyer's body, in accordance with the wish of the deceased, will be cremated—doubtless at one of the several Crematoriums now in active operation in Italy.

Mr. Charles Sawyer, the eldest son of the deceased gentleman, has long been associated with the work of the Autotype Company, and things will go on at Ealing Dean as usual.

A NOTABLE PATENT ACTION.

INJUNCTION GRANTED TO RESTRAIN THREATS OF PROCEEDINGS FOR INFRINGEMENT.

IT has long been the custom for rich men who own patents to drive smaller manufacturers out of competition by advertising constant threats of proceedings against them and those who use their wares, and there can be no doubt that in very many instances rival manufacturers have succumbed to this sort of threat, even when they have known perfectly well that the threatening party had neither right nor justice on his side; and, as advertised threats of proceedings are very common in relation to photographic patents, a recent case has special interest for photographers.

In the official reports of patent cases (issue for January 16, 1889) is a report of the action—Colley *v.* Hart—of which the following is a summary.

The defendant had for some years carried on a business for the sale of paper for a toilet requisite, and of the appliances on which the same was rolled. In October, 1884, the plaintiff, who had previously carried on a similar business of his own, sold his business to the defendant, and entered into the defendant's business as manager. In 1885 a patent was granted to the plaintiff and defendant for "Improvements in apparatus for unreeling, perforating, and re-reeling papers into rolls for toilet and other purposes," which invention was discovered by the plaintiff, but was worked with other patents for the joint benefit of the plaintiff and defendant. In May, 1888, the business connection between the plaintiff and defendant was discontinued, and the plaintiff soon afterwards commenced manufacturing and selling "Toilet requisite paper" on his own account. He sold to the firms to which the defendant had been in the habit of selling. In September, 1888, the defendant issued the following circular:—stating among other things, in reference to the plaintiff, "His proceedings are a distinct breach of my rights under both patent and trade mark, and I think it right to inform you I intend to commence proceedings forthwith against every person whom I find in any way dealing in any perforated toilet paper manufactured in breach of my patent rights." In consequence of this circular a number of the plaintiff's customers declined to continue business with him until the matter was settled, and his business was practically stopped. The plaintiff moved for an interlocutory injunction on October 10th, 1888, before the vacation Judge, who ordered the motion to stand over till the second motion day in the following term, each party undertaking not to issue any circular. Mr. Young, a mechanical engineer, deposed that the manufacture of rolls of perforated toilet paper by the plaintiff did not in any way infringe the defendant's patent. Justice North said: "I shall restrain the defendant from issuing the particular circular and from threatening any person; and from, by means of circulars, letters, or otherwise, 'threatening any person with proceedings or liability in respect of the following papers,' whatever they are, 'manufactured by the plaintiff.'"

SURFACE OF PHOTOGRAPHS.

BY W. E. DEBENHAM.

IN a recent article by Mr. W. K. Burton,* some reference is made to the subject of the surface of photographic prints. It is always a pleasure—now, unfortunately, a rare one—to meet with a paper of Burton's, from which experience has consistently taught us to expect to gain something useful. In the present case, amongst other things, he has touched, almost parenthetically, upon the subject that gives the heading to this article—a subject which, however, may properly form matter for more extended discussion. In the paper referred to, Mr. Burton, whilst giving directions for obtaining the highest surface of which paper is capable, by stripping a gelatinized film from glass, and saying, "I will even confess that the brilliant gloss that is so easily got on this paper has a certain attraction for me," yet adds, apologetically, "I am not Philistine enough to prefer a glazed to a really matt surface, but I am prepared to support the opinion that if you do have a gloss, you should have a good one whilst you are at it." There are, no doubt, good grounds for the predeliction for the glossy surface of a print stripped from the glass, but why should it require a "confession," in order to declare approval of such a surface?

If I may be allowed to be a little discursive, I will say that I should like to get an authoritative definition of the word "Philistine," used in its modern sense. I am aware that a recent writer has put it that "he who does not understand what a Philistine is, stands self-convicted; he must belong to the tribe." A bit of more positive indication of the character of a Philistine is given by the same writer when he says, "The Philistine is nothing if not the slave of conventional propriety." I have elsewhere heard Philistinism defined as "the opinion of those people who differ from the speaker." Perhaps this definition might be made a little more precise by limiting the opinions condemned, to opinions on questions of taste and sentiment; and in matters of art the word Philistine, as a reproach, appears to be used as the special property of that sect

* PHOTOGRAPHIC NEWS, 1888, p. 743.

which professes to despise what appears beautiful to those whom they consider to be the uncultured. Their own particular admiration, when delineation of the human form is concerned, is reserved for vacuous or woebegone representations of it, in which anything of health and ruddiness of colour is banished from the face, in favour of a corpse-like, livid, or greenish-yellow hue: colour of a more sanguine character only being tolerated when lavished upon the hair.

The question as to whether a glossy or a matt surface is to be preferred for photographs, is not quite so simple as might at first sight appear. It is complicated by the further question as to whether certain effects, which it may be desired to obtain, can only be produced in company with one or other of the two conditions of surface under discussion.

The learned Dr. Stolze, in an article on "The Tone and Surface of Photographs,"* has touched upon this subject. Had his paper been confined to the question of surface only, he would doubtless have given us his views with greater fulness on this branch of the subject. In explaining however, why it is that for small pictures matt surface paper is not employed, he says that "up to the present it has not been practicable to produce paper of this character (matt surface) in which the picture rests entirely upon the surface, as it does with albumen paper, or with chloride of silver emulsion paper, whereby all the details are preserved; so much desired in photographs of small size." Further on, he adds, that even in oil paintings, when small pictures are in question, they are produced on a basis of copper, with a fineness and smoothness of surface in contrast to that seen upon larger paintings. He refers also to miniature paintings—paintings on porcelain and enamel—as instances of fine surface and high gloss in artistic productions. As to the reproach which has been brought against photographs having a glossy surface, that they resemble lacquer work, he enquires why the comparison should be made with lacquer work, and not with enamels, which are so highly esteemed.

I suppose many photographers must have been nauseated in times past—I am sure *I* have—with references to the "vulgar gloss" of albumen prints; comparison with the surface of a tea-board, and so forth. Dr. Stolze's question comes in here aptly enough. The use of the word "vulgar" to a thing which is not essentially so, always seems to me to be gratuitously offensive, and reminds me of an observation that the readiest to apply to others the word "cad" are those who have the strongest claim to the distinction themselves. Whether or not a glossy surface is in itself desirable, there is one case in which it is certainly disadvantageous. When a surface is in itself rough with an irregular kind of roughness, and a varnish is applied which does not completely fill in all irregularities, but leaves some standing up on the surface, such irregularities will be more conspicuous, and the gloss then gives the idea of of an unsuccessful attempt to simulate a really fine surface. As an instance of this we may take furniture of the cheaper kind, where such parts as the carved work on side-boards or chair-backs is roughly finished and then varnished; possibly even in the varnish itself there are bits of dust left to show as raised irregular specks. If the expression "vulgar gloss" is anywhere applicable, perhaps this is a good opportunity to employ it. In photography a somewhat similar effect may be produced by mounting a print having a highly glazed surface with paste containing lumps or fragments of dirt. In these cases the gloss is objectionable as making defects more conspicuous. These defects, however, should be blamed, and not the gloss.

A real objection to a glossy surface in photographs is that reflections in it may interfere with the details of the subject which is represented in the picture. With small pictures these reflections are commonly not seen in the position in which the picture is held for examination. With larger pictures on glossy surfaces, reflections will or will not appear, according to the position in which they are placed, and the light which falls upon them; particularly when any light object is nearly in the same line from the picture as the eyes of the observer. Whether, for large pictures, the objection on the score of reflection has greater weight than the advantage of a glossy surface in yielding representation of detail, may fairly be matter for argument.

The greater amount of detail as well as depth in the shadows of a photograph, that is obtainable in conjunction with a glossy, in place of a matt surface, is not to be denied. This deficiency of detail in the shadows, however, differs materially in various processes, and this consideration may induce the hope that, in time, a matt surface process or method of printing may be found, in which detail will be rendered more perfectly than in any at present in use. The power of rendering detail in the dark parts is no doubt greatly influenced, as stated by Dr. Stolze, by the keeping of the image upon the surface; but that this is not the only effective cause is shown by the fact that an albumen print stripped from glass, or even coated with polishing paste, will show more detail than the same print when not so treated.

It may be said that we do not require to see details strongly in the shadows of a picture, and that therefore the partial loss of such details by printing on a matt surface paper is an advantage rather than otherwise. To this it may be replied that the tendency of photographic processes is to fail in pourtraying the range of tone at the ends of the scale, and if a photograph is not over-exposed for the lighter tones, the deeper half-tones will not be represented so fully as in nature. It may also be said that in some cases the shadows are too much broken up by disturbing lights. To this again it may be replied that the lights in such a case are not those truly belonging to the lower half-tones, and if the latter had been given their proper value, the disturbing lights would not be so pronounced and attractive. It will probably be generally recognised that the most striking difference between an average photographic representation of a scene, and that of a good steel or copper-plate engraving, is that in the former case there are large masses of comparatively blank shadow, unrelieved by the delicate detail which we see in nature; and which are represented, not obtrusively, in the engraving. The engraving is on matt surface paper: why therefore, it may be said, should not a photograph on paper of similar surface be equally satisfactory in the definition in the shadow? Here it may be observed that the engraver has it in his power to make his deepest shadows and deep half tones relatively to each other, of any force he likes; and chooses that strength which, on the paper, and with the ink with which he works, will give him the desired effect.

That there is a great difference in different printing processes, in their power of rendering detail in the shadows whilst preserving a matt surface, is evident from various examples. It was the practice, some thirty years ago at some of the photographic establishments of the more expensive order, to produce portraits of whole-plate size and larger, upon paper salted and not albumenized. The poverty of the shadows was, however, so great that they were almost always worked up to some extent, and their value depended upon the amount of artistic ability possessed by those who practised the working up. There was, however, one firm which, as I believe it has long ceased to exist, I may mention by name, Hennah and Kent, of Brighton, who had a special method of printing, by which more vigour and detail in the blacks was obtainable than could be produced upon ordinary salted paper. Their paper was, I think, prepared with gold, as well as with silver, before printing upon. At all events, their work was so good that with very little touching, satisfactory prints were produced, and a connection was obtained extending far beyond their own locality. There was still

* *Photographisches Wochenblatt*, 1888, p 273.

wanting, however, the full richness and detail of the shadows that characterise albumen prints, and when Adam Salomon took the photographic world by storm, his prints were made, not merely upon albumen, but a gloss was superadded by means of a polishing paste. This work in portraiture has been considered as never to have been surpassed, certainly not by those who, like him, were confined to the use of collodion for making their negatives.

In platinum printing by various methods, such variations in the power of rendering details and depth in the shadows have been shown, and some of the results in this respect are so good as to allow us to hope that finality in this walk has not been attained, but that improvements will yet be made by which the shadow details will more nearly approximate in luminosity those obtainable upon albumen or other glossy surface paper. In photo-engraving processes, too, wonderful advances have been made in this direction. I have before me a heliogravure by Blechinger, published as a supplement with the *Photographische Correspondenz* for March last, that strikes me as the most beautiful specimen of a photographic production upon matt surface paper that I have ever seen. Whether the exceptionally fine quality of the negative (it is stated to be taken on an orthochromatic plate by Angerer) is the main cause of such an approach to perfection I cannot say. It would be very interesting to see a print on albumen or collodion paper, and one on a matt surface paper by the best chemical printing processes, silver and platinum, for comparison.

Gloss itself, provided it exists upon a fine smooth flat surface, is of secondary consideration. If, in the present state of photography, there is no means of obtaining such perfectly natural rendering of existing detail on a matt surface as on a glossy one, there is no necessity to apologise for using the latter when it is desired to represent fully all the detail that photography has given us in the negative.

PHOTOGRAPHIC REFLECTIONS IN THE STUART EXHIBITION.

BY WIDE ANGLE.

IT is curious to notice how, in the Stuart Exhibition, a good many of the paintings resemble the pictures which used to be produced in the dark ages of photography. Art in the days of good Queen Bess had an engaging simplicity about it. The artist, so long as he got something like the face, did not trouble himself about originality of pose nor elaborate accessories. Probably very few English born artists were equal to drawing a tree, and it is easy to understand why scenic arrangements on the stage were confined to the announcement "This is a forest," "a house," or what not. Nor had they mastered the art of flattery. They were like the majority of the photographers who first began to "take likenesses"—they had everything to learn. Everyone knows what a trouble a sitter's hands used to be, and how the photographer almost invariably got rid of one of the incumbrances by depositing it on a table. The Elizabethan artist seems to have been worried in the same way, and there are several examples in the Stuart Exhibition which irresistibly remind one of the photographer's show case. The whole-length portrait of James V. (No. 17), for instance, might, allowing of course for the difference of costume, have come from the Euston Road. He is standing bolt upright with his face in the orthodox three-quarter view direction, and his right hand placed squarely on the table at his side. There is no attempt to compromise the situation. He might have walked into a studio, said to the artist, "I want my portrait taken." The artist might have replied, "Certainly, sir; shan't keep you waiting two minutes." The head-rest would have been applied, and all would have been over. This is the impression the picture conveys.

Most of the portraits of Mary Queen of Scots give no more of the figure than the bust. To none of them is an artist's name attached, and they are probably native efforts. The full-length life-size pictures of Mary are by Zucchero, P. Oudry, and D. Mytens, and the greater art knowledge possessed by the continental artists is plainly shown. But in spite of their technical superiority, it is doubtful whether as likenesses they give as good an idea of the real face of the queen as the more unpretentious pictures do. A good deal has been said about the extraordinary variations in these portraits, but the point has been greatly exaggerated. It may, in fact, be reduced to the differences between the avowedly foreign work, and that which may be assumed to be of home production; but whether this is so or not, it is a fact that there is a similarity in the examples of the latter. Mary in these does not convey an idea of beauty. The nose in all is long, and thickens at the end; the lips are thin; and there is a scarcity of eyebrow which gives an expressionless look to the face. The cheeks have little colour in every picture, save one, No. 29, and this is so unlike all the rest that one is tempted to think the artist has made an effort to flatter. This series of portraits may be compared to the early photographs before retouching came into fashion. In the portraits by Zucchero and Oudry the face is filled out and rounded, the nose is shortened, and the hair made dark, and altogether there is just that difference which the retoucher's pencil would produce. As to the various shades of hair, it may be said that there are scarcely two alike, but this is fully accounted for. Hair very dark or very light is not much altered by the quality of the light falling upon it; but hair of that peculiar shade which your enemies call carrotty, and your friends a golden brown, varies according to the illumination. Hence the reason of the differences shown in the portraits of the Queen of Scots, who had tresses of this fascinating tint, greatly, no doubt, to the disgust of Elizabeth, whose locks were of a dry, dusty, red hue.

Henry Darnley's portraits show him in two aspects: in one he is a fairly good-looking man; in another (No. 33) his face is extremely pale, the features swollen as though from ill-health, and the whole expression weak and effeminate. In like manner James I. has had his painter who flattered him, and the one who did not. No. 45 gives him a red prominent lower lip, very suggestive of the fact that his tongue was too large for his mouth; a big nose slightly on one side; and a fatuous expression. In 62 the artist has softened these characteristics, and has attempted to suggest an air of dignity which James certainly did not possess. As for Van Dyke's portraits of Charles I., their merits and demerits are well-known. Van Dyke started with an idealised portrait, which he consistently adhered to; and as Charles was wise enough not to be painted by any other artist, we get a tolerably distinct idea of the "martyr"; whether the idea is a true one is another matter. Van Dyke is the prototype *par excellence* of the fashionable photographer. Had he lived to-day he would have had a sumptuous reception room and a studio with all "the latest improvements." Probably he would have retained a staff of retouchers, putting in the finishing strokes himself. Paragraphs every now and then would appear about him in the society journals, and he would disdain to exhibit at Pall Mall East or belong to a photographic society.

Sir Peter Lely is of the Van Dyke type, but coarser—even vulgar in his portraits of women. Still, his Ruperts and Charles the Seconds in the Stuart Exhibition are interesting enough, and if he has flattered the "Merry Monarch," the latter must have had more than his share of ugliness. As a finish to the parallel with photography, nothing can be more appropriate than two portraits of Prince Charles Edward, the Pretender, Nos. 152 and 185. This unfortunate gentleman in each of these pictures has evidently been taken by an amateur photographer, and there he is, in a tartan dress of most extraordinary cut and pattern, with every bit of romance taken out of him. His legs are as thin as those of Sim Tappertit; his face is

pale and weazen ; and altogether he cuts a most uninspiring figure. Happily, very few of his supporters could have been acquainted with these singular works of art ; if they had, a reason would have at once presented itself for his ill-success as an aspirant for the throne.

FRENCH CORRESPONDENCE.

PHOTOGRAPHIC SOCIETY OF FRANCE—NEW LENS FOR ORTHOCHROMATIC WORK—DEVELOPER FOR GELATINO-CHLORIDE PAPER—FIFTIETH ANNIVERSARY OF THE INVENTION OF PHOTOGRAPHY—PELLICLES BY GUILLEMINOT & CO.—QUESTIONS FOR THE INTERNATIONAL CONGRESS—THE UNIVERSAL EXHIBITION—DEVELOPMENT WITH PLAIN WATER.

SINCE our last letter there has been no very striking fact crop up in the photographic world. We don't exactly know why there is just now such a torpor ; we ought, perhaps, to attribute it to the forthcoming universal exhibition. Things are kept back, and preparations for the great event are made in silence and obscurity. This is probably why so little that is new is seen or heard of. No doubt during the course of the exhibition we shall meet with more vitality ; besides, the thing itself will be of a nature to provoke study, and gatherings will take place which can scarcely be expected at the present moment. Doubtless there will be to chronicle new methods of action and new applications of photography. The international congress itself may become a source of work of communications of great interest. We shall follow it very closely, so as to be in a position to inform our readers.

At the last meeting of the French Photographic Society of France, the torpor of which we have spoken was very evident. We will distinguish, however, the objective of M. Fermaisse, intended for orthochromatic reproductions. The lenses of this objective are formed of tinted glass. Will this arrangement be of more service than the use of yellow screens, or than the colouration of the sensitive plates by such substances as eosine, cyanine, &c ? That remains to be seen. The objective is in competition for the prize of 2,000 francs given by the Minister of Public Works. We are one of the judges of the competition, and this circumstance will enable us to give an account of the value of this new lens, the principle of which appears excellent.

Developer for Gelatino-Chloride Paper.—The following formula has been communicated by M. Raymond, director of the black auto-copyist, which has been applied to collotypic impressions on flexible supports. The developer has been applied with success to a paper called "Universal," which is manufactured by Raymond ; but we are convinced that it may be used with success upon all papers sensitised with gelatino-chloride of silver. The tone obtained is a black with more or less of a bluish shade, and it is not necessary to employ any toning process whatever to obtain an agreeable tone.

Solution A.

Bromide of potassium	6 grains
Distilled water	1 ounce

Solution B.

Chlorhydrate of hydroxylamine ...	24 grains
Distilled water	4 ounces
Alcohol	2 „

Solution C.

Solution of ordinary washing soda of 36 per cent.	1 part
Distilled water	2 parts

To develop, take

Ordinary water	100 parts
Solution A	3 „
Solution B	4 „
Solution C	5 „

An exposure is given of from four to ten seconds, according to the intensity of the light. Prints thus obtained possess a tone very suitable for the reproduction of drawings.

Proposed Fête on the occasion of the Fiftieth Anniversary of the Invention of Photography.—The French Photographic Society intends to celebrate in a worthy manner the fiftieth anniversary of the invention of photography by organising a manifestation which will, doubtless, be coincident with the epoch of the International Congress, during the Universal Exhibition. The programme of this commemmorative fête is not yet settled. A special commission is to be appointed for this purpose.

Pellicular Plates by Guilleminot & Co.—These plates are covered with a medium which is coated with gelatino-chloride of silver. The medium is not expansible, and is impermeable to water. The pellicle detached from the glass is gifted with very great flexibility. We cannot as yet pronounce any decided opinion upon the value of this preparation, with which we have not at present experimented. It is only by actual use that such productions can be thoroughly appreciated. The difficulty with pellicular negatives is the tendency they exhibit to roll up. This is avoided, with difficulty, by taking the precaution recommended by M. Balagny, of immersing the film, before putting to dry, in alcohol in which some glycerine has been dissolved. Pellicles incontestibly have a great advantage, on account of their lightness, for landscape photography ; but against this advantage must be set the very serious inconvenience of rolling up. In connection with this subject, the following little incident has occurred to ourselves. In opening a box which was thought to be filled with negatives on glass, we came upon a box in which were contained stereoscopic pellicular negatives—about fifty. Immediately the whole lot were thrown out of the box, as if driven forth by a powerful spring, and all the curled up pellicles fell to the ground. It was a long and difficult matter to get them repacked in their case. It may be replied that means exist for obviating such an inconvenient occurrence, but, whatever the means employed, it is often difficult to avoid the drawback to which we have just referred. We can only hope for the improvement and perfection of pellicles for negatives, whilst pointing out that they are, at present, far from what we could wish them to be.

Questions to be Proposed for the Consideration of the International Congress.—Up to the present the programme has not been absolutely settled, but we are in a position to indicate the principal subjects that will be discussed. With some modifications the programme of the Belgian Photographic Association will be followed :—Adoption of a fixed standard of unity for light ; uniformity in the estimation of the speed of shutters ; uniformity in the method of writing photographic formulæ ; question relating to the artistic character of photographic work ; uniform measure of the effect of diagrams ; means for readily changing lenses ; understanding as to an international set of sizes for plates ; identical means for measuring the sensitiveness of plates ; uniformity in the estimation of luminous intensity in photographic operations. The Congress being an open one, it must be understood that any other questions not provided for by the programme may be considered by it on condition of notice being given at the Bureau some days in advance. As for the authority of the work of the Congress, it will depend entirely upon photographers themselves. The propositions of the Congress will have no effect, whatever the learned may think, if competent photographers do not think fit to adopt them in their daily use. No doubt the Syndical Chamber of Photography will intervene, after the work of the Congress, to examine what is to be taken and what is to be left of its proposals. The precise epoch of the meeting of the Congress remains to be settled, but it is probable that it will take place at about the commencement of August, 1889. Official statements on this head will shortly be issued.

A Surprise for Visitors to the Universal Exhibition.—Lovers of surprise will, perhaps, be satisfied at the Universal Exhibition. We have been told that a mechanician has been found clever enough to organise an arrangement whereby such a rapid completion of a photographic portrait is accomplished, that the exposure and the delivery of the photograph are almost simultaneous. A frame is placed in an opening, and some instants afterwards, by another opening, the portrait comes out. We do not know what are the technical or practical means by which the promised result is obtained, but we predict a success for the author of this recreation, if the work produced is at all passable.

Plates for Development with Plain Water.—Mr. Leo Baekelandt, a well known Belgian chemist, has just issued plates covered on the back with salts fit for the development of the image. It suffices to immerse the plate in ordinary water, and this immersion dissolves the reducing salts, and the image is developed. It is a very ingenious idea. We have just made a successful trial of these plates, and we think that they will be appreciated by amateurs desirous of dispensing with the trouble of preparing developing solutions beforehand. The fixing agent, ready powdered, is also enclosed in the box containing the plates; so that we have at once the sensitive film, the developer, and the fixing salt all to hand in the solid form. If the thing is really as good as it appears to be at first sight, what facility is offered for photographing on a journey in the country, &c.! We think that by the help of papers impregnated with developing salts the same result may be obtained, and then this method will be applicable to plates, papers, and pellicles of all makes.

LEON VIDAL.

ACTION AS TO PHOTOGRAPHIC MOUNTS.

AN action of considerable importance, as well as interest, to photographers and the business generally, was decided on Monday by Mr. Commissioner Kerr, who presides over the City of London Court, at Guildhall. The proceedings were instituted at the instance of Messrs. A. and G. Taylor, the well-known photographers, of 70, Queen Victoria Street, City, E.C., who at the Victoria Works, Forest Hill, S.E., carry on business as the Victoria Mount Cutting and Printing Company, and they sought to recover the sum of £4 16s. 10d. for photographic mounts supplied to the order of the defendants, Messrs. Sockl and Nathan, of 41, Jewin Crescent, City. The defence was that the bulk was not according to sample, and when the defendants found it out they sent them back, and then the plaintiffs returned them again, the result being that Messrs. Carter, Paterson, and Co. now had the mounts in their safe keeping.

The learned judge questioned how he could decide the question in dispute between the parties, considering that none of the bulk was in Court for his inspection. The plaintiffs' advocate said he would be able to establish to his Honour's satisfaction that they supplied 1,036 mounts of the same quality as before. They had previously supplied the defendants with 1,000 mounts, and he would show that the second order was executed from the same bulk as the first. The learned judge, interposing, remarked that that was not the question. He only had to decide whether the order in dispute was the same as the sample.

Mr. Hooper was the first witness called. He testified that he was the manager to the plaintiffs at the time the first order was given. He had previously supplied the defendant with samples of their mounts, and had negociated for an order. The bulk was the same as the sample, though it was true mounts varied a little in thickness.

Mr. C. H. Salmon, who had the conduct of the defendants' case, said the first order was properly executed, but the second one was not.

The witness, Hooper, continuing, said there was no doubt that the mounts varied in thickness. The second order was taken out of the same bulk as the first lot. They were not asked to guarantee any particular thickness. It would be a moral impossibility to do so. The bulk was equal in every respect to the sample. In cross-examination he said the samples supplied by the plaintiffs to the defendants were of six different coloured tints. The order was "the same as sample." The first order he negociated with Mr. Nathan, one of the defendants, when they went into the question very fully. He did not, however, on that occasion say anything about thickness. Witness did not tell him they had put them in at a very low price, or that they had lost money by it. They received a letter from the defendant saying that there was a quantity of thin mounts; and they would return them for alteration. They also further explained that they must be the same thickness throughout, and they could not do with them unless they were so. Thereupon Messrs. Taylor wrote and stated that the mounts were in accordance with the orders in every respect, and they could not alter them. He (witness) had since left Messrs. Taylor's employment, and after he left he wrote a private note to the defendants expressing his sorrow that the order had turned out so unsatisfactory. "He had no business to write that letter after he had left Messrs. Taylor," said his Honour. "That is the way you do business in the City of London. I can't congratulate you." The witness desired to make it clear that all he meant was, that he was sorry the affair had turned out as it had, and would have been pleased if he could have done anything with the mounts to make the matter satisfactory. It was the custom of the trade for the thickness of photographic mounts to vary somewhat, he added. One of the partners in the plaintiffs' firm having taken part in the transaction, gave evidence of finding that the bulk had been broken. Some thirteen dozens of those sent were not returned. He mentioned that he had never permitted any of his travellers to take orders for photographic mounts on the basis that they should be of the same thickness. The learned Judge did not know how he could say whether the mounts supplied were according to sample when only one of the samples was shown him. Mr. Salmon said the samples were put in with the bulk, and they had gone out with the other mounts already disposed of. A witness was called to speak to the custom of the photographic trade, being that the thickness varied; but his Honour said the custom of the trade would not decide the question. The matter which he had to enquire was, whether the mounts were according to sample, and that was all.

The defence was then gone into. Mr. Mason was called, and he gave it in evidence that he was in the service of the defendants. He produced the sample mount which was sent to Messrs. Sockl and Nathan before the first order was given, and was able to identify it by his writing on the back. The sample had been mixed up with the other mounts. They sent all the goods delivered on the first order to their customers, and they were all right; but when the second order was executed, and they in turn went out, they received complaints. The result was they examined the rest, and found they were all sorts of thicknesses, and very different from the sample. They returned the whole of the bulk, with the exception of thirteen dozen which had been used by the customers. In consequence of the various thicknesses they could not dispose of them. Their customers would not take them. Mr. Sockl said, with the first lot of goods there was no difference in the thicknesses, but in the second lot—the goods in dispute—eight out of twelve of them varied. They returned them all as soon as they found it out.

In giving judgment, Mr. Commissioner Kerr said, what the customers did was absolutely nothing to do with the question in dispute, and, indeed, was not evidence against the plaintiff at all. He had it sworn to that they were the same articles as before, and the other side said they were not. The defendants could not find it out till they had broken the bulk, so he must find for them.

Judgment was accordingly entered for the defendants with costs.

PHOTOGRAPHS TAKEN WITH THE EYE, AND THE EFFECT OF A BROMIDE PLATE IN A VACUUM AND UNDER PRESSURE.

BY FRIESE GREENE.*

By the way of preface to the subject I am about to bring before you to-night, may I ask if you have ever seen anything with your eyes shut? And when I say with your eyes shut, do not mistake me and run away with the motion that I am in any way referring to any imaginary mental vision one can conjure up in the dark. For instance, look at an object that is fairly illuminated steadily for a few seconds, then suddenly close your eyes and a similar object can be seen. I do not attempt to explain this, though it is evidently governed by some law; and

* A communication to the London and Provincial Photographic Association.

it leads me at last, after no end of failures, to the discovery which is one of the subjects of my paper to-night, namely, that you can obtain a photograph with the human eye if you have a light strong enough, and a plate sensitive enough. After no end of failures, I obtained an impression with the aid of an electric arc lamp, 2,000-candle power, which I have at my place, 92, Piccadilly, for taking photographs. I looked at the arc light for fifteen seconds, then switched the light off and exposed a very quick plate (a plate coated in different layers, which makes it much more sensitive), and held it to my eye for a minute or more. On developing it I found a spot, which pleased me very much. If you put the spot under a powerful microscope you can see the image of the arc. I have obtained marks with the magnesium flash light, but they are not so good as with the electric arc; in fact there is nothing definite about them.

I have my flash-light here, so if any of you would like to try the experiment I shall be very pleased to watch the proceedings; for I begin to value my eyes more than I did at first, because after one experiment I did at Piccadilly I had a black spot hovering about the retina for some days. With Mr. Debenham's advice, and that of others, I have come to the conclusion it is dangerous; and the black spot did not go off until I put a piece of red glass before the arc light and looked at it for two minutes, which seemed to counterbalance the effect. I shall not try it many more times, for, after all, sight is very precious. I have only chanced one eye always, but it may affect the other, so I intend to be careful.

I may say here just one or two things with regard to the eye. It is by it that we alone can judge, not only of its own perfection, but also of the comparative value of any given optical combination. It is endowed with considerable freedom of motion; and no doubt we shall have to go to the eye for many optical hints. I may here say the retina is a transparent substance composed of nerve fibres spread out into a thin layer, and corresponding to the ground glass of the camera. The retina receives the picture from the object in front, and being connected with the optic nerve behind, the picture is conveyed to the brain. I believe if one could analyse them there are salts in the retina corresponding to those used in photography, though probably of a much more sensitive nature; and the electric magnetic effect of light conducts to the brain, where there is always an alkali and acid to develop, and the atom deposit in the cells can be called at will to answer our memory. Perhaps I am going a little too far, both for myself and others who may think in a similar way, also for those who do not think in the same way; but there is no harm in giving you my thoughts, as it seems to me we like dabbling in ideas that are a perpetual mystery.

But now to offer some suggestions with regard to the picture produced by the eye. Can it be reflected from the retina, from the cornea, or from the back surface of the lens? Is there a kind of phosphorescence which can affect a photographic plate? Is it some kind of electric phenomena, and our latent image a galvanic action? Of course these suggestions are very wild, for I must confess, although I discovered the effect, I cannot explain it, and the more I try to do so the more ignorant I feel. It may lead to something important as time rolls on. Photography is now making huge strides; its history becomes a clueless labyrinth of confusion and uncertainty; it has vigorous health and plenty of practical and mental ingenuity always at hand, which affords ample proof of the earnestness with which experimental investigators work. Experimenters should work out their internal nature, with the aid of experiments, of things contained in the varied world around them, then they will have something original to tell us, and be continually adding atoms to the progress of our fascinating art. I know, for my own part, I have formed a love and veneration for photography, with all its worry, disappointments, &c., which has almost the nature of a passion. Every act of seeing leads to consideration, consideration to reflection, reflection to combination, and combination to ideas which ought to be worked out with method and system; then we shall be sure to discover something quite new and original, especially if we work earnestly and patiently.

I must here confess that a mere statement of conclusions without the experimental evidence is of no use. I know I have gathered much knowledge from the classes that I attended at the Polytechnic and the Birkbeck Institutions. These helped me to appreciate the lectures and discourses at the Royal Institution, which I have attended the last two years, both in the afternoon and evening. I have to thank many friends for giving me passes to hear the Friday evening discourses, which are unique, varied, and leave plenty of scientific food for anyone to digest.

Now, with all this, there are three important indispensable things we must be able to command—viz., time, money, and knowledge. Well, let us take the first. I wrote to your worthy secretary that if I waited for a convenient time to give this paper, I should never have the pleasure of interesting you in the way I hope I am doing. The same thing occurs with the use of money: if you want a thing and cannot afford it—well, if you wait until it is convenient, you will never get it at all. I know it's very wrong, but I buy things and get as much credit as possible, and, strange to say, all are usually most accommodating. This little incident occurred last year to me: I know a hard-working clever mechanic at Bath who, some time ago, suggested this kind of pump, so I said make me one (of course I saw something in his suggestion), and I hope it won't cost more than £10. He said it should not. I paid him, and kept those that were richer waiting. But listen what was the result; he made the pump, got a medal for it at Falmouth, also numerous letters from mining agents, and no doubt it has increased his trade; so this has done him a good turn, and the richer people I kept waiting ought to be very much obliged to me; and now I understand he can improve on this one. But what has it done for me? Ah! there is no knowing. You would not have had the latter part of this paper; and there is no knowing what more it may do.

Then, again, take only a few of the instruments. This spectroscope with the Grubb lens inside (which is unique) was no end of bother to get right. Practical experience combined with a little scientific knowledge must be possessed by those who experiment with the simplest instrument. I must make an open confession to you: I cannot carry on these experiments with the system and method I should like, so I must leave that for others who have more time and more apparatus at their disposal; but I can occasionally bring forward results which give a great field for experimentalists, though I must confess one thing. If any one had gone through with every possible care and patience Becquerel's experiments, combining method and system in every step, and after all obtained nothing, I don't envy him the trouble, for after spending £60 and no end of time I could only obtain two colours—but mind you, I must say this, it has led me to other experiments, possibly more important ones, so I have not lost by it. In due time I shall bring my experiments in connection with orthochromatic photography before one of the societies. This I have thoroughly worked in a systematic and methodical way, and I am determined to carry on these experiments with a perfect method as long as I live. Captain Abney has begun in the right way. I hope he will forgive me for mentioning his name; I only wish we had a few more like him, although not always agreeing with him, for I object to his theory of the latent image. You must not think that I do not admire and appreciate his last important communication to us, although one could wish he would take into consideration the colour which the film absorbs; also the colour of the deposit of the developer he uses. He has begun, but not at the beginning. I know I shall always agitate until we photographers know more about the latent image than we do at present. I remember reading about Ruskin saying, "a milkmaid did not know how to make milk." Now that cap fitted me, and ever since I have been determined to know what it is we use and how to use it; and through making that determination I have been led to notice the *how* and *why* of everything except such *whys* and *hows* as this; *Why* is electricity in the clouds? and *how* is electricity formed in the clouds. Well, I'll leave you to discover.

Now to the effect of a bromide plate in a vacuum and under pressure. I must first relate my experiment. I get this air-pump and an air-tight glass box, such as the one I have here. After getting as good a vacuum as possible, expose half the plate to the spectrum (why I always use the spectrum is, that I may notice something in connection with the colours), taking care to cover the other half of the plate up during the exposure. Now let in the air and expose the other half exactly the same time, of course not forgetting to cover up the half that has been exposed. You will find, on developing, the half that was exposed in the vacuum has more deposit upon it. Now I repeat the experiment, only having pressure instead of a vacuum, and, strange to say, it leaves more deposit where the exposure has been in pressure, which is very remarkable. Now I expose one in a vacuum, and instead of normal air, as I did before, I used pressure, and, strange to say, pressure has more deposit. This is very curious;

I should have thought the vacuum would have had more deposit, or at least been acted on most.

I can only account for it in this way: in pressure you have heat, which accelerates; and in vacuum you have cold, which retards. Here are the results. I can at present only say this; you have the results, but not the experiments, worked out properly. I intend to do so. Here is a guage which I intend to have fitted to my pump to enable me to give you more accurate details as to measurements, &c. In the meantime, I wish some of you would try the same experiments, and let me know the results; as I am under the impression these experiments are very important. There is another experiment I have made; filling my glass box with oxygen supplied from Brin's cylinder, and exposing a plate in it; afterwards repeating the experiment, only I used hydrogen iustead of oxygen. Which do you think had the most deposit with the same exposure? Why, hydrogen. I also tried chlorine gas, but nearly got suffocated, so I canuot give you the result, and can only suggest this—I should like some one else to try this experiment.

Notes.

Photographing in the Paris Exhibition is to be very much regulated, but no exclusive right or monopoly will be sold. Under somewhat complex rules, a permit to use one photographic apparatus in the exhibition for a period of four hours, on certain days to be determined by the Executive, is obtainable for the sum of twenty francs. If, however, a permit is not used at the time for which it is issued, the Director-General may make it good for another period.

The administration evidently contemplates large cameras being used, as in applying for a permit you must state how many operators and how many assistants will be engaged; but these operators and assistants must pay the ordinary admission fee.

Photographers who exhibit are to have the rare privilege of purchasing a season ticket *for each apparatus used*, this ticket costing three hundred francs (£12), but the apparatus can only be used during periods set apart for the work.

The regulations, which are immensely complicated—and we have only cited a few points—appear to have been made by an official of the most red-tapey sort, and one who has no knowledge of photography. According to the regulations, a man who carries a "vest" or "hat" detective camera will pay the same as one who takes an immense camera van studded all round with lenses. Then, even when you have got your ticket, you must not photograph any object whatever which is exhibited, without special authority from the exhibitor, countersigned by the director; and you can only photograph the buildings, parks, or galleries, on condition that you send ten prints to the administrators. In other words, the ordinary permit seems only to authorise photographing the sky from the exhibition grounds. Our information is gathered from a notice dated February 10th, 1888, and signed G. Berger, Directeur Général, but we are assured the same regulations are still current. Let us hope some small amount of reasonableness as regards the regulation of photography will dawn on the official mind before the exhibition opens.

One excellent regulation is that every exhibitor, before he can receive his admission ticket, must send in two "carte" size photographic portraits; one to be affixed to the admission card, and the other to be retained by the exhibition authorities.

The London correspondent of the *Moniteur de la Photographie*, in referring to a note which appeared a few weeks ago in these columns as to the badness of business among photographers in 1888, remarks that "the writer does not say how he arrived at this conclusion, nor does he give any statistics." A fact of this kind can he arrived at without statistics. It is a matter of common talk among photographers. We know of one large firm doing an extensive club business, who have been obliged to reduce their staff of paid canvassers materially, as they have scarcely earned their salaries. The cause of the depression may be due, as the correspondent of the *Moniteur* remarks, to the very inclement weather of last year, but whatever the reason, the fact of the falling off in business remains.

His Majesty of Wurtemburg intersperses his investigations into spiritualism with photographic study. The latter, however, takes rather a peculiar form. It appears that he is anxious to know whether the moon is inhabited, and his way of satisfying his curiosity is to cause photographs to be taken of the luminary, and then having the negatives magnified "a hundred thousand fold." "The pictures," says the journalist who is our authority, "produced by this process show nebulæ with little dots, and the King declares these dots to be men and women. He hopes eventually to get some of them into distinct shape."

The cost of this stupid whim, we are assured, is "enormous," and we can quite believe it. It is a pity the Court photographers who are striving to gratify His Majesty's fancy do not adopt a rough-and-ready mode of producing photographs of the moon by a method which, if we are not mistaken, was published some years ago in the NEWS. The materials are simply some common whiting and a packet of Seidlitz powders. Mix the contents of the blue packets with the whiting, and add water. Pour the mixture into a round bowl, and add the contents of the white packets. When the effervescence has ceased, photograph the surface, and a photograph of the moon with its depressions and extinct craters is obtained, which would answer the King of Wurtemburg's purpose quite as well as the real thing, and be much cheaper.

The working of an automatic photographinc machine may be impracticable, but no such objection is said by the projectors to apply to the less ambitious project, also said to be in course of organisation, of running a series of photographic studio cars in the streets of our great cities. The idea is admittedly a development of the proposal of an enterprising purveyor of refreshments who shortly intends to start a number of cars which will be virtually eating-houses on wheels—perambulating restaurants, so to speak. The enterprising gentleman in question asserts, for example,

that he will carry a passenger from Charing Cross to the Bank, and provide him with a sausage and mashed potato and convenience for eating them on the way, for a really ridiculously small sum. Well, the proprietor of the photographic car will, for a sum nearly as small, not only take the public from the Strand to the City, but take their portraits on the way. It is admitted that all the difficulties in the way of establishing the "photographic omnibus" have not yet been surmounted, and we can readily imagine that this is the case.

One obvious difficulty will be the provision of sufficient space for photographic purposes. If the portrait car be full, the operator, unless the vehicle be cumbersomely large, will surely find himself embarrassed, when taking one "inside," by the eleven other insides who may be waiting their turns. Then there is the question of backgrounds. We hardly see how the various public buildings passed can be utilized in this direction, though, doubtless, the passengers would much like for this to be done. It could not, for instance, but add to an ordinary citizen's self-importance if only he could be photographed posing gracefully in front of the new Law Courts, or with the dome of St. Paul's looming behind him. But we very much doubt, we repeat, if this could be managed; and in default of some such arrangement, it is to be feared that the background would, under the inevitable circumstances of the case, lack dignity and impressiveness.

Another still more fatal difficulty occurs to us. The very fact of riding in a cheap and popular public conveyance has the effect of temporarily souring even the most amiable of our fellow-beings. Who that has studied the faces of the twelve insides of a penny 'bus, especially on a wet day, does not know that they furnish a set of expressions in no way fitted to be perpetuated by photographic portraiture? Let our readers only put the point fairly to themselves, and we think they will admit that no one would willingly select to be photographed for his friends and posterity, whilst wearing what may be called "the omnibus scowl." The foregoing—to say nothing of the vibration of the cars—are, moreover, but a few of the difficulties that occur to us as standing in the way of a successful development of the "locomotive portrait 'bus"; so that though, doubtless, the cheap sausage will soon be consumed by passengers on their way to and from the City, we are inclined to think that the taking of the omnibus portrait will be found to be at present an Utopian dream.

Reviews.

THE LONDON BRIDGE DIARY FOR 1889. (*London: Charles Straker and Sons, 38, King William Street, London Bridge.*)

THIS diary is notable, from our own point of view, as being illustrated with remarkably fine photo-block prints of scenes of interest in London, the negatives being by Messrs. G. W. Wilson and Co. The blocks are stated to be by Husnik's process; and we assume the gelatinotype, not long ago described in the NEWS, is referred to.

The book before us contains much interesting information about London and its older monuments, and one cannot help feeling that a few photo block views of some of those scenes which may probably soon disappear would have made, perhaps, more excellent illustrations than those selected. The cottages and Elizabethan house in Nevill's Court may be mentioned; also Barnard's Inn, and the old houses in Wych Street and Holywell Street.

PHOTOGRAPHS OF NEBULÆ.

BY A. A. COMMON, F.R.S.*

THE subject on which I have to say some words to-night is the photographing of nebulæ. That is a branch of astronomical photography that one may say is quite recent. The history of astronomical photography itself is practically that of photography. The discovery, or the invention of the Daguerreotype had hardly been described before it was applied to the delineation of the moon's surface. Bond, of Harvard College, in America, made in 1841, if I am right, with the fifteen inch refractor at Harvard College, assisted by Mr. Webley, an expert photographer, photographs of the moon. These were discontinued for a time, because the driving clock, which had been the bugbear of astro-photographers, prevented the work being done. With better driving clocks they were able to get better results, and views were taken of stars. Excellent photographs were made as good as those of the present day, with a single exception. The Daguerreotype plate had to be exposed for a great length of time, and the want of sensitiveness crippled further efforts in that direction, and for a long time little was done. With the invention of the collodion process, astronomical photography took a new departure, and De la Rue in England, and a lot of other men whose names will be familiar to you, worked with the collodion process and produced very fine results. But it seems as if the end of the capabilities of the collodion process was very soon arrived at. Pictures of the moon were taken, and pictures of stars down to the ninth and tenth magnitudes were obtained with the limited exposure that could then be given to the wet plate. The sun was photographed; in fact, the sun was one of the first objects which was photographed with success, but it was very soon found that the limit of the application of photography to celestial work was small, for they were circumscribed or fixed by the length of time that the collodion plate would remain moist and in a proper state. Great expectations were naturally formed when the application of photography to celestial delineation was first undertaken, as might be expected, and those hopes were put rather too high, and, when success was not obtained, the revulsion of feeling came, and astronomical photography suffered a relapse. It remained in that state for many years; in fact, had it not been for the discovery of the gelatine plate, which quite altered the aspect of the case, there is no doubt that photography would have been of little assistance to astronomy. But with the advent of the dry plate, the whole position of matters was changed. As you know, one can expose for an indefinite time with a dry plate, and with vastly increased sensitiveness. Sir John Herschell, who was an expert photographer himself, in the course of a correspondence that extended over many years, concerning the making of the four-feet reflector for the southern hemisphere, gave it as his deliberate opinion that photography would never enable us to delineate a nebula. I had occasion to refer to a memoir which was published for private circulation giving this correspondence, and he stated in this that photography might be used to get the bright stars, and might be used for the purpose of forming a background on which the artist could delineate the Nebulæ; but another man who wrote some very charming books on astronomy gave it as his opinion as early as 1845 or 1846. In fact, he was speaking of the Daguerrotype, and he says:—"Nor is it impossible that the planets Mars, Venus, Jupiter, and Saturn might be delineated in this way and objects discovered which could not be discerned by means of the telescope. It might not perhaps be considered beyond the bounds of possibility to expect that even distant nebulæ might be fixed." Here was a man twenty years before Sir John Herschell spoke, who said a great deal more than Sir John Herschell did, and he said what has turned out to be a great deal of truth in, for the

* Read before the Camera Club.

distant nebulæ which he thought might be taken have been taken since, thanks to the dry plate. With the introduction of the dry plate the whole of the capabilities of photography for astronomical research were altered, and it was not long before efforts were made to obtain photographs of the nebulæ. One of the first men to do this was Dr. Draper, in America, who, by exposing a dry plate for a very long time, obtained what was then a successful photograph of the Orion Nebula, one of the brightest in the heavens. Some of the nebulæ in the heaveus, of which there are three or four large examples in the northern hemisphere—the Orion Nebula, the great Nebula of Andromeda, and one or two of less importance as regards their size—are objects you cannot classify or describe, except as being a large irregular mass of cloud. One can become acquainted with the general shape and recognise them in that way, but you cannot say what they are. Herschel classified them partly by their light and partly by their shape; but the smallness in nebulæ is only a relative term here; the known nebulæ as they increase or decrease in brightness seem to have different shapes, and when we leave the class comprising the larger nebulæ, we get into the classes of nebulæ in which the shape is not a cloud, but a line; we get into classes of nebulæ where the shape is that of a ring; and in the planetary nebulæ, where the appearance is that of a disc. Perhaps the better way of getting an idea of what a nebula is will be to see it on a photograph. Mr. Draper's work was perhaps the first. I had made attempts to photograph the nebulæ because it was a subject I took up in 1874 or 1875, rather with a view to seeing if something more could not be done by means of such a powerful thing as photography. Mr. Draper was the first man who successfully photographed the nebula, and since then the thing has been a series of successes, and we have got on now to such things as would have been considered marvellous only a few years ago.

I now show you some slides of the comet, taken by Dr. Gill at the Cape, with an ordinary lens and camera attached to his equatorial. You cannot fail to notice the numerous quantity of small stars shown. In the old Daguerreotype days only one or two of the largest would have been shown, and even with collodion they would have been considerably less in number. In fact, this photograph first brought home to me what power photography could give for delineating the heavens.

To come back to the photograph of the nebulæ, there are one or two points of importance to dwell upon when we consider the importance of photographs of the nebulæ, in contradistinction to drawings. It is very easy to draw an object that has well-defined apertures, where the lines between the light and the shadow are extremely well defined, but to draw Orion where the lights gradually merge into shadows it is impossible to get a good picture. The power of the observer's eye changes, and the longer he is in the dark the more he sees, and there is always a tendency to make more of the fainter points to the detriment of the brighter points, and to delineate bright stars with a total absence of nebulæ near them, owing to the fact that the nebula, which is undoubtedly round certain stars, has not its effect upon the eye through the brightness of the star seen. Consequently, we get with the best intention in the world a conventional representation of a drawing. It can only be read in connection with a drawing made under similar circumstances with the same hand and the same light. Consequently, one is prepared to see what one does see. In a very remarkable book, published by the now director of the Lick Observatory, Professor Holden, on the Nebula of Orion, there are the strangest shapes put down to represent one defined object that it is possible for the human mind to conceive. It does not matter whether they are upside down or inside out, they are all the same, and have no resemblance whatever one with another. Therefore, as representatives of the nebula they cease to have any value. To make a comparison between such an amorphous object as a nebula, and make it clear to you, I will ask that a few of the next slides should be put on. The next slide is Orion, from a drawing. Everyone knows the three bright stars in the belt. The nebula is here (indicating), and it is just faintly indicated by a little brightness. This photograph was taken in 1881 or 1882 with a very small lens indeed, and it embraces a very large part of the sky. We will now take the next slide. This is a drawing of the same object. It has been variously delineated by men during the last 200 years. This was about the earliest form. If you can bear this slide in mind for a moment while some more slides come on, and then compare it with one of the photographs, you will find, in some respects, there are some very remarkable things. (*To be continued*).

PROGRESS IN PHOTOGRAPHY IN 1888.

BY C. H. BOTHAMLEY, F.I.C., F.C.S.*

THE most noteworthy papers relating to the manufacture of emulsions are a communication to the Photographic Society of Great Britain, by Prof. W. K. Burton, on the use of chrome alum (p. 291), special emphasis being laid on the necessity of ensuring the absence of any free acid; and a paper on the advantages of centrifugal separation read by Pringle at the Camera Club Conference (p. 171). A note by Spiller on the removal of free acid by treating chrome alum with alcohol (p. 314) is also of interest. Howard Farmer and Tompkins have taken out a patent (p. 716) for the preparation of emulsions in which albumen takes the place of gelatine, these emulsions being intended chiefly for the production of positive images, the image being printed out or developed according to circumstances.

Much attention has been directed to the capabilities of hydroquinone as a developer, and many formula not differing greatly from one another have been published, usually without any quantitative data as to their merits. A comprehensive summary of the principal formulæ and results has quite recently been given in the NEWS (pp. 753, 769, and 817). One of the most important points is the abolition of the use of alcohol as a solvent for the hydroquinone, advantage being taken of the fact that this substance is sufficiently soluble for practical purposes in a solution of sodium sulphite. The most valuable contribution to this question made during the past year is a paper by Eder and Lenhard in the last number of *Photographische Correspondenz* (1888, p. 511). They employed a sensitometer, and made quantitative experiments with several different varieties of plates and various proportions of the different ingredients of the developer. Their experiments prove that it is better to use potassium carbonate than sodium carbonate, since the former not only has greater developing energy, but also gives negatives of better quality; that the character of the negative can be modified by varying the relative proportions of hydroquinone and alkali, an increase of the latter giving more detail and less contrast, whilst an increase in the amount of hydroquinone gives greater contrast; that hydroquinone with sulphite and potassium carbonate is as powerful a developer as ferrous oxalate, or as pyrogallol with sodium carbonate. No comparison was made between the hydroquinone, and pyro with ammonia. An increase in the amount of potassium carbonate beyond a certain limit produces no corresponding increase in the energy of the developer. Development requires about eight minutes Eder and Lenhard recommend the following formula:—

Hydroquinone.

Hydroquinone	...	...	...	1 part
Sodium sulphite	...	...	...	4 parts
Water...	...	...	...	40 „

Alkali.

Potassium carbonate (anhydrous)	...			1 part
Water...	...	...	...	10 parts

Mix two parts of the first with one of the second, equal parts, or one part of the first with two of the second, according to the character of the result required. If a somewhat less energetic developer is preferred, a solution of crystallized sodium carbonate ($Na_2CO_3 \cdot 10H_2O$) may be used as the alkali, 1 part of the salt being dissolved in 8 parts of water. The authors point out the importance of well rinsing the plate after it is taken out of the developer and before it is immersed in the alum, in order to avoid precipitation of alumina upon the film.

Himly (*Correspondenz*, 94) uses caustic alkalies in place of alkaline carbonates, and recommends the following formula:—

* Continued from page 27.

A.—Hydroquinone	... ...	... 3 parts
Sodium sulphite	... ...	... 10 ,,
Water ...	... ...	... 50 ,,
B.—Caustic soda ...	... ...	... 1 part
Sodium sulphite	... ...	... 1 ,,
Water ...	... ...	... 8 parts

Equal volumes of A and B are mixed and diluted with 10 volumes of water. The image appears in about half a minute, and development is complete in about three minutes. In order to prevent frilling, the plate is immersed in an alum bath without washing, and is then washed and fixed in the usual way.

Wilkinson has recently published (*Brit. J. Phot.*) the following formula, which he uses for photo-mechanical work with slow gelatino-bromide plates :—

A.—Hydroquinone	... ...	... 10 grains
Potassium meta-bisulphite		... 10 ,,
Water ...	... ...	... 10 ounces
B.—Caustic potash	... ...	... 25 grains
Water ...	... ...	... 10 ounces
C.—Potassium bromide	...	... 60 grains
Water ...	... ...	... 10 ounces

Mix equal quantities of A and B, and add C according to circumstances.

Many attempts have been made to render hydroxylamine serviceable as a developer. The greatest drawback to the use of this energetic reducing agent is the fact that the reduction of the silver bromide involves the decomposition of the hydroxylamine, and this results in the evolution of nitrogen (Konkoly) and sometimes nitrous oxide (Lossen), and the escaping gas produces blisters in the films. The evolution of gas is greater the stronger the alkali used, or in other words, the more energetic the developer (Lainer, *Correspondenz*, p. 488), but cannot be prevented by varying the nature of the alkali (Konkoly, *Correspondenz*, p. 144). Various devices for the mitigation of this evil by toughening the film by treatment with tannin or chrome alum, or by adding sugar, treacle, or glycerine to the developer, are only very partially successful (*loc. cit.*)

Experiments with the sensitometer show that, without producing fog, no greater sensitiveness can be got with hydroxylamine than with pyro-soda, or ferrous oxalate, and Lainer concludes that there is no probability of these latter developers being replaced by hydroxylamine. Hydroxylamine is much more successful with bromide paper than with plates. Lainer has also made experiments with a view to determine whether the addition of potassium ferrocyanide to the developer really has any advantages (*Correspondenz*, p. 337). He finds that when freshly mixed the ferrocyanide acts as an accelerator and gives increased detail and vigour; but if the ferrocyanide remains in contact with an acidified solution of pyro and sulphite for some time, a small quantity of hydrocyanic acid (prussic acid) is liberated, and acts as a very powerful restrainer.

Patent Intelligence.

Applications for Letters Patent.

484. EMILY AGNES HAMILTON, 76, Chancery Lane, London, W.C., for "A New or Improved Packing Device for the Transmission of Photographs and like articles."—January 10th, 1889.

494. CHARLES WINTER, 47, Lincoln's Inn Fields, London, for "Improvements in Apparatus for use in Taking Photographic Pictures, Exhibiting Magic Lantern Pictures, and the like."—January 10th, 1889.

611. GEORGE HERBERT WEST, 17 and 18, Southampton Buildings, for "Improvements in So-called 'Magic' or Scientific Demonstrating Lanterns."—January 12th, 1889.

Specifications Published.

1583. THOMAS RUDOLPH DALLMEYER, of 25, Newman Street, Oxford Street, in the County of Middlesex, for "Improvements in Photographic Lenses."—Dated February 2nd, 1888.

My improved lens is a compound lens consisting of three single lenses each a meniscus, with the convexity of two of them outwards. The outer lens is of flint glass, and the middle and posterior ones are of crown glass. The outer and middle lenses are preferably cemented together, but this is not absolutely necessary, whilst an air space is left between the middle and posterior one; the two latter lenses have their concavities adjacent.

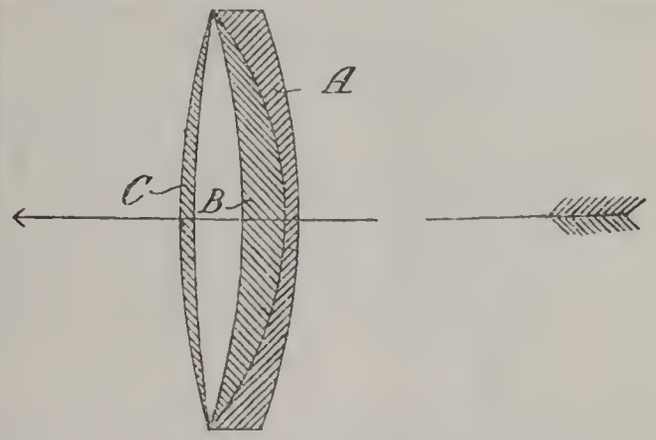
The diaphragm is placed in front of the outer flint lens. With this form of lens, although the diaphragm is placed in front, I entirely get rid of marginal distortion.

In order that my said invention may be more fully understood and readily carried into effect, I will proceed to describe the drawing hereunto annexed.

Description of the Drawing.

The drawing shows a lens constructed according to my invention.

A is the outer lens, B the middle lens, and C the inner lens; they have the following curvatures and indices of refraction



which give good results, but it must be understood that I do not limit myself to them.

	Radii in Inches.		Indices of Refraction. D. Line.	G. Line.
A of flint glass ...	+ 2·900			
	— 1·558	..	1·574015 ...	1·592824
B of crown glass ...	+ 1·558	...		
	— 3·342	...	1·514591 ...	1·526595
C of crown glass ...	— 6·001	...		
	+ 3·489	...	1·517114 ...	1·528358

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is :—

1. A compound lens consisting of three single lenses each a meniscus, the outer and middle lenses having their convexities outwards and their adjacent surfaces of the same curvature, the inner lens having its convexity inwards, with an air space between it and the middle lens.

2. In lenses such as are referred to in the first claim, making the outer lens of flint glass, and the middle and inner lenses of crown glass.

3. Lenses substantially as described and shown in the drawings.

2,382. EDMUND PHIPPS, 11, Breeze Hill, Bootle, Lancaster, for "Improvements in Photographic Cameras."—Dated February 17th, 1888.

The Patentee says :—

The invention relates to cameras commonly known as reflecting cameras, in which the image is for focussing purposes reflected by a mirror on to a screen. The objects are to adapt such cameras for instantaneous work, and to enable the operator to regulate the time of exposure of different portions of the sensitive film.

The invention consists—

First. In the combination of a dark chamber having lens attachments at one side, and appliances for holding a sensitive film opposite thereto, with a hinged mirror fitted with hanging curtains or screens, and so arranged as to reflect the rays of light passing through the lens on to a screen attached to the

dark chamber, or to allow the said rays to impinge on the sensitive film. A convenient form of camera under my invention consists of a rectangular box having a lens opening on one side and a sensitive film holder on the opposite side, a ground glass screen at the top, and a mirror hinged in the angle of the chamber above the sensitive plate. The said mirror is fitted with hanging curtains or screens, and is capable of being turned to an angle which will shut off all light from the sensitive film, and reflect the light on to a focussing screen ; it may also be turned so as to allow the rays of light to pass through an opening in the front hanging screen directly to the sensitive film. The mirror can be arranged to operate a sliding or other shutter fitted to the dark chamber or lens-holder. A spring may be used to give rapid motion to the mirror in one direction, and it is moved in the other direction by means of a projecting piece passing outside the chamber.

Second. To enable the length of time various parts of the sensitive film are subjected to the action of the focussed image to be varied in cameras under my invention, I employ in combination with the shutter means such as a thin strip of metal for varying the dimensions and shape of the exposive aperture of the shutter.

8,508. WILLIAM GUTTENBERG, 29, Triangle, Queen's Road, Bristol, for "A Lamp to be used for Photographing by Magnesium Light."—June 11th, 1888.

The patentee says :—This invention is a lamp for photography by magnesium light, consisting of a glass case composed of two parts, namely, the bottom and cover, so fitted that when smoke is generated by the ignition of magnesium powder inside the lamp, the smoke does not escape until the lamp is opened. The magnesium powder is mixed with powdered chlorate of potash in the proportion of one of potash to four parts of magnesium, and for use is laid in a train on the upper surface of the ground glass bottom, and when the cover has been placed in position the mixture is ignited through a hole cut in one of the ends of the lamp, and a glass door is slid over the hole to prevent smoke escaping. The duration of the exposure is regulated by the length of the train.

For taking portraits the lamp should be suspended a suitable height by means of chains attached to a strip of wood fitting on the top of the lamp.

My invention consists of a lamp in which magnesium powder is burned in conjunction with chlorate of potash, gunpowder, or any other combustible mixture, for photographing by artificial light. It has sides, ends, and bottom (and top, if so desired, according to shape) of glass, and is composed of two parts : the one part being the bottom, which is a thick piece of ground glass, whereon a train of illuminating mixture is placed for ignition ; the other part being the cover for retaining the smoke generated by the ignition of the powder. The said cover is made of pieces of clear glass bound together with tin (the shape of the cover I am describing is that of an inverted V, with ends fitted to the sides).

The piece of glass used for the bottom of the lamp has a wooden frame round it, with a beading on the upper side of the frame, so that when the glass cover is placed on the frame, the upper part of which is covered with felt, the cover just fits outside the beading, making the lamp smoke-tight ; or, the wooden frame may be attached to the glass cover, and the bottom ground-glass can be made to slide into the frame after the manner of a drawer. In both cases a strip of wood having an angular groove cut into it, and two chains attached, a suitable distance apart, in the middle of the strip of wood, is placed on the apex of the lamp, and the chains are brought round under the lamp and hooked on the other side of the strip of wood. The lamp can now be fitted with any sort of loop attached to said strip of wood and suspended at any suitable height for use. In one end of the glass cover a semi-circular hole is cut in the middle of the glass where it sits on the wooden frame, and a sliding glass door is fitted. The purpose of this hole and door is to enable the operator to ignite the mixture and close the door, thus keeping the smoke generated from coming into the studio or room where the artificial light is used. A tissue paper screen should be placed between the lamp and sitter, to soften the light.

Claims.—1. A lamp for photographing by magnesium light, all having sides made of glass, thus causing a radiation of light in all directions, so that an even illumination is given on the subject to be photographed.

2. A lamp for the above purpose, composed of two parts, so fitted that the smoke generated by the combustion does not escape into the room, thus enabling repeated exposures to be made without getting the image veiled by fog.

3. A lamp for the above purpose, so constructed that it can be suspended in such a manner that the light falls on the sitter from the same directions as in daylight portraiture, so that no shadow of the sitter is thrown on the background.

4. A lamp for the above purpose the construction of which admits of a train of the illuminating powder to be laid, thereby giving a latitude of exposure from one to any number of seconds according to the length of train, so that the resulting light is not so sudden and intense, thus avoiding the consequent contraction of the facial or optic muscles caused by a flash light.

5. A lamp for the purpose stated, the size and shape of which are immaterial. It is advisable not to make it smaller, twenty-one inches in length, seventeen and a half inches in breadth, and twelve inches in height.

The triangular shape is most adaptable.

Correspondence.

THE JUBILEE AND HENRY FOX TALBOT.

DEAR SIR,—As the photographers of London are about to commemorate the present year with a sort of jubilee festival, it seems to me especially desirable that this should be made as widespread as possible, in order to clearly define the progress made during fifty years of photographic history. It is not, of course, likely that those who have the matter in hand contemplate anything approaching the general interest attached to the jubilee of the Sovereign, or in costliness at all resembling that which commemorated the jubilee of his Holiness the Pope. Whatever is done must emanate from within the photographic circle, and be supplemented, as far as can be expected, by scientists, artists, and others. Few men are destined to see, like Izaak Pitman, the inventor of phonography, a jubilee commemoration of the introduction of their valuable discoveries. Dates of inventions in photography are more numerous and diverse than those which have occurred in the case of shorthand systems of writing. Thus with the latter there was the matured system of Mason, 1682, that of Taylor 1786, and phonography 1837, since which time the inventor has perseveringly studied and vastly improved the system. The name of Izaak Pitman, of Bath, will probably never be forgotten, or, at any rate, so long as there is any necessity for mankind to convey thoughts to paper. At any rate, the value of his invention to the world is of such magnitude, that it is no exaggeration to say that its sudden cessation would be the greatest calamnity that could happen.

Equally dire would be the absence of the reproductive processes of photography now that we have this immense power in daily use ; and it is a curious coincidence that the foundation of the most of the present-day photography is to be found in the discoveries made by Henry Fox Talbot at Lacock Abbey, near Bath. It is just half a century ago that this English scientist communicated his discovery of photogenic drawing to the Royal Society, and as doubtless many speakers at the jubilee and other meetings will allude to the history of the photographic negative in their speeches, I should like to draw attention to some facts regarding Mr. H. Fox Talbot's discoveries, which I have been recently favoured with, by no less an authenticated source than that of Mr. C. H. Talbot, the present owner of Lacock Abbey, and son of the man whom we, as photographers, are determinsd to honour. Quoting from his letter of January 12th, he says, in reply to my queries : "The process communicated by my father to the Royal Society on January 31st, 1839, was not the Talbot-type, but his original discovery of 'Photogenic Drawing.' The first account of the calotype process was communicated to the Royal Society, June 10th, 1841. The name was changed from Calotype to Talbot-type on the recommendation of Sir David Brewster." Mr. C. H. Talbot then goes on to relate that he does not think his father

much liked the new name, and he (Mr. C. H. Talbot) has the same preference for the name Calotype. The original process, that of "Photogenic Drawing," is retained in the Calotype process for printing the proofs.

I think you will agree with me, Sir, that no time should be lost in placing on a permanent basis all that relates to the discoveries from which we, as photographers, derive so much benefit. Valuable information can be obtained by those competent to deal with the subject, and I believe I can say, with safety, that the present owner of Lacock Abbey would facilitate such work by imparting to the historian materials which he could not obtain from any other source.—Yours faithfully, W. M. ASHMAN.

SHAKESPEARE AND PHOTOGRAPHY.

DEAR SIR,—Can any of your readers tell me the whereabouts of the following quotation from Shakespeare:—

"The glorious sun
Stays in his course and plays the alchymist."

I do not think that the above can allude to any other solar chemical action than that upon horn silver (*luna cornea*), and it adds a fresh feather to Shakespeare's cap that at that early stage he was aware of Fabricius's experiments, published only in 1559, on the metals.

I came across the above quotation on the outside of the *Photographic Magazine*, published by Reeve and Co., of Henrietta Street, in 1864. I have only a single copy of this publication, the No. VI, for June It contains four silver prints in a most excellent state of preservation. Many of your readers should have copies of this interesting little magazine. Will they note that a "kind home" is open to them in the library of the Camera Club?—I am, &c., LYONEL CLARK, Hon. Librarian.
Camera Club.

POLLARD *v.* PHOTOGRAPHIC COMPANY.

SIR,—I notice in my letter in the last issue of your valuable paper, a foot-note to the effect that "I admit I have no right to use a negative," and asking the reason why I should wish to appeal.

In reply, I beg to point out that you must have misunderstood my meaning in the letter, because I do not admit I have no right to use a negative—in fact, I most certainly claim the right to use a negative for specimen purposes, as long as it is not used for an unlawful purpose, and as long as I am not restricted by the sitter from doing so.

Our first reason for wishing to appeal lies in the fact that the lady's photo was exhibited in our window for about two months, and during the whole of that time she never objected to it. Therefore, we maintain, we had an implied permission to exhibit.

Secondly,—The gentleman being instructed by the lady to purchase, we maintain there was no unlawful sale. May I refer to the paragraph of Mr. W. E. Debenham's letter:—

"The case of portraits printed as specimens merely, is a little different. There are many, probably most people, who do not object to such use being made of their portraits, but who yet would not give any written consent to it. They would fancy that the doing so would make them appear vain of their personal appearance. Moreover, whilst they have given no consent, they are at liberty, at any time, to request the removal of the specimen. Here, again, custom has established a common-sense proceeding, at all events amongst the right feeling. If any objection is made to the use of a portrait as a specimen, such objection is at once met by the withdrawal of the picture."

Our case coincides exactly with this paragraph. Why, then, would an appeal not be a just one?—Yours respectfully, W. C. BAX.

Proceedings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE monthly technical meeting of this Society was held on Tuesday evening last, the 22nd inst., Mr. T. SEBASTIAN DAVIS in the chair.

Mr. FRIESE GREENE demonstrated a statement that he had previously made to the effect that with a certain combination of silver salts, he had found stronger photographic action in the yellow band of the spectrum than in the green. To show this, he had fitted up a limelight spectrum apparatus, and exposed to the coloured rays a plate which had originally been an ordinary gelatino-bromide plate, but which had been re-coated with collodio-chloride of silver emulsion containing excess of nitrate. The plate was exposed to the rays of the spectrum for a period of about an hour and a half, and was then handed round for the inspection of the members, when it was seen that the action of light, which was direct without development, had been powerful in the blue and violet, and had almost ceased at the green, but was slightly evident again at the place of the yellow. During the continuance of the exposure, a discussion on this and other matters took place, and Mr. Greene expounded his views. In the course of his remarks he observed that, in experiments with orthochromatic photography, it was necessary to take into consideration the colour that was absorbed by the sensitive film, and, as well as that, the colour of the deposit produced by the developing agent.

Mr. W. BEDFORD said that the generally accepted rule was that the salts of silver were sensitive to the rays which they absorbed. In searching for colour sensitisers, it was found that those colours which absorbed certain rays were the best chemical sensitisers for these rays. He also remarked upon Mr. Greene's statement that the colour of the deposit produced in developing must be taken into consideration when working orthochromatic photography, and enquired whether there was any proof of that statement.

Mr. GREENE then showed an appliance for exhibiting a more life-like effect upon the screen, when projected by an optical lantern, than had hitherto been accomplished. The apparatus consisted of a pair of lanterns, furnished with a series of portraits of the same person, with varying expressions. These portraits were mounted in frames linked together into a sort of endless chain, and the pair of chains were actuated by clockwork driven by a heavy weight. On setting the apparatus in motion, the portrait in one of the lanterns was covered by a dissolver, and whilst this portrait was hidden, the slide was changed by a movement of the chain, so as to bring another portrait into place. The other lantern objective was then covered, and the portrait behind it changed in the same way. It thus became possible by using a series of gradually changing images to represent the movements of a person when bursting into a laugh, when winking, &c. An addition to the apparatus which it was proposed to use was to photograph the sitter in the act of speaking, showing the movements of the mouth, and at the same time to use a phonograph to record the utterance. The phonogram being fitted up in conjunction with the lantern, the image on the screen might be made to appear to talk. In order to get a perfect representation of motion, Mr. Greene considered that it would be necessary to take the photographs at the rate of five in a second. He also intended to fit up a third lantern with one photograph which would remain unchanged upon the screen, whilst the others with varying expressions were superimposed upon it.

Mr. G. DAVISON did not think that five photographs in a second was anything like sufficient frequency to secure proper images of any rapidly moving object.

Returning to the main subject of the evening, Mr. LYONEL CLARK said that no bromide film absorbed green, bromide absorbed red, so did chloride.

W. BEDFORD had had experience with photographing colours as obtainable in pigments, but not in photographing the spectrum. He had often found that an ordinary plate was more sensitive to a red colour than an orthochromatic plate. That was because the pigment was not a pure red, but reflected a good deal of blue, which was less actinic to an orthochromatic than to another plate. If a film transmits a different spectrum from that given by another film, the orthochromatic effect will be different also; a film transmitting red, for instance, would absorb the complementary colours and be sensitive to them.

Mr. GREENE next handed round two samples of red glasses both

purchased for dark room use, and both sold as ruby. The one gave a safe light, whilst the other transmitted light that fogged photographic plates. He would like the opinion of the members as to which of the two looked the safer.

With the exception of the Chairman, those members who expressed an opinion thought that the glass numbered 1 would prove the safer, but the CHAIRMAN remarked that No. 2 transmitted less light, and probably less photographic action.

Mr. GREENE replied that the Chairman was right, and, on placing the two glasses in the lantern spectrum arrangement, a band of blue was observable in No. 1 that did not appear in No. 2.

A member then suggested that as No. 1 was the more transparent of the two, two thicknesses of it should be placed in the lantern. This was done, and it then showed the narrower red band of the two, and no blue could be seen. The light transmitted, however, was less than that yielded by a single thickness of the other specimen.

A vote of thanks to Mr. Greene closed the business of the meeting.

CAMERA CLUB.

ON Thursday, January 17th, Mr. A. PRINGLE gave an address on "Photo-Micrography," Sir GEORGE R. PRESCOTT occupying the chair.

Previous to the lecture a camera by Messrs. Watson and Co. was shown and described. The lecturer dealt with the practical portions of photo-microscopic work in detail, and pointed out the great advantage accruing to any microscopist who worked his science photographically. Messrs. Nelson, Smith, Beck, Evans, Davison, and others added to the discussion. Mr. Pringle illustrated his lecture with a number of fine prints, and a goodly collection of apparatus by Messrs. Baker, Beck, and Watson was kindly lent for the occasion.

On Thursday, January 31st, Mr. Graham Balfour will read a paper on "Figure in Landscape and Genre."

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on the 17th inst., Mr. J. TRAILL TAYLOR in the chair.

Mr. A. HADDON said, at the previous meeting reference had been made by the Chairman to absorbent wool, which acted as an efficient filter. A piece of the wool was placed in a tumbler of water, and in a very short time it dropped to the bottom of the tumbler. Mr. Haddon said it had been suggested by Mr. A. L. Henderson that gun-cotton, magnesium powder, and camphor, might be made to produce celluloid that would burn slowly, and by which better effect could be produced than by the flash light now in use.

Mr. E. CLIFTON explained the principle and advantages of a light which a company formed for the purpose were introducing for household lighting. A lime cone is suspended above the usual gas burner, to which is attached a tube conveying oxygen gas, rendering the cone incandescent in the same way as the ordinary limelight, the company undertaking to deliver the oxygen at a cheap rate regularly to consumers.

Mr. A. HADDON said that Mr. L. Warnerke had some time ago constructed a jet on a similar principle.

Mr. FRIESE GREENE read a paper on "Photographs taken with the Eye, and the Effect of Light on a Bromide Plate in a Vacuum and Normal Air Compared" (see page 54). He passed round some negatives, the results of previous experiments, to prove what could be accomplished in this direction, remarking, however, that in the interest of his eyesight, he did not think it advisable to continue the experiments to any great extent. On one occasion, after looking at an electric arc lamp of 2,000-candle power, a dark spot had appeared which continued for some days. It was partially removed by looking at an arc light through a piece of ruby glass. He had been careful in his experiments only to use one eye. By looking at a flash light he was able to get a photograph on a very sensitive plate. To demonstrate this, he stood a short distance from a lamp through which a large charge of magnesium powder was blown, afterwards holding his eye about an inch from a piece of sensitive bromide paper for a short time. The paper was then developed and fixed, showing a dense black spot from the light given out by the eye.

In further illustration of his paper a bromide plate, half of which was protected, was placed in the glass receiver of an air-pump, and the air exhausted; the plate was then exposed for a given time. The other half of the plate was then exposed under ordinary conditions. Upon development greater reduction was apparent in the part of the plate exposed in the vacuum.

Mr. FRIESE GREENE said he was not prepared to explain this; he had introduced the experiment hoping it might lead to a discussion, and be productive of some result. The necessity of testing the medium used in the illumination of the dark room was referred to. Mr. Greene showed two samples of ruby glass bought commercially as being quite safe; no difference in the colour whatever could be detected by the eyes. On being subjected, however, to the test of the spectroscope, one piece of the ruby glass proved to be quite unfit for the purpose intended.

The CHAIRMAN said, on one occasion, a very bright day, he was engaged adjusting the mirrors of a diplicdoscope, an instrument for observing the transit of the sun over the meridian to ascertain true time. On looking at a bright star the same night the star disappeared, and for two or three years after he was unable to see any very bright object. *Apropos* of the persistence of vision, he suggested holding a negative up to a bright light at a fixed point, and looking at it steadily; if the eye was then directed to a white wall, a positive image would be seen.

Mr. A. HADDON said the focal length of the eye for parallel rays was $\frac{3}{4}$ of an inch. He related the experiment of a German physiologist. The eyes of a rabbit were bandaged and kept some time in the dark; one eye was then uncovered and directed towards a window, and the head of the rabbit immediately severed. A perfect image was found on the eye. The dead eye was now directed to the window, and a perfect image found also, thus disproving the theory that the eye was incapable of receiving an image after death.

Mr. J. B. B. WELLINGTON said Professor Dewar, after exposing a luminous tablet to white light, obliterated the phosphorescence by subsequent exposure to red light.

A hearty vote of thanks was passed to Mr. Friese Greene for his interesting paper.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

THE fourth monthly meeting of the Session 1888-9 was held in Lamb's Hotel, Dundee, on Thursday, January 10th, Mr. JOHN ROBERTSON, President in the chair.

Two new members were elected, and one nomination for membership received.

The desirability of acquiring rooms for the Society having been brought under notice at a recent meeting, a committee was appointed to look out for suitable premises and report. This report was ordered by the December meeting to be printed and circulated amongst the members along with voting cards. Only about half of the members voted, and as the question involved a considerable outlay annually, it was moved and seconded that the report be left on the table.

Messrs. Sturrock and Macdongald gave a demonstration of lantern slide making by the wet process. A first-class slide was produced by reduction from a $7\frac{1}{2}$ by 5 negative, a powerful Argand burner being the illuminant, and exposure of five minutes being sufficient. Another successful slide was then made by contact. The prepared plate was laid on the floor between two pieces of stick such as two matches, slightly thicker than the glass, the negative resting on these, though not touching the plate, was near enough to give a sharp slide. Two inches of magnesium ribbon burned about four feet from the negative gave sufficient exposure.

SHROPSHIRE CAMERA CLUB.

THE annual meeting of members was held in the Hon. Secretary's room, The Square, at which the following gentlemen were present:—Messrs. Alltree, Bowdler, Burson, Heath, A. Pritchard, Drayton, Pyefinch, H. H. Hughes, Irwin, and Naunton (Hon. Sec.).

Mr ALLTREE, being elected Chairman, after a few suitable remarks as to the present important position of the club, and the pleasure it afforded to those members who found time to participate in its privileges, called upon the Hon. Secretary,

Mr. NAUNTON, who then read the audited statement of accounts, by which it appeared there was a balance in hand of £7 7s. 4d. He referred with some regret to the fact that the majority of members had failed to show that amount of interest in the affairs of the club as could have been wished. Ten meetings had been held during the past year, at which there was an average attendance of only nine members, out of some forty-three constituting the club. The members, he felt sure, would

adly acknowledge Mr. Greatorex's kindness in giving the lan· ern exhibition last November, and also a demonstration in lan- ern slide making, both of which were much appreciated by nose present. He was pleased to inform them their club had eceived recognition from the Photographic Convention of the Jnited Kingdom by their inviting a delegate to be sent to the onvention meeting held in Birmingham, and afterwards onoured him (Mr. Naunton) with a seat on the council of the onvention to be held in London next August. It would, he nought, be gratifying for the members to know that two from heir midst had won prizes in open competitions during the past ear, viz., Mr. M. J. Harding, two silver medals, at Gloucester nd Vienna, and himself a diploma at the Cardiff Exhibition. rrangements were in course of progress with the Shropshire rt Society for providing a photographic section in connection ith their exhibition to be held in Shrewsbury next June. This as a pleasing fact, as he believed it was the first occasion on hich any art society had acknowledged that photography had a ir claim to be classed with the fine arts. In conclusion, he rged upon each member during the ensuing year to interest imself in the welfare of the club, and to assist generally in romoting its usefulness.

The following gentlemen were elected honorary officers for the nsuing year:—Mr. E. C. Peele, president; Mr. J. R. Greatorex, ice-president; Mr. M. J. Harding, treasurer; Mr. W. W. aunton, secretary; and Messrs. Alltree, Bidlake, Bowdler, urson, Cureton, Lloyd-Oswell, Pyefinch, and Williams, council.

On the motion of Mr. Burson, seconded by Mr. Drayton, a ordial vote of thanks was passed to the honorary officers of the ub for their valuable services during the past year, and Mr. owdler and Mr. Naunton acknowledged the compliment.

The council was then authorised to arrange a magic lantern isplay and musical entertainment some time next month for he benefit of the club funds.

Six new members were then unanmously elected; and a vote f thanks to the chairman brought this pleasant evening to a ose.

Notts Amateur Photographic Association.

A large number of members of the above Association held their nual fortnightly meeting on Monday evening, the 21st, the resident, Mr. Henry Blandy, L.D.S, Edin., presiding.

Four new members were elected.

Mr. M. Tuquet gave a very practical demonstration on "Backrounds." First, he very ably illustrated the use and abuse of he background as applied to photography, showing, by means f a quantity of diagrams, in what relation the background should e to the subject, and *vice versa*; after which he proceeded to ketch, and afterwards fill in, a landscape view selected by the ompany, explaining, as he proceeded, the different methods of reating the colours as to mixing and applying. The progress of he work was watched with interest, the time occupied being bout sixty minutes, the lecturer having succeeded in bringing nt a very effective landscape. Mr. Tuquet was listened to hroughout with great attention, and much valuable information as obtained by the members present during the evening.

Mr. T. Carnell exhibited some prints taken by the flash light; Mr. A. Middlebrooks had some very fine transparencies made by he transferrotype process; Mr. R. S. Armitage had on view ome very fine enlargements on bromide paper.

A very hearty vote of thanks brought the evening to a close.

Leicester and Leicestershire Photographic Society.

A meeting of the above Society was held in the Mayor's alour, Old Town Hall, on 17th inst., Mr. George Bankart n the chair. The minutes of the last meeting were read and onfirmed, and two members were ballotted for and elected.

The accounts for the past year were presented by the Hon. reasurer, Mr. W. Sculthorp, showing a balance in hand of over 11, and several unpaid subscriptions yet to come in. Votes f thanks were passed to the President, Treasurer, Committee, nd Hon. Secretary for their past services.

The election of officers was then proceeded with, resulting n the following gentlemen being elected for the ensuing year, iz:—

President—Mr. George Bankart.
Vice-President—Mr. S. S. Partridge.
Treasurer—Mr. W. Sculthorp.
Hon. Secretary—Mr. H. Pickering.
Committee—Messrs. W. Sculthorp, Mr. W. T. Tucker, Mr. J. Weatherhead, and Mr. A. W. Wilson.

It was decided, after discussion, that the lantern slide competition for the silver and bronze medals of the Society take place at the next regular meeting of the Society on Wednesday, December 13th, the slides to be delivered to the Hon. Secretary twenty-four hours before the exhibition.

It was also decided that the general competition for the silver and bronze medals of the Society for out-door work take place on Wednesday, March 13th, prints to be delivered to the Hon. Secretary twenty-four hours before time stated for competition, and arrangements have been made for the prints to be on view at the Old Town Hall during the afternoon and evening of the date stated.

A few experiments in flash light photography were then conducted by the Hon. Secretary, resulting in a well-exposed negative of the President with Vevers' magnesium burner.

The meeting then adjourned until February 13th.

Photographic Society of Philadelphia.

The annual meeting of the Society was held Wednesday evening, January 2nd, 1889, the President, Mr. Frederic Graff, in the chair.

The election for officers and committees for 1889 resulted as follows:—*President*—Mr. Frederic Graff; *Vice-Presidents*—Messrs. John G. Bullock, Joseph H. Burroughs; *Secretary*—Mr. Robert S. Redfield; *Treasurer*—Mr. Samuel M. Fox; *Executive Committee*—Dr. Herbert M. Howe, Dr. Ellerslie Wallace, Mr. William A. Dripps. *Excursion Committee*—Messrs. Samuel Sartain, John Carbutt, W. D. H. Wilson. *Committee on Membership*—Messrs. Henry T. Coates, John Bartlett, George Vaux, Jr., David Pepper, Edward W. Keene, Joseph H. Burroughs, Charles L. Mitchell, Frank Bement, W. H. Walmsley. *Committee on Revision of Minutes and Articles for Publication*—Messrs. John C. Browne, John G. Bullock, Robert S. Redfield. *Committee on Lantern Slides*—Messrs. Edmund Stirling, Frank Bement, William H. Rau.

The President, in accepting the chair for the year 1889, made the following remarks:—"I assure you I most highly appreciate the honour you have conferred by again electing me to preside over the affairs of the Photographic Society, in which I have been so long and deeply interested. I take great pleasure in congratulating you upon the prosperity of the Society, and that it so ably maintains its reputation and influence in advancing the interest now so general in the useful, instructive, and pleasurable pursuit we are all engaged in. The reports of our executive committee and officers are so full of details that nothing more is left in that direction for me to say. We certainly have reason to feel proud of the papers read, and of the work of our members from time to time exhibited. I feel quite satisfied that in the high character of the specimens shown here of lantern slides, negatives, and prints, it is evident that we not only hold our own, but steadily improve. I desire particularly to call attention to the Exhibition about to be held jointly with the Boston Camera Club and the Society of Amateur Photographers of New York, at the Academy of Fine Arts, commencing April 8th, 1889, and sincerely hope that the members will use all their efforts to make the Exhibition an eminently creditable one, even more so than that held three years since at the same place. I will not detain you by any attempt to recapitulate the new processes that have been brought forward during the past year. This is done so fully in the many journals now published, to be found upon our library table, that I should only repeat, probably with fewer details and less instruction, what they have already said. I think we have every reason to look forward to a year even more full of improvement than the past, which, while it has not been remarkable, perhaps, for any very startling new methods, has most certainly brought forth many valuable improvements on old ones. The introduction of new supports for the sensitive medium as substitutes for glass, increased sensitiveness of films, and more portable apparatus, have added to the facility of working, and given renewed inducement for amateurs to indulge in photography as a study and amusement. I believe all have been pleased with the neat and comfortable room we now occupy. It is, however, quite evident, from the rapid and gratifying increase in our membership, that before the year expires we shall probably have outgrown the limits of our present desirable quarters. I cannot close without referring to the great loss sustained by the Society in the death of Mr. S. Fisher Corlies. You all knew the deep interest that he took in our

welfare; how he was always ready to help those not so fully educated to the work as himself, and how as a warm friend and companion we must miss him and mourn his loss. I most sincerely hope that the year 1889 will be to all of you one full of success and prosperity."

Mr. EDMUND STIRLING presented, as supplementary to Mr. Child's recent gift, a book entitled "Animal Locomotion," "The Muybridge Work at the University of Pennsylvania—the Method and the Result," which was accepted with a vote of thanks.

Mr. BARTLETT exhibited several photographs which were interesting from a historical point of view, the property of Mr. Julius F. Sachse, of Philadelphia. They were the work of Mr. Langenheim, one of the pioneers in American photography, and antedated the days of collodion. The impressions, which date about 1850, were made from silver albumen glass negatives upon plain paper without toning, and represented a portrait of Mr. Langenheim, one of President Fillmore, a view of the Treasury building at Washington, and what seemed to be an instantaneous view of Niagara Falls with natural clouds. The first attempts at negative retouching were apparent, and the importance of the process indicated by the signatures of the retoucher appearing on the prints.

Talk in the Studio.

BATH PHOTOGRAPHIC SOCIETY.—At the next meeting, to be held at Quiet Street Rooms on January 30th, Mr. Phillip Braham will deliver a lecture on "Light and its Chemical Action, with especial reference to Photographic Processes." The lecture will be illustrated with experiments.

DETECTIVE CAMERAS FOR PHOTOGRAPHING BURGLARS.—The *St. Louis and Canadian Photographer*, in reference to a patent applied for by Professor Wemyss, of Ontario, says :—"The invention consists of a detective camera for the protection of valuable property, such as jewels, cash, plate, &c., that may be stored in any room of a house for safety. A strong portrait camera is firmly screwed down to a strong iron stand in the centre of the room, and having as many tubes focused to each window or door of the said room, with an instantaneous dry plate behind each tube. The moment a thief forces open either sufficiently wide to gain an entrance by door or window, an electric spring touches a wire in communication with the shutter of the lens, and simultaneously with a magnesium flash placed in suitable position. The flash, the exposures, are immediate, and the burglar beats a retreat in amazement, leaving his portrait behind him, at the same time an alarm bell hastens his movements."

MESSRS. LEATHER, SADLER, AND HOLMES.—We are authorised to state that Mr. John Leather is no longer a member of this firm of photographic material manufacturers, the initiative in the change having been taken by the other partners in the concern, which will in future be known as Holmes, Sadler, and Holmes. Mr. Leather was recently fined for circulating indecent photographs, but it was so clear that the offence was personal, and in no way implicated the firm, that the magistrate, in passing sentence, said : "You have not only been engaged in polluting the public with these photographs, but you have brought a reproach upon your firm, and upon men who knew nothing about your conduct. . . . . I thoroughly believe that the other partners in the firm knew nothing about these photographs."

FESTIVAL OF THE WORK PEOPLE AT MESSRS. MAWSON AND SWAN'S.—On the evening of the 16th inst. the whole of the employés of the Mosley Street and Low Fell establishments took dinner at Mr. Joel's Sale Room. A very enjoyable night was spent, the various departments contributing to make up an interesting programme.

PHOTOGRAPHIC CLUB.—The meeting on January 30th will be a special lantern night with music, and will be held in the Masonic Hall, Anderton's Hotel. No ordinary business on this occasion.

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor in the "Answers to Correspondents" column, should now be sent to Mr. Spiller in accordance with that gentleman's own notice in the column which he controls.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

E. E. B.—Although the solution called *Eau de Javelle* has been used and advocated as a hypo eliminator, we should not be inclined to join in such recommendation, for the slightest excess tends to impoverish the tone and depth of the silver image, and unless it be used in excess there is no certainty of its destroying the last traces of hypo. As the prints and wash-waters contain an ever-varying proportion of residual fixing salt, no exact formula can possibly be given; but if you are inclined to experiment with it, use for the 2 oz. chloride of lime and 4 oz. carbonate of potash well rubbed together in a mortar with, as you say, 30 oz. of water, and filtered. Then dilute this with at least one gallon more water, and consider this a rather strong solution, to be added sparingly to the last wash-water. Remember that after leaving the prints or negatives in soak for about fifteen minutes, they must be again pretty thoroughly washed to remove the potash salts which you have thus introduced. Our contention is that if you use the same amount of water alone (preferably warm) in the final stages, your object will be equally well accomplished, and without any deterioration of tone or quality.

ROVER.—You cannot do better than select a rapid rectilinear lens for general outdoor photography, using the largest diaphragm consistent with the proper rendering of the scene to be depicted, and even full aperture for portraits or groups.

ARBROATH.—The Daguerre medal in bronze of the Vienna Club has been awarded to the following British exhibitors:—Messrs. T. M. Brownrigg, Cyril S. Cobb, John Kenworthy, A. G. Tagliaferro, W. J. Anckorn, Friese-Greene, J. P. Gibson, R. H. Lord, Wm. Parry, C. E. Wyatt, and Mrs. Clarissa Miles. The others are only small bronze medals given for apparatus.

W. H.—The publishers have sent you the desired information.

T. M. A.—The fluoride of silver is soluble, and there is no reason for supposing that it could have any advantage over the nitrate in the preparation of gelatine emulsions; besides, it might act injuriously by corroding the glass.

JUBILEE.—This is said to be the Jubilee year of photography by virtue of the fact that Daguerre's process was first given to the world in 1839, and Mr. Fox Talbot's earliest results were reported to the Royal Society in the same year. The calotype was patented two years later in its perfected form, and subsequently became known as the Talbotype. The *Pencil of Nature* was undoubtedly the first publication illustrated by photographs. A portrait of Daguerre formed the frontispiece to the YEAR-BOOK for 1881, and an excellent photo-engraving on steel of Fox Talbot was given with the NEWS of March 11, 1881.

G. B.—We are not aware of there being any dry plate now in the market suitable for taking direct positives of the nature of the ferrotype. Opals for contact printing, and gelatino-chloride plates for lantern slides or transparencies, can be procured. About a year ago ferrotype plates could be had thinly coated with emulsion; but they were not very successful, and we believe the manufacture has since been given up.

AMATEUR.—Nothing answers better than kaolin for removing the brown organic impurities from an old silver printing bath. Shake up well, allow to subside, and filter. Do not attempt to use animal charcoal for this purpose, or the mineral phosphates in it will be sure to cause a waste of silver.

DELTA.—Perhaps the best way of waterproofing wooden dishes and trays is to dry the wood thoroughly, and, whilst warm, run in some melted paraffin and spread it over evenly with the help of a hot plastering-iron or some such tool. A mixture of beeswax and common resin makes a very good water-tight composition when applied in this way; also the same with an addition of Venice turpentine to make it less brittle. The glass-bottom plates are satisfactory, if only you can manage to secure a tight union with the wood all round; but in some of those now on sale shellac varnish is too much relied upon for making the joints, and by long soaking in water these sometimes fail. Electrical cement is not to be recommended, for the red ochre is not always proof against the action of acids.

MUNKTELL.—We have received some cut-filters which have been treated with hydrochloric acid, and subsequently washed. The amount of ash is very small, and the paper-stuff very pure. They are certainly well adapted for chemical use, and therefore likely to be of service to the photographer. As with all Swedish papers, the filtration is rather slow, but when dealing with finely-divided precipitates this is no disadvantage.

Several other correspondents in our next.

PATENT OFFICE LIBRARY.

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RAPID HYDROKINONE DEVELOPMENT.

SECOND ARTICLE.

WHEN recently discussing the subject which forms the heading of this article, we found ourselves compelled, by want of space, to leave over for future treatment the consideration of a paper by Captain Eugen Himly, which appeared partly in the same issue of the *Photographische Mittheilungen* as that in which the communication of Herr Baltin on the same topic was published.

Captain Himly's paper treats of a comparison between pyro developer when combined with the fixed alkalies, potash and soda; and the hydrokinone developer when prepared with and without the addition of meta-bisulphate of potash; and with and without the employment of a small quantity of solution of caustic soda as an accelerator. In the course of his experiments, he has come to some conclusions which may serve to form a useful basis for guidance. Among these conclusions we may mention the following. He considered it desirable to ascertain the smallest amount of hydrokinone with which development can be satisfactorily carried on, and how much meta-bisulphite of potash is necessary for the preservative solution, whether of pyro or of hydrokinone. On the former of these heads, he concludes that about two grains of hydrokinone to the ounce of water is the smallest quantity to be employed, otherwise the developing action is very slow, and the process tedious. With respect to the last-named point, it must, however, always be remembered that temperature possesses a remarkably powerful effect, so that the solution which will be best and most convenient in one country or at one season of the year, is not necessarily the best under other conditions, and the duration of development will be so much affected by differences of temperature, that unless this fact is borne in mind the photographer is likely to be either misled as to the exposure that the plate under development has received, or to imagine that some unexplained change has occurred to his solutions.

A point of great importance is stated by Capt. Himly, and his statement concurs with what has reached us from other quarters—namely, that the addition of a small quantity of caustic alkali to either the carbonate of potash or soda developers, confers more brilliancy and more detail upon the negative, advantages independent of that for which it was added—its great accelerating influence. This, a very curious and unexpected result, the general effect of an accelerated developer when using pyro and ferrous oxalate, not being in favour of additional brilliancy, at all events.

As to the use of meta-bisulphite of potash, Capt. Himly finds that, when used in too great proportion, it retards development considerably, but is notably more powerful as a preservative in the solution than sulphite of soda alone. When colour of the image is important, however it is not desirable to omit the sulphite of soda, or even to reduce the amount of it, when meta-bisulphite of potash is used, as the former salt has such a beneficial effect upon the colour of the deposit.

As the result of Capt. Himly's researches, he recommends the following developer, here put into English measures:—

HYDROKINONE AND CAUSTIC SODA DEVELOPER.

Solution A.

Hydrokinone	40 grains
Meta-bisulphite of potash	16 „
Water	2¼ ounces

Solution B.

Caustic soda	1 ounce
Water	8 ounces

To 5 ounces of water, ½ ounce of each the above solutions is added. This developer is recommended as very good for negatives, but not for positives upon bromide of silver emulsion paper, as the tone is very unequal, and for the most part of a reddish colour.

HYDROKINONE AND POTASH DEVELOPER.

Solution A.

Hydrokinone	40 grains
Meta-bisulphite of potash	16 „
Water	2¼ ounces

Solution B.

Carbonate of potash	1 ounce
Sulphite of soda	½ „
Water	10 ounces

For development, ten parts of A and from fifty to seventy-five parts of B, are added to from fifty to twenty-five parts of water, according as it may be desired to produce a soft or a powerful negative. As accelerator, six minims of the one in eight solution of caustic soda above mentioned is to be added. The addition is stated to have also a favourable influence upon the colour of the deposit. This developer is also recommended as very suitable for positives.

HYDROKINONE AND SODA DEVELOPER.

Solution A.

Hydrokinone	40 grains
Meta-bisulphite of potash	20 „
Water	2¼ ounces

Solution B.

Carbonate of soda	1 ounce
Sulphite of soda	½ „
Water	10 ounces

For development, to ten parts of A from fifty to seventy-

five parts of B are added, and fifty or twenty-five parts of water, as with the potash developer.

This developer also works noticeably better when six minims of the one in eight solution of caustic soda as accelerator is added. The developer works exceedingly well both for negatives, and for positives upon bromide of silver emulsion; and is especially good for the latter purpose, the tone being very even. It is recommended, before washing, to immerse the print for a short time in a dilute acetic acid solution, which discharges any yellow colour that may have appeared upon the paper. The use of a bromide as a restrainer is unnecessary, this function being sufficiently fulfilled by the meta-bisulphite of potash.

In the table of comparative results given by Captain Himly, caustic potash shows a less favourable action than caustic soda, and the latter is therefore recommended. On other accounts—less cost, and greater freedom from impurity—soda is also to be preferred.

Those who are contemplating using hydrokinone for the first time, should bear in mind points that have been mentioned in former articles. The carbonate of soda required is not the powder sold under that name, and known also as sesqui-carbonate and bi-carbonate, but the crystals. Washing soda, if moderately pure, generally answers perfectly. The precaution of using for the hydrokinone solution either distilled water or water that has been boiled and allowed to cool, must be observed, as well as that of thoroughly dissolving the sulphite—when sulphite of soda is used—before the addition of the hydrokinone. Sulphite of soda must be in good condition—must not have effloresced.

Development by hydrokinone has been making way by leaps and bounds. The present modification—that which removes the one most serious objection hitherto raised to its use (slowness of action)—appears at the same time to confer additional good qualities to the negative itself, and seems likely to bring the method into a much more extended application than it has hitherto enjoyed.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

BY W. M. ASHMAN.

SIXTEENTH ARTICLE.

ANYONE commencing the study of photography and applying themselves to the literature of the art will be struck with the very large number of formulæ published, each of which is supposed to be possessed of some such special quality of speed, conveniences, fine gradation of negatives produced by it, or some particular resulting colour suitable for printing. The only plan to follow is to get a clear idea of the properties of the various agents employed, and of the part they play in the process known as developing the latent image in a sensitive film. In each case there is some re-agent, as it is chemically denominated, which has the power of appropriating to itself that which is chemically combined with something else. It is more often termed a reducer, because, as it seizes upon the oxygen which forms a compound with a metal—such as silver oxide, for instance—it literally reduces that silver to the metallic state. It is only necessary to have the reducer alkaline or acid, as the case may be, and to apply it in suitable proportions, and under favourable conditions. But the energy of such re-agents is frequently found to be too great for the purpose, so some other substance must be added to it to render its action less rapid, and, therefore, more under control. Such a substance is, therefore, called the restrainer, and is represented for the most part by a soluble bromide, a citrate, or a chloride salt. On the other hand, where the energy of the reagent is insufficient, something must be added to increase the reducing power; this is very naturally called the accelerator, and is represented generally by strong alkalies, or alkaline salts, and occasionally by minute quantities of sodium thiosulphate (hypo). These may be looked upon as the general principles upon which development is conducted, and the beginner will do well to bear them in mind when attempting to ascertain the result of some of his exposures.

There is some latitude as regards choice of developing agents, but these may be all included under the following names:—Ferrous oxalate, citro ferrous oxalate, alkaline pyrogallol, hydroquinon, and hydroxylamine.

With regard to the first-named it may be termed an acid developer, as pointed out by Carey Lea, the inventor, in 1877, for though all formulæ recommend the employment of neutral potassium oxalate (KC_2O_4), the fact is that rather than risk any alkalinity it is better to err on the other side, and render all solutions distinctly acid either with oxalic, sulphuric, or citric acid. A perfectly saturated solution of this salt so acidified is mixed with one-fourth part of a filtered saturated solution of ferrous sulphate ($FeSO_4$). The result is the production of ferrous oxalate, a yellow powder insoluble in water, but instantly soluble as soon as produced in a solution of potassium oxalate of a given strength. This being so, the latter salt must always be in sufficient excess and strong, to effect that solution, and the mixing must never be done except by pouring the iron solution into the oxalate, or otherwise the insoluble powder will be thrown down, and some trouble be given to induce it to dissolve afterwards. Precautions must also be taken not to add ordinary water to such a developer, in order to reduce the strength, as by weakening the solvent the precipitation of the ferric oxalate soon takes place in addition to the production of insoluble calcium oxalate, which forms a veil over the surface of the negative. The restrainer usually employed with this developer is potassium bromide, a few drops of a solution (30 grains to the fluid ounce of water being added to every two ounces by measure of the developer). In rare cases, where a little acceleration is required, a few drops of a solution of sodium thiosulphate (four grains per fluid ounce of water) may be used with great care and patience, to avoid fogging the whole of the plate. The action of this developer involves the formation of a second iron salt called ferric oxalate, by the absorption of oxygen, and as this ferric salt has really a tendency to thin and destroy the image, it will be seen how necessary it is either to have enough of the ferric salt at starting to bring out the image, or to add more of the ferrous sulphate as the action proceeds. The longer the duration of the exposure, and the more of the ferrous oxalate present, the quicker does the blackening take place. An excess of potassium oxalate—which means, of course, less of the iron salt—helps to prolong the process. Rapid development is conducive to foggy shadows and weak lights. Well restrained developers exert an influence in the contrary direction. When we come to speak of transparencies for the lantern, this will be more clearly understood.

For negatives the following formulæ may be used:—

Solution A.

Potassium oxalate	...	...	16 ounces
Boiling water to make	...	...	64 „

Oxalic or citric acid *q. s.* to redden blue litmus paper, cool, and filter.

Solution B.

Ferrous sulphate	...	...	16 ounces
Water to make	...	...	64 „

Sulphuric or citric acid to acidify as above, and filter.

Solution C.

Potassium bromide	...	...	1 ounce
Water to make	...	...	15 ounces

These solutions being kept separately, are mixed as required. To develop a half-plate, measure off two ounces solution A, and add to it half-an-ounce of B, when a bright red colour should at once be seen; then further add 5 minims of C. Should the mixed developer become turbid through the accidental addition of too much of

solution B, or too little of A, add more of A until it is clear again. At first it is better that the tyro should always soak his plates in a flat dish of cold water for a few minutes before applying the developer, then after pouring it off, to flood the plate *all over* with the mixed developer. The vessel should be kept in gentle motion in order that the liquid may flow equally over the surface, and any air-bells removed by a touch with a camel hair brush or a clean finger. Very soon a black image will be seen on the light-coloured plate, growing stronger as the work proceeds. When the greater part of the plate has thus changed in appearance upon the surface, as seen by the reflected light of the dark-room window or lamp, then the solution can be poured back into the graduate or other measuring vessel, and the plate lifted and examined for density.

To do this, hold the negative say twelve inches from the light, and if, upon looking through it, those portions which first appeared to darken—namely, the strongest lights, as explained in the last chapter—appear to have considerable force, and there is a distinct renderiug of foliage and other easily distinguished details, then the process of development need not be prolonged. But if the lights are strong, and there are uo details, the probability is that the negative has been uudertiued, in which case the developer may be made stronger. To do this, add say two drachms more of the solution B, and uote results.

Should the developer contain more than one-fourth of its bulk of a strong iron solutiou, the turbidity before referred to will most likely make its appearauce, and so require clearing with an excess of A. Should the addition of B not effect the object of bringing up more of the detail required, a few drops of the sodium thiosulphate solutiou may be tried as an accelerator, but the action must be stopped the moment the whitest parts of the plate begin to show signs of a black fog pervading them. This last is best effected by plunging the plate into a bath consisting of a cold saturated solution of common alum to which about one per cent. of either citric or hydrochloric acid has beeu added. After remaining in this for a few minutes it can be washed a little, and the silver bromide that does not constitute the picture may be removed by fixing, of which we will treat in auother chapter.

This developer is sometimes made available again by being stored up until in sufficient quantity, and then exposed to the direct rays of the sun, after adding about one per cent. of tartaric acid to it. The ferric salts are thus converted into ferrous again by the power of the light, and though the developer is rather weaker than that freshly made, it is still very useful for some subjects. Care must be taken, however, not to add those spent solutions to the stock that have had the thiosulphate added to them.

This developer is both efficient, clean, economical, and easy to master, and it can be modified to suit a wide range of exposure. Au increase of C, or of A, or the use of partly spent mixed solution, all help to slow the development of an over-timed plate, while the omission of C and increase of B, and the use of very little of the accelerator mentioned, all add to the power of bringing out detail in an under-timed one. It is better to stop development before full density has been reached, since in practice it is found that the action is partially contiuued even after the short sojouru of the plate in the alum bath.

Citro-ferrous-oxalate development is seldom employed for ordinary bromide plates intended for negatives. It is sometimes used in the production of transparencies. Alkaline pyrogallol is more generally used in this country thau ferrous oxalate for developing plates, for the reason that plate-makers are in the habit of recommending its use with their several samples of plates, and doubtless the complex formulæ met with by beginners make selection rather a difficult business. Without desiring to detract from the merits of any such, because, perhaps, all may be made to yield excellent results, the writer gives one differing little from the general run, which is easy to prepare, keeps any reasonable time, and has given satisfaction.

Into an ounce bottle of pyrogallol pour eight ounces of saturated solutiou of sodium sulphite (acidified with sulphuric acid), add half an ounce of potassium or ammonium bromide in six ounces of water. Filter, and keep in closely stoppered bottle (as stock), or dilute at ouce, if required, to 109 ounces, aud label "Solution P." Either of the alkalies may be used; thus, for example: strong ammonia (·880) 1 ouuce, water 120 ounces (label "Solution A"). Equal parts of P aud A form a developer containing about two grains of pyrogallol to each ounce of mixed solution, with a full workable amount of ammonia. As the student progresses he will doubtless try other formulæ, which would only tend to confuse him if included in this chapter. Of these, sodium carbonate and potassium carbonate, as a substitute for ammonia, are much used. Hydroquinoue and hydroxalymin are also very attractive, and exhibit special characteristics which will be referred to in another place.

Returning to pyrogallol development with ammonia, it should be observed that this latter agent, being of a highly volatile nature, is liable to reduce in streugth very much by reason of ammoniacal gas escaping from the concentrated solution. Dilution prevents this iu a large measure. When a plate, after fixing, appears on looking through it to be red in the shadows, or ou looking along the surface shows iridescent stains, and, perhaps, a decidedly green tinge in places, it is termed a case of green fog, aud is mostly produced by forcing development with an excess of ammonia. Some brands of plates more readily exhibit this than others, and the best plan is to reduce the limit up to which the ammonia may be added, and to increase the exposure when using other plates of the same kind, in order to secure full details in the shadows. Potassium aud sodium carbonates do uot so readily produce green fog, neither does ferrous oxalate.

Green fog cannot satisfactorily be removed from a negative, but in most instances it does not affect the quality of the prints taken from it, merely prolonging the time of printing. Concerning qualities of negatives we have already spoken in the last chapter, but as miuor points in practice arise, attention will be drawn to them.

In choosing bottles to hold developers, it is a good plan to use those made partly of opal glass, with black letters on them, such as P and A, so that mistakes are less likely to occur iu mixing proportions of different solutions in the dim light of the dark-room.

PROGRESS IN PHOTOGRAPHY IN 1888.

BY C. H. BOTHAMLEY, F.I.C., F.C.S.

Orthochromatic photography has attracted increased attention. The results of experiments in the application of orthochromatic plates to landscape work, and quantitative measurements of the relative sensitiveness obtained by different methods, were communicated by the writer to the Convention at Birmingham (p. 508). Interesting papers have been communicated to the Photographic Society and to the Camera Club by W. Bedford (pp. 230, 775). He states that the presence of ammonia is not at all essential when erythrosin is added to the emulsiou at the moment of its formatiou; a result of considerable importance. An important paper was read by Captain Abney at the Conference, and further communications from the same investigator will be found at pp. 580, 642, 707. Recently he communicated to the Photographic Society the results of a series of careful measuremeuts of the density of the deposit obtained by the actiou of different parts of the spectrum (pp. 779, 797, 803) From these results curves were drawn showing the effect of the spectrum on plates sensitised with erythrosin and cyanin, aud it is interesting to find that the character

• Continued from page 59.

of the curves obtained in this way agrees perfectly with those previously obtained by Eder, Schumann, and the writer. There are differences in the relative heights of different parts of the curves, but the maxima and minima are situated at exactly the same places. Other observations will be found recorded on pp. 56, 385, and 513. Eder has described the method of preparing orthochromatic collodion emulsion (p. 337), and also an orthochromatic collodion process with the bath (p. 388). Albert claims to have made an orthochromatic collodion emulsion equal to gelatino-bromide in rapidity (p. 657). According to Vogel, it is an ordinary collodion emulsion sensitised with a concentrated ammoniacal solution of silver eoside or silver erythroside.

Vogel and Eder both confirm Albert's statements as to the sensitiveness of this emulsion, but experiments made by E. von Gothard, at the Herèny Observatory (*Correspondenz*, 481), lead him to the conclusion that Albert's emulsion is slower than any gelatine emulsion that he has met with, and that it is inferior to the emulsion prepared by Eder's formula (*loc. cit.*). In the spectrum, with Albert's emulsion, the maximum sensitiveness is near D and extends as far as C, whilst with Eder's emulsion the maximum sensitiveness is in the yellow-green and extends very little beyond D. Gelatine plates treated with an ammoniacal solution of silver erythroside are little inferior to collodion emulsion plates in sensitiveness to yellow, &c. Von Gothard concludes that for spectrum and astronomical work collodion has no advantage over gelatine. It is less sensitive, and the images are much more liable to distortion from the slipping of the film. Burbank has recently stated (p. 790) that gelatine plates sensitized with cyanin gave him a non-reversed image of the spectrum extending into the infra-red as far as wave length 9,900. So far as the writer is aware, no previous observer has been able to obtain a similar result, and if this statement is confirmed it will be of very great importance.

Few improvements have been made in methods for intensification and reduction, but E. Vogel has made an important modification of the uranium intensifier by acidifying with about ten per cent. of acetic acid, and thus preventing a general staining of the film (p. 326). Wellington has devised a process for intensification by silver (ALMANAC 1889, p. 575), in which the metal is deposited by the action of alkaline pyro on a solution of silver sulphocyanide in weak hypo. Another method has been proposed in which the image is first partially converted into silver chloride by treatment with a solution of ferric chloride, and is then intensified by means of a solution of ferrous oxalate to which silver nitrate has been added. This method promises well, because the silver chloride will be reduced by the ferrous oxalate, and this freshly reduced silver will attract the additional silver more readily than an ordinary deposit which has been subjected to the action of hypo and alum. Attention has again been directed to the use of ferric oxalate as a reducer in conjunction with hypo.

Turning now to methods for the production of positive images, it may safely be said that platinotype has attracted a lion's share of attention, and the introduction of Pizzighelli's printing out process (pp. 1 and 17), and of Willis's cold development process (*Journal Camera Club*, conference number), marks a distinct epoch in the history of printing processes. It is not to be expected that these methods will at once give results equal to those obtained by hot development, since the latter has the advantage of the experience of several years in the working of it; but that the Pizzighelli process is capable of giving excellent results was sufficiently demonstrated at the recent exhibition in Pall Mall, and the writer has himself obtained prints by this method practically indistinguishable from prints from the same negatives by the hot development process. The last paper by Willis (p. 793), in which he described the various modifications which may be made in development and other details in order to modify the result according to the character of the negative and the character of the print which it is desired to obtain, indicates that the process is now capable of answering to the will of the artist—a desideratum of a perfect printing process which was not found in the older method. A long paper by Cembrano (pp. 712 and 729), in which he describes an elaborate set of comparisons of the different processes and their modifications, is worthy of the most careful attention. The announcement that the Platinotype Company intend to remove the restrictions which have hitherto somewhat hampered the general use of this process comes as a fitting sequence to these advances, and photographers have reason to congratulate themselves not only on the great improvements that have been made, but also on the probability of the more general adoption of this beautiful and simple process. It is not improbable that improvements in the quality of bromide paper will follow as a secondary result. No bromide prints that the writer has ever seen have equalled the best examples of platinotype in colour and general quality.

With regard to other methods of printing, Burton's method of toning and fixing prints on gelatino-citrochloride at one operation (p. 743); Dr. Just's method of obtaining brown tones on gelatino-bromide paper (p. 51); and Acworth's exposing apparatus (p. 569), should be referred to. A very valuable paper, giving the results of the experience of the Indian Survey Office in the working of the blue process or cyanotype, has been published by Lieut.-Colonel Waterhouse (p. 563). Methods for testing mounts, often a valuable precaution, have been described by Foxlee, Spiller, and others (pp. 673, 706, 742, 764).

Improvements in photo-mechanical printing processes have been in the direction of perfection of details rather than in the application of any new principles. Summaries of the methods now in use and of the modifications lately made in them will be found on pp. 86 (Wood); 187, 197 (Waterlow); 98, 155, 197 (Gunther); 493, 502 (Jaffé); 482, 731, 757 (Winstanley).

Interest in the magnesium flash light has somewhat abated, but several forms of flash lamp, all with a strong family likeness, have been described. Schirm's modification of the Bunsen lamp for this purpose is, perhaps, the most noteworthy (p. 609). It is satisfactory to find that the general tendency is to adopt some plan of blowing magnesium powder through a flame, and to avoid the use of gun-cotton and of the various deflagrating powders. It cannot be too often nor too strongly insisted upon, that most of the latter are of a highly dangerous character. Any mixture of a combustible substance with potassium chlorate is liable to explode even with comparatively slight friction, and the fumes which are produced when the powders are burnt are far more noxious than the magnesium oxide formed by simply burning magnesium; indeed, if sulphide of antimony is one of the ingredients, the fumes are positively poisonous. Gun-cotton is open to less objection, though there is always some risk of explosion, and when gun-cotton is burnt with free exposure to air—*i.e.*, not under pressure—oxides of nitrogen are invariably formed in greater or less quantity, and they, of course, are anything but innocuous.

Attention has again been called (pp. 275 and 738) to the photographic qualities of the light emitted by a burning mixture of nitric oxide and carbon bisulphide, but this light is never likely to come into general use. Carbon bisulphide is not only extremely volatile and inflammable, but usually has an excessively disagreeable smell; the preparation of nitric oxide, except in the hands of a trained chemist, is a risky operation; the products of combustion are of a strongly acid and irritating character; and lastly, but by no means least, unless the proportions of the mixture are properly adjusted there is no little risk of an explosion.

Standard lights form an essential part of the equipment of an experimental photographer, and during the past year

important reports on the values of different standards have been published. Attempts to define an absolute unit of light have not yet met with complete success, although Violle's proposal to adopt as this unit the radiation from a square centimetre of metallic platinum at its melting point has met with a considerable amount of favour. It may, however, be taken as established that there are three or four arbitrary standards which may be relied upon to give uniform results under the prescribed conditions. The experimental results, and the conclusions drawn from them, are contained in the report of the British Association Committee on Standards of Light, and in a paper read before the Society of Chemical Industry by Mr. W. J. Dibdin (*J. Soc. Chem. Industry*, vii., p. 367). Candles are altogether untrustworthy for accurate work, but the pentane lamp and the amyl acetate lamp give very satisfactory results indeed. A description of the former will be found in the patent specification 11,985, 1887, (p. 668); the latter is merely an ordinary spirit lamp, burning amyl acetate instead of alcohol, the wick having a definite diameter, and the flame being regulated to a certain height. The amyl acetate lamp is also frequently called the Hefner-Altneck lamp, and sometimes the Siemen's Unit Lamp. The flame of amyl acetate is redder in colour and contains a much lower proportion of blue and violet rays than the flame of pentane, and the amyl acetate has a very powerful odour resembling that of some species of pears. On the other hand, the amyl acetate lamp costs only a few shillings, and is very much cheaper than the pentane lamp, which is a costly instrument.

Increased interest has been excited in favour of stereoscopic photography, and useful papers by Donkin and by Stroh will be found on p.p. 82, 293, 314. Accounts of the directions in which photography has been made useful as an auxiliary to various branches of science are given by Thomson, Wood, and others on pp. 179, 181, 401, 466, 758.

LIGHT AND COLOUR.

BY CAPT. W. DE W. ABNEY, C.B., F.R.S.*

Lecture II.

In the last lecture I finished the matching of the colour of pigments with parts of the spectrum, and to-night I will endeavour to show you that colourless bodies can be made coloured, under certain conditions, although the light that falls upon them is colourless. I told you last time that the waves of red light are such that if you put 38,000 end to end they make up an inch. If in the sea we have two sets of waves, one set of which is exactly half a wave behind the other, then the crest of the one wave will exactly fill the trough of the other, and instead of motion we shall have rest. Suppose I have a colourless body, whose thickness is comparable with a wave of red light, and that a wave of red light, when reflected from the back surface, is half a wave length behind that reflected from the front surface, we get darkness instead of light. The easiest way to obtain a colourless body answering to the above conditions is to use a soap film stretched across a vertical aperture. Its thickness is found to be comparable with a wave of light, and as it gradually thins by gravity, some part of the film becomes of the thickness that the reflection from the back surface is half a wave length behind that reflected from the front surface, the red is annihilated at such place. There will be another thickness of film in which the green light would be similarly absent, and yet another in which the blue is absent, and so on. The light reflected from the first locality would be the componeuts of white less the red, in the second the same less the green, and in the third the same less the blue.

I can show you the kind of colour that is seen by the suppression of one small part of the spectrum, by using our patch-forming apparatus, and passing a thin rod along the spectrum, which cuts out the part required. It will be seen that the patch is no longer white, but coloured. These colours, remember, are not simple colours, but white light, with some colour abstracted.

Putting a soap film on a ring in the beam of the electric light, at an angle of about 45° with it, the light is reflected on the screen, and a lens in the beam forms an image of the ring. At first the film appears white, but after a short interval of time coloured bars appear horizontally across it. Putting a piece of red glass in front of the beam, we have a succession of red and black bars, the red glass cutting off all the remainiug colours. A piece of green glass placed in the beam shows green bars, and so on.

The bars are brighter at the bottom of the image, which is in reality at the top of the film, for the reason that the film is of a thickness of $1\frac{1}{2}$, $2\frac{1}{2}$, $3\frac{1}{2}$, $4\frac{1}{2}$, $5\frac{1}{2}$, &c., wave lengths of the different coloured lights as we go from the top to the bottom of it. The bars gradually widen out and become very far apart, until we see only 3. I now cause a gentle current of gas to play on the film, and the coloured glass being withdawn, we get a magnificent series of colours whirling one around the other. Peacock green, golden yellow, azure blue, succeed one another, and give a most brilliant effect. All these colours are due to white light falling on a colourless body.

The next experiment is to throw a small image of the film upon the slit of the spectroscope. We see the spectrum traversed by black lines curving down from red to blue, and rapidly shifting in position. These lines show the colours which are absent in the horizontal bars of coloured light reflected from the film, a section of which passes through the slit. In this case we have a demonstration that the colours reflected from the film are not produced by any conversiou of white light into coloured light, but by the abstraction of certain colours from the components of white light.

In the opal we have an example of interfereuce colours, caused by a thin layer of material of different thicknesses, which abstract a certain component of white light in exactly the same manner as does the soap film. When we have the light from the varying thicknesses close together, as we have in the reflected beam in the patch-forming apparatus, they have very much the same appearance as has the opal.

But one more example of interferences, which is very beautiful, as time will not allow me to go into the theory of the matter; suffice it to say that if parallel lines be ruled on a surface very close together, and the beam of light be thrown on them, the "interferences" are such that pure colours are produced, and we have a spectrum.

Next let me show you that the colour of transparent bodies is also due to the abstraction of colour or colours from the white light.

In a cell I have a liquid which appears green. A spectrum is formed on the screen, and in front of the slit of the spectroscope the cell is placed. You will see that the blue and most of the red is cut off, and that we only have green and a small band in the red left of the spectrum. Recombining the remainder of the spectrum to form a patch as before, we have a square of green light, and side by side with it is the patch formed by the reflected beam, which is coloured by the light which has not passed through the prisms, but only through the cell and the collimator. They are both absolutely of the same hue, showing that the recombined spectrum gives the same colour as the light after passing through the cell. Repeat the same with a red liquid or a blue liquid, and we obtain the same results.

A paper is coloured with the green dye which I had in the cell, and I allow the patch of white light to play on it, and you see the light reflected from it is green. In the path of the reflected beam I place a cell containing the green liquid, and throw the patch on white paper. The two patches, viz., the white light on the green paper, and the green light on the white paper, are the same colour. The white light which penetrates colouring matter is the same in the two cases, though when on the paper itself it traverses the colouring matter twice. This leads to an important axiom, viz., that the effect is the same whether the colouring matter is in contact with the paper, or at a distance from it, so long as the eye receives the light which has traversed such colouring matter. I shall immediatety take advantage of this, for I wish to show you that the depth of colour depends on the thickness of colouring matter through which the light passes. Of a double wedge-shaped trough, half is filled with pure water, and the other half with coloured water. Different thicknesses of the blue colouring matter are passed in front of the slit, and as the thickness is increased so the spectrum gets fainter in the blue than in the red.

The patch of white light is next formed, and the wedge of coloured liquid is again passed across the slit, and you will see that the colour deepens as it passes through different thicknesses. As this is true when the colouring matter is in front of the

* *Journal of the Photographic Society.* Continued from page 22.

light, so must it be true when the colouring matter is in contact with the papers.

There is another feature which I must not pass over, *i.e.*, what is known as fluorescence, and though it does not enter into the effect of pigments used in water colours, yet it has much to say to the coloured materials of everyday wear. One of the most beautiful examples of this fluorescence is fluorescene. In the beam of the electric light a jar of water is placed, and in it is dropped a concentrated solution of fluorescene. We have a fine example of fluorescence; the fine threads of liquid as they stretch towards the bottom appear of a brilliant green. I take another jar and repeat the same with quinine sulphate, and we have a gorgeous blue.

We will endeavour to trace this fluorescence to its source. I take a piece of card and brush it over with the solution of fluorescene, and place it in our colour patch; the different colours of the spectrum illuminate one after the other; we now can readily see the light which causes this fluorescence. It is in the green and the blue, but the light reflected from the fluorescene is of a totally different hue from the rest of the colour patch. So with the quinine. We see that when the colour patch is apparently dark, the paper covered with quinine shines out with peculiar lustre. The rays which excite fluorescence in this case are the invisible rays in the ultra violet. Common machine oil is fluorescent in the same part of the spectrum, but shines with a greenish light, and not blue.

We now come to the point when we must ascertain the second constant of colour, viz., its luminosity or brightness. Before showing how this is done for pigments, it will be necessary to show you how we can ascertain the luminosity of the spectrum itself. The luminosity of the spectrum varies greatly in different parts, the maximum luminosity in bright lights, such as the electric light, being in the yellow, and there is a degradation of brightness as we go towards each end of the spectrum. Now suppose we find that the reflected beam of white light, when the rotating sectors are as widely open as possible, is slightly brighter than a yellow patch formed from the yellow of the spectrum—it is manifest that other parts of the spectrum will be dimmer than that. If, now, in the reflected beam, I rotate the sectors at less than full aperture, less light will reach the screen, and it is evident that there are two parts of the spectrum, one on each side of the yellow, which will match the brightness of this degraded white.

In order to make this match, we place the rod as before in front of the colour patch. One shadow is thrown on the white screen by the spectrum colour, and another shadow is thrown alongside it from the reflected beam. The white light and the coloured light, each light up one of the shadows. The slit in the card is moved across the spectrum till we find (say) that in the blue, the blue illuminated shadow is too dark, and where the slit lets

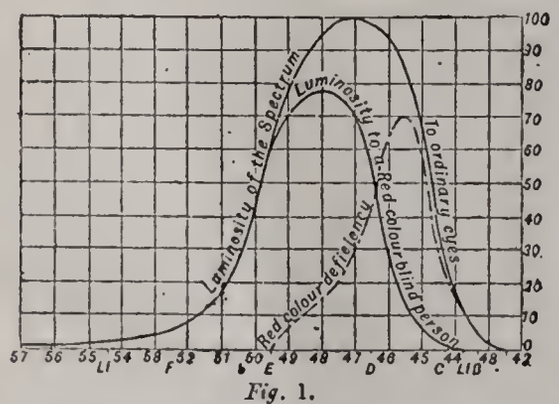


Fig. 1.

the green light through, the green illuminated shadow is too light. It is evident that at some intermediate place in the spectrum there the coloured shadow is neither too light nor too dark. This place in the spectrum is found by moving the slit rapidly, making the coloured shadow first too light and then too dark, diminisbing the extent of the oscillations till equality of brightness is seen to the eye. The same procedure is carried on on the red side of the yellow. The angular aperture of the sectors is again altered, and a fresh determination made. Now the card in which the slit is cut carries a scale, and by means of a pointer the scale is read off, which tells us the exact part of the spectrum where the different equalities of brightness are established. We then use the apertures used as giving the relative luminosities of the different parts of the spectrum as measured, and make such a curve as we have in fig. 1.

The method, then, of ascertaining the luminosity of a colour depends on the rapid oscillation of either the white or coloured shadow between "too light" and "too dark." This gives us a clue by which we can measure the luminosity of a coloured surface in a direct manner. The rotating sectors in fig. 2 give us the means of doing this in an easy manner. Suppose the luminosity of a vermilion-coloured surface had to be compared with a white surface when both were illuminated, say, by gas light, the following procedure is adopted:—A square space of such a size is cut out of black paper so that its side is rather less than twice the breadth of the rod used to cast a shadow. One half of the aperture is filled with a white surface, and the other half



Fig. 2.

with the vermilion-coloured surface. The light, L, illuminates the whole of these, and the rod R, placed in such a position that it casts a shadow on the white surface, the edge of the shadow being placed accurately at the junction of the vermilion and white surface. A flat silvered mirror, M, is placed at such a distance and at such an angle that the light it reflects casts a second shadow on the vermilion surface. Between R and L is placed the rotating sectors, A. The white strip is caused to be evidently too dark and then too light by altering the aperture of

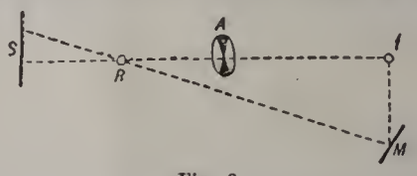


Fig. 3.

the sectors, and an oscillation of diminishing extent is rapidly made till the two shadows appeared equally luminous. A white screen is next substituted for the vermilion, and again a comparison made. The mean of the two sets of readings of angular apertures give the relative value of the two luminosities. It must be stated, however, that if the screen remained unshaded, as represented, the values would not be correct, since any diffused light which might be in the room would relatively illuminate the white surface more than the coloured one. To obviate this the receiving screen is placed in a box, in the front of which a narrow aperture is cut just wide enough to allow the two beams to reach the screen. An aperture is also cut at the front angle of the box through which the observer can see the screen. When this apparatus is adopted, its efficiency is seen from the fact that when the apertures of the rotating sectors are closed the shadow on the white surface appeared quite black, which it would not have done had there been diffused light in any quantity present within the box. The box, it may be stated, is blackened inside, and is used in a darkened chamber. The mirror arrangement is useful, as any variation in the direct light also shows itself in the reflected light. Instead of gas light reflected skylight, the electric light or sun light can be employed by very obvious artifices, in some cases a gas light taking the place of the reflected beam.

It will be in your recollection that I said that the colour of an object depended on the eye of the observer. Vision, I have told you, depends on the fact that three colour sensations are necessary for the normal eye to see white light. There are in fact, as I have said, three sets of nerves, one responding to the blue, one to the green, and one to the red.

If one of these sensations be absent, then the eye does not see white light as we know it, but as—what would to us be—coloured light. The above diagram shows the three sensations as determined by Clerk Maxwell. The top line is supposed to be the spectrum as the eyes sees it, all colours being of equal

lue. It will be noticed that at only three places in the spec-um is the colour pure, and all intermediate colours are made p by mixtures of two sonsations, tho height of the curves

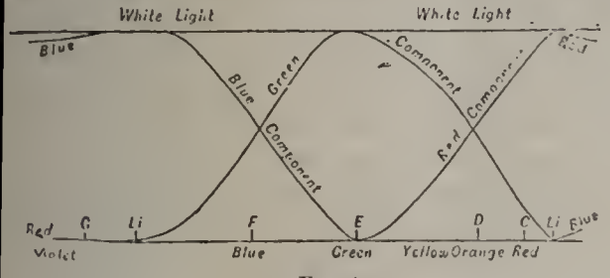


Fig. 4.

dded together giving the height of the straight line parallel o the base of the curve.

Now, in order to test the eye for colour-blindness, it is only ecessary to get a person so afflicted, to measure the luminosity f the spectrum. For evidently, if deficient (say) in red sensa-ion, the spectrum would begin where the green colour sensation ommences, and even then the luminosity would be much maller, owing to the absence of such red sensation. Such a uminosity curve is seen in Fig. 5, and in the same figure is shown



Fig. 5.

the colour deficiency. It is comparatively easy to show the colour of the light which colour-blind people see. If a certain proportion of the light near the position which the blue lithium line occupies in spectrum be mixed with a certain proportiou of the green light of the spectrum near E, and the two be combined in a patch, the colour of the patch will be that seen by a red colour-blind person. [This was shown on the screen, and the vermilion, emerald green, ultramarine, and gamboge were placed in the mixed light, and the alteration in colour of the pigments noted.] In the same way the white light which, blue and green colour-blind see, can be shown.

In measuring the luminosity of the spectrum you cannot but have noticed that the shadow illuminated by the white light never appeared as white, but always coloured. Thus, when placed in juxtaposition with the yellow, the shadow illuminated by the white light appeared bluish; when with the green, reddish; and when with the blue, yellowish. The colour given to the shadows illuminated by the white light is merely the effect of contrast, and is due to error of judgment by the eye. The tendency of white in proximity to a colour is to make it to appear of the hue of the complementary colour, to which I shall draw attention in my next lecture.

ON REVERSED PHOTOGRAPHS OF THE SOLAR SPECTRUM BEYOND THE RED, OBTAINED ON A COLLODION PLATE.

(In a Letter to Professor Stokes.)

BY CAPTAIN J. WATERHOUSE, ASSISTANT SURVEYOR-GENERAL OF INDIA.*

Surveyor-General's Office, Calcutta, November 5, 1875.

My Dear Sir,—I have the pleasure to send you, by Overland Parcel Post, for presentation to the Royal Society, two photographs on glass of the solar spectrum, showing the extreme red rays below A, obtained on a dry collodion plate prepared with bromide of silver stained with a blue dye* and exposed to diffused daylight for a moment before being placed in the camera to receive the image of the spectrum. I also send another plate, also a dry bromide plate, stained with the same blue dye, and prepared at the same time and in the same manner as the other plates, but not exposed to light and quite free from fog; and you will observe that on this there is no trace of the reversed action in the red rays, and that the direct action only extends slightly below C.

This power of the red rays of the spectrum to neutralise the action of white light on sensitive Daguerreotype plates was frequently noticed by Sir J. Herschel, Draper, Fizeau, Claudet, and other Daguerreotypists about thirty years ago, but, so far as I can ascertain, it has never been observed on collodion plates. As collodion has so many advantages over the Daguerreotype, it seems probable that this new extension of an old principle may have an important practical applicatiou in spectroscopic photography, particularly for the mapping of a part of the spectrum in which eye-observations can only be made with difficulty and under favourable circumstances.

The apparatus used for obtaining two of these photographs consisted of a Browning's chemical spectroscope, fitted with a very fine flint prism of 60°, and used in conjunction with one of Dallmeyer's rapid rectilinear lenses of 30″ focus. The rays of the sun were collected from a 9″ heliotrope, worked by hand, and thrown on the slit by means of a condensing lens of 3″ diameter and 25″ focus. The aperture of the slit varied from ·003 to ·005, as marked on the plate.

The other single photograph was taken with a five-prism direct vision spectroscope by the same maker, also attached to the rapid rectilinear lens, and with the same arrangement of heliotrope and condenser.

The plates were prepared with a bromized collodion made by Rouch, sensitized in a bath of pure nitrate of silver at 16 per cent., then well washed in several changes of water and treated with a watery solutiou of the blue dye, again washed to remove the superfluous colour, and then dried. The colour of the prepared plates, when dry, was a light lavender. The development was by the alkaline method, followed by an intensificatiou with acid, silver, and pyrogallic acid. Before being placed in the dark slide, the plates on which the extreme red rays are shown received a momentary exposure to diffused daylight by quickly openiug and shutting the window of the dark room.

It will be observed that the best results have been obtained with long exposures of thirty or forty minutes; and it is also necessary to work with rather an open slit, which injures the definition very much, so that the details of the many lines which I have ascertained to exist iu the portion of the spectrum below A are not at all distinct; but it is possible that means may be found for obtaining better results with moderate exposure and a fine slit; and I hope to be able to continue the investigation with this object in view.

I have not been able yet to ascertain in what manner the blue dye acts; but that it plays au important part in obtaining the results is evident from the fact that on a dry bromide plate unstained the reversing effect of the red rays is not observed. I was led to use it from observing, during the course of au investigation of Dr. H. Vogel's importaut discovery of the effect of certain dyes on the sensibility of dry bromide of silver plates to the less refrangible rays, that on plates stained with auiline red, orange, green, aud blue, the A and other lines in the red were often visible reversed; and there were traces of reversed action below A, but most markedly on the plates stained with the particular blue dye referred to. As I had not observed it on the plain unstained bromide plates, I attributed the effect to the action of the dyes, overlooking the fact that the plates were all slightly fogged. On repeating the experiments with the blue-stained plates, prepared in a purified bath and very free from fog, the reversed action was not perceptible; and recollecting the old Daguerreotype experiments, the idea suggested itself of trying whether it could be obtained by means of the preliminary exposure to light.

On examining my spectrum negatives I find that the same reversing action in the red is also to be traced on a few plates

* From the *Proceedings of the Royal Society*, No. 166, 1876. Now reprinted in reference to Major Waterhouse's letter on p. 77

* I enclose a specimen of the dye. I do not know its chemical name, but it appears to belong to the aniline or some analogous series, and was obtained in the native market here. Dissolved in alcohol it is of a fine deep blue, but the addition of water changes the tint to a rich violet or purple. [I have compared the specimen as to its absorption-spectrum and the action of reagents with authentic aniline blue, and the two appear to be identical. —G.G.S.]

prepared with bromo-iodised collodion, exposed wet and developed with the ordinary iron developer; but further experiments are required before I can ascertain whether good results can be obtained in this manner. The effect of staining the dry bromide films with other dyes has also to be investigated.

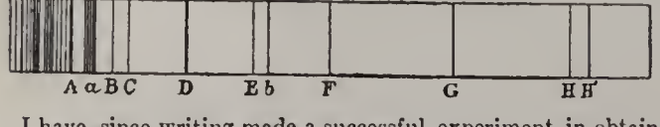
I would further draw your attention to the reversal of the blue and violet rays between H and F. I have observed this effect on all dry bromide plates, whether stained or unstained. It appears to be caused chiefly by over-exposure, but may also be partly due to the action of the alkaline developer. On some plates it is more distinct and of greater extent than on others. I am scarcely sufficiently acquainted with the subject to venture on an explanation of this action of the blue rays, but may remark that they would appear to lose by long and excessive action the decomposing power they first exert on the bromide of silver film, and to exercise instead the neutralizing and bleaching action of the red rays. On a single photograph this reversed action of both sets of rays is well illustrated, and the whole spectrum is reversed from H to below A, the minimum of action being about F.

Should you consider the subject of sufficient interest, I trust you will do me the favour of bringing this communication to the notice of the Society; and I need not say that I shall be exceedingly glad of any suggestions for improving the method, and utilizing it in making systematic observations of any points which may be elucidated by its means.

RECEIVED DECEMBER 6, 1875.

Surveyor-General's Office, Calcutta, November, 12, 1875.

DEAR SIR,—In continuation of my letter of last week, I enclose a sketch of the lines in the extreme red rays, as nearly as I can make them out, from one of the photographs I have taken in the manner described, and the only one in which I have obtained the lines so clearly. It was taken at 1.48 P.M., on the 8th October (just at the close of our rainy season) with an exposure of 15 minutes, the same arrangement of spectroscope being used as for taking the two negatives I sent you last mail.



I have since writing made a successful experiment in obtaining reversed negatives on insolated, blue-stained, dry bromized collodion plates by means of the reversing action of the red rays passing through ruby glass, and also on similar plates prepared with bromized collodion coloured a bright yellow with tincture of annatto. I have also reason to believe that it will not be impossible to obtain the same reversing action through blue glass; but further trials are requisite.

I may also add that I have found that dry bromide plates prepared with the collodion containing annatto are more highly sensitive to the whole spectrum than any others; so that I have obtained the C, B, *a*, and A lines quite distinctly on such plates *unreversed*, and also one line below A at about the same distance from it as *a*.

Notes.

A curious whim, we are told by a society journal entered the brain of a philosopher twenty years ago, namely, to photograph himself on the first day of every month, in order to show the progressive effects of time; and he thinks the collection of sufficient interest to be made a public exhibition. The individual may think so, but we doubt if the public will endorse his opinion. No doubt the changes due to advancing age will be interesting to note, but to make the collection of value, the photographs should be taken by the same man and under similar conditions of weather and lighting. We do not hesitate to say that if a man chose to take the trouble to devote a week to being photographed by different photographers, he would not get two portraits alike, while between the oldest and the youngest looking there would be at least ten years.

A photographer and an artist attached to an illustrated paper were comparing notes the other day, especially in relation to portraits and sitters. Said the photographer, "Fancy dress balls have brought me in more commissions than anything else this season. People like to see how they look in fancy costume. I have reason to bless fancy dress balls, I can assure you." "And I have reason for the very opposite opinion," replied the artist. "These functions have caused me more annoyance than enough. Just imagine: I had a portrait to do of a man the other day who was to take part in a certain ceremony. To save time, I had his photograph sent to me beforehand and drew his face according to the photo, of course. Judge of my disgust when, on seeing him at the ceremony in question, I found he had shaved off his moustache and whiskers, and was not a bit like the photograph. 'Oh, yes,' said a friend, when I mentioned it. 'Mr. So-and-so had his chin shaved in order to appear at Colonel North's fancy ball.' Fortunately there was just time to make the required alteration in my drawing, but had I not seen the original in the flesh, it would not have been a bit like him."

A contemporary points out that amongst the curious epitaphs said to be in Ashford churchyard is one to a local photographer named Gleason, which runs thus:—"To the memory of John Gleason, photographer of this town. In his own familiar words, 'Don't move!'" This is surely not so characteristic as an inscription to be seen on the tomb of a "Knight of the Camera"—which is penny-a-linese for photographer, we take it—who lies buried far from home in a village churchyard in a picturesque Cumberland fell, where he had died of a chill induced by a night involuntarily passed on the bleak sides of a neighbouring mountain. The stone erected to his memory bears merely his name and the date of his death, with the simple words, "Spoilt by undue exposure," an expression which can hardly fail to appeal to the sympathies of passing photographers, whether amateur or professional. As to the odd epitaphs which are so frequently seen in the American newspapers, there is good reason to suspect that many of them are the invention of those native humourists of whom Mr. W. D. Howells is so proud. Unfortunately, there is too often a flippancy—to use a mild term—about these tombstone efforts which detracts from their interest. Take, for example, that well-known obituary inscription on a Chicago photographer's tomb, which, after detailing that this "pattern parent and excellent developer" had died in a fit on a specified date, finishes up with the line—"Taken by the Instantaneous process." This is as unseemly in its way as that other professional epitaph, which informs the world that the late Mr. So-and-So, "The Tenant Photographer" of Albany, N.Y., is being "developed for eternity." If the late Reverend Mr. Harvey had "meditated amongst the tombs" in these days, it is tolerably sure that his sorrowful reflections would have been frequently interrupted, even if his sense of gravity—we mean no joke—had not been terribly shocked.

A photographer of experience says that as a rule, when husband and wife come together to be photographed, the

portrait of the former is rarely a success, because the lady is rather addicted to sarcastic remarks on the gentleman's pose, appearance, and so on. It is not often, however, that feminine criticism takes the severe form, as it did recently, according to a contemporary, when, upon the husband objecting to flowers upon the table, on the ground that he wanted his portrait entirely natural, the wife struck in with "Yes, you'd better put a bottle of whisky and a pack of cards on the table, burst his collar, rumple his hair, and make the clock strike 2·30 a.m. !"

Neither the photographer who took the portrait of the Bishop of Lincoln in his High Church vestments, nor the one who photographed the new reredos in St. Paul's, ever imagined, we suppose, that he was putting a weapon into the hands of the ultra Protestants to use against the Catholics. The optical lantern, however, is now recognised as a valuable ally, both politically, and in a religious sense, and we note that in a dissolving view lecture on the Spanish Armada, given last week at Brighton, the photograph of the reredos, when turned upon the screen, was received with a storm of hisses, and repeated cries of "Shame !" A photograph of the Bishop of Lincoln and his chaplains was vigorously hissed, as were also a couple of photographic slides representing the interior of a Ritualistic church. If this kind of thing comes into favour, the prospect opened up is not a very pleasant one. We fancy a better use could be found for photography than its introduction into religious warfare.

While one fashion journal assures us that the latest craze among professional beauties is to have their feet photographed, another is equally serious in informing its readers that those ladies who desire to be in the extreme mode sit for their hands, wrists, and arms. There is no objection to this fancy, especially if the limbs be shapely; indeed, we do not see why it should not be carried a little further. A pair of eyes, a nose, a mouth, an ear, even a dimple, might be made the objects of special study, and the photographs would no doubt be highly valued by the recipients.

PHOTOGRAPHS OF NEBULÆ.

BY A. A. COMMON, F.R.S.*

HERE is Shroeter's Bridge, this peculiar ship's prow business. Then there are the four stars forming the trapezeum. Now we come to the advantage of photographs. I shall be glad if you will carry in mind the difference between the drawing and the photograph as illustrating the point I want to make—viz., the greater value of the photograph. This is one of two or three photographs which represent the different exposures of the nebula, my object being to get contour lines as showing the points of the nebulous mass which more nearly agree in intensity, but here we have absolutely no indication of the nebula.

Here is a longer exposure [slide]. On the principle that I should like to see carried out with regard to photographing the nebulæ; exposures of varying lengths, so as to measure the different luminosities, and be able to draw a contour map, and that is the best way to determine if there is any change of intensity. The next slide shows us more of the nebulæ, this one the whole shape and form. If we can consider that between this and the last one there are several gradations, we can easily imagine that we can get many contour lines. And you can see that this and this portion are equal in intensity, a point which it is impossible to be sure of by any hand-drawing. We need not make separate negatives to get the contour lines, for if I take a photograph fully developed, showing every detail I can make from that original negative which was fully exposed—with varying exposures, other copies which show the bright parts in their proper orders. While I am on this point, which I wish to impress upon you—that is, the enormous importance of photographs over the hand-drawings—I want to show you this other example. This is the second large nebula that we see in the northern hemisphere—that is, the Nebula in Andromeda. This is a very large nebula indeed, and can be seen about this time of the year almost like a comet. There is a bright mass here with some outlying spots. If you get that in the right light you can easily conceive the centre position as a sun, and other nebulous masses revolving around it. Fancy this ring here (indicating) Saturn if you like, with a bright mass of condensation, and a mass of nebulæ all around it, and parts which may eventually coalesce and form a separate part. This was taken by Mr. Roberts with about two hours' exposure this year; bear that in mind for a moment. You may consider that an absolute representation true to nature of the appearance of the nebula. Bear that in mind, and turn to the next one, which shows the same nebula as drawn by Truebelow, a man whose capacity for drawing these things was unequalled at the time, and I question whether any person with ordinary means or extraordinary means can show so much as is shown there. Instead of showing anything like a bright mass with any indication of a spiral character, we have here only an odd-shaped character of "3." The general shape gives the impression that it is a circular moving mass of nebulæ, whereas the next one does not. Supposing that a man had drawn this as carefully as this is drawn, and wished to compare the drawing of another man, which might vary in several points—that is, the other man might make a drawing which is more nearly approaching the photograph—are we to be able to say that any change had taken place between the first and the second drawing? Certainly not. We cannot with our knowledge as to how drawings do differ. But if this photograph is compared with a photograph which is taken later on with the same exposure and the same plates, they must be sensitive to the different parts of the spectrum, then we have a certain criterion as to whether they have changed or not.

There is another photograph I will show you—the photograph of some nebulous nucleus of the Andromeda nebula. That part is largely extended here [indicating] and, overpowered by the great light, shows a distinct nucleus. That was the centre of the brighter portion, and it was just about here [indicating] where the Nova occurred, which suddenly burst out a few years ago in such a remarkable way. I happened to have taken this photograph the year before, and I was able to say without any hesitation that there was not the slightest indication of a star there at that time I should like to show you a slide taken five years ago. This is [slide] the spiral nebula which has been lately photographed by M. Gothard. Touching the spiral nebulæ, of which there are many in the heavens, Lord Ross found so many that he became infatuated with the idea that all these nebulæ which were clumped together were spiral nebulæ, and he did draw the nebulæ, but broken away here [indicating] and there [indicating], and did not form a true spiral. He was led in his drawing to represent that as a mass of nebulous masses, all sweeping away with proper motions toward the centre. This is a very faint thing, and was taken five years ago with a comparatively short exposure; but with the ten-inch telescope, M. Gothard, in Hungary, has been able to show this in a most wonderful way. Every little patch here [indicating] comes out in a most wonderful manner, showing the character of the Nebula, which is certainly not spiral. To hark back to the drawing, you will bear in mind Bond's picture. This is Lord Ross's picture of the Nebula of Orion, as made by a series of competent draughtsmen with the large reflector at Parsons-town, of six feet diameter. Here they were hampered with more light, but with a larger field They had not only more light in the telescope, but owing to the greater focal length they had a smaller view, and consequently the view was reduced in angular measurement, and they could dwell longer on particular parts. This part [indicating] is only poorly shown in Bond's. It is pronounced here, and the whole thing becomes one luminous mass of light of equal intensity, and no one with a telescope would recognise that as the Orion Nebula. There is one more photograph in this connection [shown]. There is a little mass of light here which gives the impression of an hour-

* (Continued from page 10.)

glass. This is the drawing of the object [shown], and you can compare it with the photograph, which makes more pronounced the objection I have to any drawings. This is such a delicate object that I was obliged to put this round to enable me to find it. It is a little plate I took of the Nebulæ in 1873, which is represented in Herschell's drawing as a triangular nebula, and you can see its bright star with a little circular tail running away from it like the nebula discovered by the Bros. Henri. In photographing these feeble-lighted Nebulæ very long exposures have to be made, and in order to get the image falling on the same part of the plate consistently and persistently, it is necessary to have a good driviug clock, capable of working accurately from half-an-hour up to even four hours, in order to get the best results. With regard to the question as to the telescope and the aperture and focal length and proportion of aperture to focal length, it would be absurd to dwell too long on that here. But there is no doubt that whatever the perfection of the photographic process may be, however sensitive we may get the plates, the advantage will be always with the biggest aperture, because you can reduce the time of exposure; and consequently reduce the difficulty you have to suffer from through bad driviug and other defects, and particularly bad weather, to the smallest possible amount. With regard to the sensitive plate used, the grains of silver that are in the best photographs are of real size, and do affect the image more or less. The image when it is magnified is a series of very large dots put in, and as the dots are of constant size, it affects the beauty of the picture, just in proportion to the size upon which the original negative is taken. Consequently, that points for the best results to the long focus, where you could get an original image as large as possible, and increase the number of dots which go to form it. What the exposure will be I do not know; that is a question. With the best knowledge in the world you may come to a wrong conclusion. For a long time I thought the balance of advantages was in favour of the long telescope, but the gentleman iu Hungary with a 10-inch reflector has taken such beautiful photographs of different objects, such as spiral nebula, that I should have thought it was impossible to be taken with a small aperture. He has proved that ten inches is not the limitation downwards to which you cau go for a really good photograph. Just now, it may be said, there are a great number of very large telescopes, all capable of taking very good photographs, but there is no determiued effort made to systematically photograph the nebulæ of the heavens. The siderial heavens have beeu done for and settled by the Conference in Paris, which is, by united actiou, going to take them; but as to photographs of the Nebulæ—and there are many thousands all ready to be photographed—the Conference at Paris last year determined to leave this and other questions in the hands of Mr. Janser, President of the Academy of Science in Paris, and myself, with a view of forming a committee, and if any men cau do auything to increase our knowledge of what can be done in any way as to choice of plates or manner of development, it would be of the first advantage to us astronomical photographers to know. I think I have said enough about Nebula photography, but, before I finish, I should like to show you one or two photographs as illustrating how celestial photography in itself has been modified by the invention of bromide plates. It is to that, and that only, which we owe the great advances that have been made; and I have one or two slides which I shall pass upon the screen, and speak upon as briefly as I can. This is a photograph of Jupiter [exhibited] takeu iu 1879, when that very remarkable red spot was on. You see the red ball across the equatorial aud the spot at the side. You will see the spots I spoke of come promineutly before you, because you can all see the original images; and you can see the great granulations. If we could get a finer deposit of silver, or could decrease the relative scale of the image, we should get a much finer graiu; and you will sec how that is shown in the next slide, which represents a photograph of Saturn. I thought that at the time when the work of the Brothers Henri came over from Paris that it was one of the finest examples, and so it is to the preseut day, of stellar photography. Owing to the sensitiveness of the plates the Brothers Henri were enabled to enlarge the original image, and so get what I have suggested—that is, increase the scale of the image compared to the dots, and you will see there is a great deal more sharpness of the dots. The next picture is the only picture where the collodion has a distinct advantage over the gelatiue plate, and there is no doubt that, for this purpose, the collodion is better than the gelatine plate. In the first place, because we have an euormous amount of light, and the exposure has to be reduced to one-thousandth part of a second to get this effect. Any person conversant with the sun will know the remarkable sun spots which occur, and the peculiar aspect of the spots. We have some very fine photographs of the moon, and this is one of the finest I have ever seen except the Lick one. The moon is a thankless thing to photograph. It makes a fine picture, but a useless picture, for I do not think our knowledge of the moon has been advanced one jot by the finest photographs which have been taken. The Brothers Henri have tried to apply that method of enlargement to the moon as they have to Saturn, but they are not so good as Saturn. De La Rue took the moon, and he pretty well exhausted it, and the early pictures taken by him in the early days of the collodion process are nearly good as those taken by the gelatine process of the present time. The next picture is not a celestial one at all, but it illustrates rather a peculiar thing. In 1881 I exposed a plate to the moonlight in order to see what the accumulative effect of the moonlight was, and I got in an hour and a half or two hours' exposure in a fairly bright moon this picture of the house opposite. You can distinguish the lace of the curtains in the windows on the other side of the road. That strongly impressed me with the power of photography, as to its cumulative effect, in getting objects you cannot see. Unless you used the telescope you could not see them. You could not see the lace of the curtains on the other side of the road, yet they were seen by a small telescope. I want to emphasise my remarks about the comparison of photography and hand-drawing rather forcibly here. This [picture] is an enlargement from one of the maps, the best series of maps of stars that were ever done; that is Argander's Maps of the Southern Heavens. When I first received copies of the Brothers Henri's work I immediately sought out on Arglander's map similar portions of the sky in order to find out how the photographic magnitude varied with the estimated magnitude. If you will turn to the next picture you will see how the photograph comes out. Here [indicating] is one star, and here [indicating] is another; but iustead of two or three, just look at the enormous number of stars in comparison with those on Arglander's map, and look how beautifully round aud regular they show. You cau see at once by casual comparison the great superiority of the photographic maps over the hand ones. This [indicating] represents about the scale, shape, and size, and about the magnitude that is proposed to be taken by the Paris Conference; so if you get a map on this scale, call this a degree from here to here [indicating] and divide it iuto 60 seconds, you will see with what degree of accuracy you can locate the positiou of any stars. They represent, practically, immeasurable dots, even on such a large scale as they are magnified now. Here are a couple of photographs I want to show you to give you some idea of the telescope used for the particular purpose.

This [exhibited] is a representatiou of Mr. Robert's telescope. He has done some remarkably good work in England, and I am indebted for some of his photographs to-night; and some of his latest nebulous photographs are surprising. He has an ordinary refractor telescope. [Described working of same.] I hope, gentlemen, I have not wearied you too much in this long discourse.

THE COLD BATH PLATINOTYPE PROCESS.

BY W. WILLIS.*

A good plan to adopt in printing from such flat negatives is to cut the paper a little longer than necessary, and then, in placing it in the printiug frame, to fold backwards the part which overlaps; this part will then be sufficiently protected from light action to afford means of comparison with the priuted portion.

I may say of developers that their name is legion, but the one to be used to-night is, I have very good reason to believe, the best. Potassic oxalate and mono-potassic orthophosphate are the developing agents, and these salts are mixed, roughly, in the proportion of two parts of the former to one of the latter. The office of these salts in the developer is described in the paper read at the Conference, to which I will refer you.

One half pound of these salts, mixed in the above proportions, is dissolved iu fifty ounces of water and called "Solution D."

Sixty grains of potassic chloro-platiuite are dissolved in two ounces of water and called "Solution P."

* Continued from page 791.

Solution D is too strong for general use, but it is perhaps useful to have ready a strong solution, and it is less bulky.

Before making up the developer we will dilute solution D thus:—

Solution D ...	...	...	3 parts	} Call this diluted
Water ...	...	...	2 „	} D solution.

Now the standard developing solution is made by taking five parts of diluted D solution and one part of platinum solution P.

I find measures graduated in cubic centimetres very convenient for proportioning these solutions.

The mixed developer keeps in good condition for a certain time, and then slowly deteriorates. I am unable, at present, to give any time limits, but I should estimate that no sensible loss in working value would take place within twenty-four hours after it is mixed.

The developer is best worked in a porcelain tray with a flat bottom, or, if the prints are large, by the trough method. The operation of floating the prints on the developer demands a little attention. In the first place, the prints to be developed should either be flat, or, if they have been rolled up, the printed surfaces should be convex. If rolled with the printed surfaces inwards it is not always easy to secure a good flotation. The developing bath is weak in platinum salt, and it follows that the quantity of solution taken up by the printed surface will only rarely suffice to supply sufficient platinum for the complete development of the shadows; on this account it is necessary to float the print on the developer at least twice. But it is better to allow only a short time to elapse between the first and second floatings. I have found that if long delayed the second floating is not so efficacious. The print after its second flotation is held in the hand and carefully watched as it continues to grow in detail and strength, and when the right effect has been reached it must be immediately immersed in the acid bath.

During this growth of the image both the extreme high lights and the deep shadows should be inspected; the one to see that sufficient detail has been developed, the other that the proper strength has been attained. If the shadows are very heavy, a third, or even a fourth, flotation may be necessary. · In the early stages of a development both the high lights and the shadows may appear granulated, but as development progresses this granulation disappears.

Suppose a print to be floated on the developer, then removed for a few seconds, until most of the detail is out, and then refloated, but instead of being again removed is kept oscillating backwards and forwards on the surface of the liquid, we shall then obtain a result somewhat similar to that obtained by the rocking of the dish during dry-plate development, namely, a piling up of the metal on the strongest portions of the image. Between the development of each print the bath should be rocked once or twice from side to side, in order to break up surface scum.

When only two or three prints have to be made, and the process is not regularly worked, it is important, in order to secure economy, that developer sufficient only for the prints should be mixed; now, in order to operate with such a small quantity of solution, I have found that nothing is so satisfactory for applying it as a broad camel-hair brush: at any rate, when the prints do not exceed the dimensions of 12 by 10. I have not tried larger prints, but it is quite possible that the method is applicable even to them, though I should for this purpose recommend the trough method, which is very simple and easily worked.

In using the brush it is almost self-evident that the strokes should follow and overlap each other; if they were made so that they were separated, developing marks would be the inevitable result. Perhaps it is better to work from one side of a print to the other, and if there is a sky this should receive the final strokes. The operation must be carried out rapidly, and with a wet brush, which must be re-dipped in the developer at least after every second stroke. Before beginning a second print with the brush, let the latter be washed in the developer so as to detach any ferrous salt which it has derived from the previous print.

As to the best mode of utilising old developers, I am at present unable to say much, but if they are not more than two or three days old it appears to be quite safe to mix them with fresh solution; but if much older than this the safest plan is to put them aside as residues for reduction by means of zinc, aided, if necessary, by a little hydrochloric acid.

The solutions D and P, by the mixing of which the developer is made, may be used in various preparations and strengths, and by these variations many different effects may be produced. For instance, it is thus possible to increase or decrease half-tone, to produce warm or cold tints, to increase or decrease the rapidity of developing action, or to flatten or reduce the strength of the shadows. My intention was to have indicated the means of producing these various effects, but upon consideration it seemed that the means already in our hands were sufficient for almost every case likely to be met with. I may afterwards refer to one or two of these variations, but let us see first what may be done with the standard developer before described.

By giving a normal exposure, after a slight damping of the paper, and developing without any "ageing," the maximum amount of vigour will be attained. By an "ageing" of the paper for a few hours before development an increase in half tone will be secured, and by a further "ageing" still more half tone and a tendency to flatness. Again, should prints have been, by accident, under-exposed, "ageing" will bring out half-tone; and if exposure has been rather overdone, the prints may be dried as soon as they come out of the frames, and developed in this state, the development being carried only sufficiently far to secure the right effect. But I think the "ageing" method should be used with a certain amount of caution, for, if carried to excess, it will tend to muddiness in the prints.

In order to slow the developing action the addition of 50 per cent. of water may be made to the standard developer, and by adding an amount of a saturated solution of potassic chloride equal to one half of the bulk of the P solution present in the developer, the developer will be rendered still more slow. The developer thus diluted and restrained by K Cl is useful for tentative work and for prints (not of strong subjects) which have been over-exposed.

I may here mention that chlorides appear to act much better than any oxidising agents for the purpose of restraining development, and for theoretical reasons this might be expected.

The development of this paper may be looked upon as affording similar variations in effect to those obtained in the development of dry plates, and as in the latter case the beginner would proceed by a long and devious course if he began by using, one after another, a dozen different developers before he had properly learnt the use of one, so in the working of the cold bath process his progress would be very slow and "mixed" if every day he tried something new. I therefore earnestly hope that those who begin this process will adhere to the formula laid down until, at least, they are able to both expose and develop with accuracy.

Nothing has been said as to the keeping qualities of this paper, but of course no exact limits can be given, as so much depends upon the conditions under which the paper is stored. But when properly secured in a calcium tube, it certainly remains in good condition for at least as long as hot bath paper, but probably for a longer period. Some paper, so stored for seven months, gave prints as good as when fresh; prudent workers will, however, not stock more than sufficient for, say, two months' work.

The exposure to light is less than that required for hot bath paper—perhaps about one-third less; when compared with albumenised paper, in a weak or feeble light, the advantage is enormous.

I will now state what appear to me to be the most important features and advantages of this process; they are:—

1. The pigment of which the image is formed is derived wholly from the developer, and, in consequence, the utmost transparency possible on a matt surface is attained.

2. The operator has great power to modify his results; his success depends upon his skill, and he is not bound to an inflexible and fated result by the want of plasticity in his materials.

In conclusion, I may be allowed to give an opinion as to the value of this method, and perhaps the strongest statement I can make is, that after working many years at the platinotype process, always with an ideal before me, I feel that my aims are at last as far satisfied as is permitted to those working in a world where all things are conditioned.

PICTURES BY THE ACTION OF HEAT AND "COLD."

BY D. WINSTANLEY.

ARTICLE IV.

I REMEMBER reading when I was young, and I think in "Brewster's Letters on Natural Magic," that the image on a coin which had been worn quite smooth, and from

• Continued from page 758.

PATENT OFFICE LIBRARY.

which accordingly that image had disappeared, might for a time, at any rate, be revived by heating the coin upon a plate of iron. The "image and superscription" produced in metal by the stamping of a die is of less density than the ground on which it stands, and when the coin is heated in the air the image and superscription oxidise with more facility than the general surface of the metal, and as the oxides differ from the metals in point of colour, and in the absence of metallic sheen, a picture of what once existed in relief is formed. Of course, although no picture was visible on the worn-out surface of the coin, a physical picture was actually there; but then a physical picture is actually there when the surface of a body is of different temperatures, and the problem now before us is to render this latter kind of physical picture visible to the eye, to compose its parts of chemical materials differing from each other in their colour, to make these colours permanent in kind, and to produce them in short periods of time. When this problem, or rather this series of problems, has been solved, we shall be able to "take photographs in the dark." "Nocternograms or obscurograms" might, I apprehend be a fitting name for them. I do not say they would be much good when taken, and I do not say that they would not. My business with this question (and most others) is that of a student of philosophy; with all my getting, I would get understanding.

Concerning the experiments with the cobalt salt (it was the chloride which I used), they have not thus far yielded satisfactory results so easily as the moisture method, though very likely I shall soon arrive at something like a fairly satisfactory mode of working. The best results are got on paper which has been floated on both sides. In the present condition of the process, one is often placed in something of the chronic predicament of the spiritualist: "unless the conditions are observed, the manifestations do not occur," and when they do occur they are frequently the opposite of what one sought, being positives when one looked for negatives, and *vice versa*, from the fact of the radiation being *plus* when one thought it *minus*, and *minus* when one thought it *plus*. There is, however, one consolation which many spiritualists have not, and that is that with a very moderate amount of perseverance the results do come, and are equally visible to "them which believe" and to "them which" don't. The screens which I have found to answer best, apart from the stencils, which are of course "perfection," are formed by painting with photographer's black varnish on tin foil sheets, or on the metal surfaced papers in which tea dealers wrap their wares. When such a screen is superimposed upon a piece of cobalt paper and exposed to the radiance of a fire (with the bright side out when the metalised paper has been used) the process is sure enough, and in a very brief interval of time (a minute will suffice), the picture is visible from behind. I have just performed the experiment as I write, and I pronounce it good. The sunshine also, even when it is weak, does not take long to give the result desired.

There is something weird and curious, and, to the uninitiated, decidedly impressive, in photographing an unseen picture through a sheet of metal. I have also frequently performed the experiment with the aid of a screen of thick black card, with the figure of a vase in tinfoil pasted on its outer side. Under the influence of decided thermal radiation, the metallic picture readily leaves its counterfeit presentment on the cobalt paper, even when the thickness of the card is so much as the twentieth of an inch. With diffused daylight, however, and when the thermal radiation is of low intensity, the desired results are not with certainty obtained at the temperature which prevailed when my experiments have been performed. The best temperature, no doubt, will be that of the critical point of the deliquescense of the salt of cobalt.

(*To be continued.*)

Patent Intelligence.

Applications for Letters Patent.

741. ALEXANDER FERDINAND YORK SCHWARTZ and FRIEDRICH HERMANN MERCKLIN, 433, Strand, London, for "Improvements in the Production of Films Sensitive to Light, and of Materials for Assisting or Continuing the Effect of Light on Photographic Films."—January 15th, 1889.

749. JAMES SWIFT, 81, Tottenham Court Road, London, for "Improvements in Photographic Shutters."—January 15th 1889.

838. WILLIAM ROOKE, 166, Fleet Street, London, for "Improved Bath with Circular Flow of Water for Washing Photographic Pictures."—January 16th, 1889.

972. EDWARD IRVING POWNALL PELLEW, 54, Fleet Street, London, E.C., for "Improvements in Instantaneous Photographic Shutters." (*Partly communicated by Charles Pritchard*, France.)—Jan. 18th, 1889.

Correspondence.

SHAKESPEARE AND PHOTOGRAPHY.

SIR,—Your worthy correspondent, Mr. Lyonel Clark, hon. librarian of the Camera Club, in his letter of the 25th January, asks in what play of Shakespeare's occur the lines :—

"The glorious sun
Stays in his course and plays the alchymist."

The passage occurs in the play of "King John," Act iii., Scene 1, in the speech of King Philip. It runs thus :—

"*K. Phi.* 'Tis true, fair daughter; and this blessed day
Ever in France shall be kept festival.
To solemnise this day, the glorious sun
Stays in his course, and plays the alchymist,
Turning, with splendour of his precious eye,
The meagre cloddy earth to glittering gold."

It will be seen by this that Shakespeare, symbolising a glorious sunny day, did not refer to any photographic action of the sun's rays, but to the alchymistic operation of turning common earth to gold.

We have no proof that Shakespeare was acquainted with the darkening of horn silver by the action of light. It is evident, therefore, that we cannot, to use Mr. L. Clark's expression, add this feather to Shakespeare's cap—but he can do without it.—Yours, &c., T. L. PHIPSON.

London Correspondent to the
Moniteur de la Photographie.

Hotham Villa, Putney, S.W., January 26, 1889.

OCULAR PHOTOGRAPHS.

SIR,—Mr. Friese Greene's communication to the London and Provincial Photographic Association is very interesting and important. To me it is especially interesting, for he has been enabled to photograph an ocular spectrum—for such was the phenomenon dealt with. I have made ocular spectra a great study, and if other than the instance he treated could be photographed, the photos might enable us to form some very important conclusions. The bright spectrum of the arc light, in a dark field, would, after the lapse of a certain interval of time, become a dark spot in a bright field, as it did rather persistently in Mr. Greene's eye. The law of this reaction may be thus stated: the dark spot appears as much darker than the light field as the light spot was brighter than the dark field. I explain these phenomena by my hypothethis of the libration of sensation. If Mr. Greene, after being sun-dazed, were to close his eyes, or to turn them into a dark chamber, he would see a series of spectra, which, commencing with a bright spot, would decline through several colour spots to a dark one. Can these be photographed? From long practice I can observe ocular spectra with great facility,

and even the persistence of the images of external objects on the retina after the eyes are closed. I fear, however, that long-continued observation of the ocular spectra is very detrimental to the sight.

The reason why the images of external objects should persist as spectra on the retina for a certain length of time, and why it should be possible to photograph them, are the following: Light, colours, are phenomena alone of the sentient eye having no external existence but as mechanical vibrations. These mechanical vibrations of various periodicity set the nerves of the eye into corresponding vibratory action; which action is capable of being re-communicated to the retina's surroundings, and outwards through the lens to the sensitized plate. The retina would appear to perform an analogous function to the diaphragm in the phonograph, which may not only be actuated by the vibrations of the air from without, but which is also capable of re-transmitting similar vibrations from within. W. CAVE THOMAS.

8, *Fitzroy Street, Fitzroy Square, London, January* 26.

A PHOTOGRAPHIC SOCIETY FOR BRIGHTON.

DEAR SIR,—Will you allow me to state that a Photographic Society has been started for Brighton and the neighbourhood. The following resolutions passed at the preliminary meeting will make the terms of membership clear:—

1. Ladies and gentlemen, amateur or professional, shall be eligible for election.

2. That the annual subscription shall be 15s., with an entrance fee of 2s. 6d., which fee, however, will be remitted in the case of the first forty members, or those submitting their names to the Society before February 7.

Any further information may be obtained from yours very truly, W. H. REAN,

36, *Vernon Terrace, Brighton.* *Hon. Sec., pro tem.*

THE PHOTOGRAPHIC CONFERENCE.

DEAR SIR,—Will you kindly permit attention to be drawn in the PHOTOGRAPHIC NEWS to the forthcoming Camera Club Conference, which will take place at the Society of Arts on Tuesday and Wednesday, March 26th and March 27th.

The Conference will be presided over by Captain W. de W. Abney, C.B., R.E., F.R.S., who will open the proceedings at 2 p.m. each day. At the same time an exhibition of apparatus will be held in the Library of the Society of Arts, and there will be a collection of members' photographs at the Club.

An international exhibition of lantern slides is being arranged for the evening of the 26th, and at the conclusion of the Conference, on the 27th, the annual Club dinner will be held.

On the Monday previous to the Conference a smoking concert will be given at the Club. Full particulars and programme of papers to be read, and other arrangements, will be announced later.—We are, dear Sir, yours faithfully, G. DAVISON, E. Y. SPIERS, *Hon. Secs.*

Camera Club, 21, *Bedford Street, W.C., January* 29*th.*

THE OPTICAL LANTERN.

SIR,—In your issue of January 25th, I notice in your report of the proceedings of the Photographic Society of Great Britain that Mr. Friese Greene showed an appliance for exhibiting a life-like effect upon the screen, but he omitted to say who was the originator of an apparatus of that kind. Permit me to say, through the medium of your valuable paper, that I am the first inventor of perfect life-like effects in the lantern without the aid of persistence of vision.

I sold an apparatus of this kind to Mr. Friese Greene. I took out Provisional Protection for my invention in the year 1884, No. 14,886, but through illness was unable to complete the patent. I showed my invention to Mr. Steward, optician, Strand, W.C., and he appeared much pleased with it. This apparatus consisted of a rack worked by special mechanism which carried the pictures in their exact position in relation to each other.

I now make the apparatus either for one or two lanterns. If for one lantern, the pictures are taken smaller, and worked by two racks in one frame; in place of the usual front lens of the lantern two small ones are used, and by shifting these very slightly towards each other, the pictures can be registered so as to come exactly one on the other on the screen.

There are two ways by which the wonderful life-like effect can be produced:—1st. By moving the picture; 2nd. By moving the light and the condenser. The latter method gives the most perfect results.

I have been perfecting this invention for the last fifteen years, and have spent a large amount of labour and expense upon it. I have exhibited it publicly for two years.

There was a report, I believe in your paper in March, 1887, of Mr. Friese Greene's having shown an apparatus of this kind at the Birkbeck Society, but by some means or other the name of Roger was given as the inventor, instead of Rudge.—I am, sir, yours faithfully,

J. A. R. RUDGE.

1, *New Bond Street Place, Bath, January* 29*th.*

PHOTOGRAPHY OF THE LEAST REFRANGIBLE PORTION OF THE SOLAR SPECTRUM.

DEAR SIR,—With reference to the highly interesting article on "Photography of the Least Refrangible Portion of the Solar Spectrum," by J. C. B. Burbank, which appears in the NEWS of December 14th, will you kindly permit me to point out that my early results in photographing the lines on the less refrangible side of A, which the author attributes to the use of turmeric, were, for the most part, obtained on collodio-bromide plates stained with a blue dye—ordinary anilin blue—the lines in this part of the spectrum being reversed. I found, however, at the same time, that some collodio-bromide plates stained with tincture of the seeds of the annatto plant (*Bixa orellana*), not turmeric, were unusually sensitive to the whole spectrum, so that I obtained the spectrum up to A, and traces of a line below it unreversed; but apart from the reversing the best results were secured with the blue stained plates. An account of these experiments was published in the "Proceedings of the Royal Society," No. 166 of 1876.*

I may take this opportunity of recommending the treatment of cyanin proposed by Messrs. Wellington and Burbank. Plates stained with the dye so treated are exceedingly sensitive in the red, and work much cleaner than if stained with the ordinary cyanin. On Wratten and Wrainwright's "Ordinary" plates, so treated, I have obtained very good photos of the spectrum from C to A; but, although there is a considerable extension of action below A, there are only just traces of lines.—I remain, dear sir, yours truly,

J. WATERHOUSE, Lieut.-Col., B.S.C.

Survey of India Office, Calcutta, Jan. 7th, 1889.

P.S.—I have tried the anilin blue with gelatine plates, but so far have not obtained any special sensitiveness in the red, as with the cyanin.

Proceedings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on the 24th inst., Mr. W. E. DEBENHAM in the chair.

Mr. A. L. HENDERSON, referring to a suggestion made by him

* We reproduce this paper on p. 71 of the present number.—ED. P.N.

at a former meeting, that maguesium powder might be incorporated with celluloid for the purposes of illumination, said he had recently made several experiments in this direction. After dissolving the celluloid in alcohol and ether, it was mixed with chlorate of potash and magnesium powder and left for several days to dry spontaneously ; when dry it burnt splendidly.

Mr. A. HADDON said the most explosive variety of gun cotton was absolutely insoluble in ether and alcohol ; it was employed in analysis to separate the soluble cotton from the explosive ; compression would act upon the rapidity of combustion.

Mr. W. H. HARRISON said any mixture containing chlorate of potash was highly dangerous, and the Government would not legalize any manufacture containing chlorate of potash.

Mr. J. J. BRIGINSHAW passed round some samples of asbestos in the raw state, and also manufactured into cloth. He said he believed a similar cloth was used originally for wrapping embalmed bodies in.

Mr. A. HADDON said the cloth was a capital protection to a flask when used for boiling solutions. A piece of the cloth put over the ring used to suspend the flask above the burner would prevent the flask from breaking.

C. H. COOKE showed a negative that had become stained in parts from contact with a carbon film that was not quite dry, asking for a remedy for same.

Mr. A. COWAN suggested a solution of caustic potash.

The CHAIRMAN thought soaking in plain water ought to remove the stain ; if not, he would recommend that ammonia and water be used.

Mr. J. LAWFORD said, after developing four plates with the hydrokinone developer, he used the same solution for some bromide prints ; they were perfectly clear, the whites of the picture showing no stain whatever.

Mr. J. E. FRESHWATER passed round a negative that had been sent him by a correspondent in India. It presented a mottled appearance, and occasioned some trouble to the operator, who was unable to find a remedy for it.

Several members thought it arose from the tray not being rocked during development.

A question from the box asked the best kind of leather to use for a camera bellows.

The CHAIRMAN said Russian leather ; it was not affected either by damp or insects.

Mr. T. KERR exhibited three negatives taken with a shutter in front of the plate, behind and in front of the lens respectively. Judging from the result of the trials he had made he contended that behind the lens was the best place for a shutter for morning objects.

Another question from the box, "Can any member give a formula for making the lac varnish that is used for glaziug collotype?"

The CHAIRMAN said lac and ammonia, adding a small quantity of alcohol.

Mr. P. EVERITT asked if there was any advantage in using a lens of large aperture stoppered down to the size of a smaller one.

The CHAIRMAN said supposing the lenses to be of equal foci, and were the same distance from the stop, the larger lens would give better illumination at the corners.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.

A LECTURE was delivered by Mr J. B. Payne on "Photography, Past and Present," in the Lecture Hall of the Literary and Philosophical Society, Newcastle, on Thursday, January 24th. There was a large audience.

The lecturer at the outset referred to the fascination of the art of photography, its spread amongst amateurs, and the rapid progress it had made iu public departments. Amongst the numerous photographic associations their own Association took a prominent position. During the last three or four years there had not been an exhibition of photography held in any part of the United Kingdom of any importance where that Association had not been well represeuted, and on each occasion they had carried away awards. The lecturer then described in a lucid manner the chemical action of light, and urged upon amateurs generally the great importance of their devoting attention to the character aud quality of light. He traced the history of photography during the past century, and detailed the different processes, papers, and experiments that had been adopted by various workers, commencing with Scheele, and proceeding step by step. The various printing processes—albumen, gelatino-chloride, collodio-chloride, gelatino-bromide, platinotype, cyanotype—were severally dealt with and examples shown. Commencing with Niepce's bitumen process, and instancing Daguerre's method, the many photo-mechanieal processes were each explained, including those of Fizeau, Poitevin, Lerebour, Lemercier, Fox Talbot, the carbon process, the Woodburytype, collotype, photo-lithographic, and other methods. The lecturer read a letter which he had received from the Rev. F. Hardwich, M.A., who said, "At the date of publication of the first editiou of my photographic book it is not too much to say that almost nothing was known of the chemistry of photography. The best operators worked by rule or thumb. The late Prince Consort got up a committee to examine the cause of fading of silver prints when he found that those taken by himself and others were not permanent. He gave £50 towards the experiments, and I made them in the laboratory of King's College ; you will find a report in one of the old journals of that time. I worked harder, however, at the chemistry of collodion than at anything else, and found it a hard nut to crack. These two points, however, proved to be the crucial ones :—The fibre of the cotton must be parchmentised by using excess of oil of vitriol ; this gives toughness to the film and intensity to the negative ; secondly, the pyroxyline must be the lowest, and not the higher and explosive variety ; this produces a smooth, flowing collodion which sticks well to the glass. With reference to dry processes, in my opinion, Major Russell's tannin process was the best of the old methods. Your lecture will, I am sure, be a very interesting one. As proof of the rapid progress which photography had made, and the important position it now held in scientific, artistic, and industrial pursuits, the lecturer explained how the manufacture of photographic apparatus and its appurtenauces had resulted in the formation of a great industry. The publication of photographs in various forms, the ilustration of magazines, and the reproduction of pictures, showed in an uumistakeable manner the position the art of photography held with the public.

The lecture throughout was of an iuteresting character, and the practical hints upou the art were warmly appreciated, especially by amateurs, who formed a large portion of the audience.

DEVON AND CORNWALL CAMERA CLUB.

A MEETING was held at the Freemasons' Hall, Cornwall Street, Plymouth, on Wednesday, when Mr. W. GAGE TWEEDY was in the chair.

Mr. R. MURRAY read a paper eutitled "A Retrospect by an Old Photographer, with a Few Hints to the New Generation." The lecturer began by saying that some forty years ago, when he first commenced the art, photography was very different to what it is at present. It was then surrounded by a mysterious halo of wonder ; its study coufined to a very few patient and simple-minded people ; processes were all slow, in every sense of the word ; apparatus was then solid, made for all time ; the cameras then in use would not now be called portable, being huge brass-bound chests, made of wood, specially selected for its strength aud weight. There were then no lenses with wonderful unpronounceable names ; uo conflicting developers ; no squabble of rival inventors ; and no photographic journals. In his opinion, the brilliancy and transparency of collodion plates had not since been equalled. Collodion had, of course, its disadvantages, which had led to its abandonment ; one required to carry about, in addition to the camera and fittings, a dark tent, chemicals, and water. As a sample, he instanced Mr. Wilson, of Aberdeen, driving up to the Blair Athol Hotel in a four-horse coach, laden with necessary apparatus for taking his photographs. The lecturer then stated that now-a-days anyone could take a photograph ; to take an artistic one was, however, quite a different affair. A really good photographer was to the manner born with special aptitudes. He should be clever with his fingers, neat and orderly in his habits ; patient, hopeful, and, above all things, possess a fair share of brains, having also a keen appreciation of the beauties of nature. He recommended that a beginner should commence with a quarter-plate camera, and stick to one kind of plate and one developer until he had mastered the subject. Then a larger size might with advautage be attempted, but he thought that 10 by 8 should be the smallest, but he preferred 12 by 10, or even larger. He thought "ordinary" plates more useful than "extra rapid."

The latter were difficult to manage, and seldom used except for instantaneous exposures. He asked his hearers always to carefully consider the subject before exposing a plate, remarking that a really good artistic picture was worth a dozen bad ones. As regards plates *v.* films, he thought the former better for portraiture, but the latter for views, principally on account of their lightness, freedom from breakage, and the absence of halation. He devoted a few remarks on composition, avoidance of straight lines, proper proportion of foreground, middle distance, and sky. He advised everyone to do his own printing; many a fair negative had been libelled by careless printing. Beginners should not be unduly puffed up by the praises of their friends, but should always be ready to take hints from their more experienced associates. In conclusion, he recommended the art to all as giving plenty of exercise, both to body and mind, pleasant occupation and enjoyment; and in his opinion every photographer should be a happy individual.

Major Barrington Baker, while cordially agreeing with most of the lecture, took exception to the statement that 10 by 8 was the smallest camera that should be used. He pointed out that complete with, say, three lenses, its weight would be some thirty pounds, and that this was more than most amateurs would care to carry any great distance. In his opinion, half-plate was the most suitable for ladies, and whole plate for gentlemen. Few cared for much larger sizes on account of the weight. He also asked the Lecturer if he did not think the negatives from Thomas's plates, developed with hydrokine, showed quite equal to the old collodion process.

Mr. Roy asked if the skies were obtained by double printing, and was answered in the affirmative.

Several specimens of collodio-albumen, coffee, tannin, calotype, and Eastman paper were passed round for inspection.

The next meeting will be held on February 6th, when Mr. A. A. Carnell will give a demonstration, "Coutact Printing on Bromide Paper."

Birmingham Photographic Society.

The usual fortnightly meeting was held in the Technical Schools, Bridge Street, on Thursday, the 24th inst.; there was a large attendance of members, Mr. B. Karleese (Vice-President) in the chair.

The minutes of the last meeting (which were special for raising the subscription for the purpose of obtaining large rooms and accommodation required for the increasing number of members in the Society) were read and confirmed.

Letters were read from Camera Club, asking for representatives for the Conference, and from Mr. A. Tate, Belfast, conveying the thanks of the Ulster Society for loan of lantern slides.

Messrs. Thomas Coud, H. A. Dugard, R. Folland, Herbert Miller, A. W. Wills, J.P., and W. L. Wills were elected members, and Messrs. T. H. Kendrick, W. F. May, and G. E. Wilson nominated for election.

The Chairman requested members to volunteer for leadership for excursions during the summer months, and to hand in to the Secretaries suggestions as to route, &c.

Mr. E. C. Middleton exhibited negative 12 by 15 of a newspaper, taken with cheap lens 10 by 8, which showed excellent definition to extreme edges.

Mr. W. B. Osborn presented to the Society for library "Photography," by R. Hunt; "Photographic Journal of London, 1857."

The Chairman announced that four of the prizes at the late competition, not having been won, the donors had kindly consented to continue the prizes for next competition.

The thanks of the meeting were unanimously voted to Mr. Osborn for presents of books, and to Messrs. J. Collier, E. H. Jaques, W. S. Harding, J.P., and W. Tylar, the donors of the prizes held over for competition.

The remainder of the evening was devoted to the exhibition of members' slides, under the superintendence of Messrs. Bonchill and Fowler, of the lantern committee. Upwards of 250 slides were thrown upon the screen, including many interesting views of Switzerland and the Alps, Holland, &c., and other holiday trips of last year, and some splendid specimens of hoar frost by Messrs. Archer, Barrow, Harrold Baker, Barnett, Button, Bonchill, Fowler, Greening, Godfrey, Harrison, Jaques, Manley, Miller, Osborn, Pumphrey, Pickard, Southall, Tittley, Thomason, Wakefield, the whole showing marked improvement on former exhibitions of members' slides.

Messrs. Harrold Baker, E. H. Jaques, and Charles Pumphrey presented the slides they exhibited to the lantern committee, and the thanks of the meeting were voted to these gentlemen.

The Council have decided on taking a suite of rooms at Grand Hotel, Colmore Row, for the future meetings of the Society.

West London Photographic Society.

An ordinary meeting of this Society was held on Friday, the 25th inst., at the Addison Hall, Mr. William England (the President) in the chair.

The formal business having been disposed of, Mr. John A. Hodges proceeded to give an account of a tour with the camera in North Wales, illustrated by the exhibition of upwards of fifty slides, produced by himself from his own negatives. At the conclusion of the descriptive portion of his paper the Lecturer said that as he was addressing an audience of photographers, some of whom might not have had much experience in touring with a camera, he would conclude by briefly recounting his own experiences. The first question that arose was, what was the best sized plate to work? He was of opinion, taking comfort and conveuience into consideration, that a half-plate camera was the largest size that could be carried for a whole day in a mountainous locality by a person of ordiuary physique, but that personally he preferred a 5 by 4, or even a quarter-plate. The small pictures were large enough for presentation or for mounting in an album, and with the exercise of ordinary care excellent enlargements of any desired dimensions could easily be produced. Further, the small negatives afforded an easy means of producing transparencies for the lantern by means of contact printing, although he preferred himself to print by reduction in the camera. If what he had said that evening should prove to be the means of inducing others to take up that most interesting department of photography, he should deem himself amply repaid for what little trouble he had been put to.

A vote of thanks to the Lecturer terminated the proceedings.

On Friday, February 8th, Mr. Wallace Bennetto will read a paper on "Lighting and Posing," and Mr. J. D. England will give a demonstration of the method of using the flash light for portraiture. Visitors are invited to attend.

Camera Club.

On Thursday, January 24th, Mr. W. Marriott, Assistant-Secretary of the Royal Meteorological Society, read a paper on the "Application of Photography to Meteorology." Mr. Francis Cobb occupied the chair, and introduced the lecturer, who gave a most interesting account of the uses and application of photographic paper in securing automatic records of barometric and thermometric variations. He also described the processes adopted for measuring the movements of clouds, and drew attention to the subject of lightning photographs, pointing out the assistance in this matter which photographers could afford to the work of the Royal Meteorological Society. Some interesting apparatus and a large number of photographs, barograms, and thermograms were on exhibition in the rooms.

Some discussion followed, in which Messrs. Elder, Whipple, Symonds, Ferrero, Lyonel Clark, Stroh, Captain Wilson Barker, and Dr. Marcet took part.

The subject on Thursday, February 7th, will be "Enlarging," when Mr. J. E. Austin will read a paper. Mr. Austin will illustrate his subject with some enlargements on Alpha paper, which will be shown in the rooms.

North Middlesex Photographic Club.

The anunal dinner of this Club, which was held on Monday, January 21st, although thinly attended, was a decided success. Each diner was provided with a photographic dinner card, and all seemed to enjoy the first-class spread which was set before them. A very good smoking concert was afterwards gone through, in which the following gentlemen assisted:—Messrs. Beckett, Crasling, Hiscock, Humphries, Pither, Rayment, Saville, and Stewart. Mr. Rayment's comic songs were much appreciated.

On Monday evening, January 28th, the Club held a meeting in the Iron Room, Stroud Green, when the subject for discussion was "Cameras."

Mr. V. W. Delves Broughton, of Hatton Garden, exhibited two of his "Disraeli" Cameras, unique in design, perfect in arrangement, and excellent in workmanship.

Mr. William Beck, Junr. (of Messrs. R. and J. Beck, Cornhill), showed one of his firm's twelve-guinea hand cameras which seemed to embrace many excellent points, besides being made capable of being used on a tripod. Specimens of work done with it spoke highly as to its merits.

Several other cameras were shown, as were also some flash-light prints by Mr. G. R. Martin.

The next meeting will be held on Monday, February 11th.

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.

THE fortnightly meeting of the above Society was held at their studio on Wednesday evening, Mr. S. W. ALLEN in the chair.

The HON. SEC. of the Cardiff Naturalists' Society attended and explained the views of his committee on photographing places of historical interest in the neighbourhood for permanent record. An arrangement was made by which the Society undertake to act upon any suggestion that may be thrown out by the Naturalist Society with this object in view.

Mr. Geo. Davidson, of the Camera Club, was duly elected an honorary member, and was requested to represent the Society at the Club conference held in March next in London.

The Society anticipate a visit from Mr. Bellsmith, the representative of the Eastman Co., and to favour them with a demonstration.

The lecturer for the evening, Mr. C. MURREL, gave an interesting lecture on "Hydroquinone as a Developer." From the specimens passed round for inspection, the lecturer has evidently been very successful in his researches in this new phase of photography.

Mr. Annibal Pinheiro will give a lantern exhibition on Wednesday next. Subject :—"Brazilian Scenery," from photographs taken personally. All photographic friends are invited.

THE YORKSHIRE COLLEGE PHOTOGRAPHIC CLUB.

THE annual exhibition of lantern slides was held on Friday, January 25th, in the Chemical Lecture Theatre at the College. There was a very large attendance of members and their friends. 138 slides were contributed by Messrs. C. H. Bothamley (President), T. B. Davies, H. B. Hall (Secretary), and Herbert Ingle, Professor E. H. Jacob, and Messrs. A. E. Nichols and H. Pocklington. All the slides had been produced during the past twelve months, and were entirely the work of the exhibitors. The subjects were chiefly landscapes and architecture from the counties of York, Lincoln, Leicester, Warwick, Oxford, Merioneth, and Somerset, and Scotland and the Isle of Man ; but a few sea pieces of figure studies were also shown.

At the next meeting, on February 28th, there will be a discussion on "Fine Art in Photography."

Talk in the Studio.

ACTION AS TO PHOTOGRAPHIC MOUNTS.—Messrs. A. and G. Taylor write as follows :—"Victoria Works, Forest Hill, S.E. January 30th, 1889. Sir,—Our attention has just been drawn to the report of our case in your issue of January 25th. We cannot congratulate you on your reporter's accuracy, since you say that judgment was given for the defendants. On the contrary, judgment was given for ourselves, with costs, and in proof of that, we have received this morning £6 4s. 6d. from the City of London Court. Your last paragraph is entirely at variance with the evidence above it, and should read 'The defendants had broken bulk, so he (Mr. Commissioner Kerr) must find for the plaintiffs.' As the case *is* of importance, we trust that you will correct your report.—Truly yours, A. and G. Taylor."

PHOTOGRAPHIC CLUB.—The subject for discussion on Feb. 6th will be "Photographic Lenses, and the work for which they are best suited."

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor in the "Answers to Correspondents" column, should now be sent to Mr. Spiller in accordance with that gentleman's own notice in the column which he controls.

Answers to Correspondents.

W. F. (Fulham).—By the table of solubilities at the end of the YEAR-BOOK you will see that 10 parts of sulphate of iron are soluble in 18 parts of water at common temperature, 59° F., and 10 parts sulphate of copper in 26 parts of water. The latter is permanent, but the saturated iron solution must be kept in a well-corked or stoppered bottle to preserve it from peroxidation by the air. The ferrotype and wet process for glass positives are described at pp. 115, 116, of Captain Abney's "Instruction in Photography."

L. MURONOY.—Large photographs of the kind you mention may be seen at Spooner's, in the Strand; also enquire of the Platinotype Company, 29, Southampton Row, High Holborn.

E. E. (Sevenoaks).—We are inclined to attribute the stains to the use of old cracked dishes in sensitizing the paper, or to dirty clips; or they may be caused by want of care in filtering the bath from the scum which always forms in old solutions. You are not bound to state the cause in returning sheets which bear such indisputable marks of bad workmanship.

Rev. C. G. SMITH.—Gelatine (not starch) is used for mounting silver prints in mechanical contact with glass. Flood the plate with warm dilute gelatine, and slide the wet print over it. Squeegee down whilst held inclined; let the excess of gelatine run off, and dry in a horizontal position. Bates's black varnish is used for the dark margins, or the same thinned with benzole.

H. NOEL.—The gelatino-chloride is by far the best process for lantern slides. The Taupenot or collodio-albumen process is slow, very troublesome to prepare, and the plates would not keep with certainty as long as three or four months. The acetate bath could be used for toning the transparencies, but generally a very weak solution of double chloride of gold and sodium is preferred. M. Dagron's micro-photographs were required to be structureless, and this consideration may have determined his choice of the process; note also the fact of his using a mixed gallic and pyrogallic developer, by which he would get finer and blacker particles requiring no gold for toning.

CONDENSER.—For a method of enlarging with the light of a paraffin lamp, see page 168 of the YEAR-BOOK; or, if you have gas laid on, this illuminant is even better. The gas flame (broad bat's-wing) may be rendered more brilliant by a naphthaliser. There is no need to resort to electric lighting, but an opal glass must be used to help in diffusing the light.

OPAL.—The novel proceeding in the Woodburytype process, of which you may have heard an imperfect account, is not a mode of transfer, but a new clear margin process recently patented by Mr. G. C. Whitfield, a fine example of which is given as the frontispiece of the YEAR-BOOK. For details, see the specification, page 42 of the present volume. The transfer of a Woodbury print would appear to be a matter of very great difficulty, for it is not, like the carbon print, absolutely insoluble.

PAPYRUS.—A method of development with hydroxylamine for gelatino-chloride paper was given only last week in the NEWS. We have not yet tried this formula, but it is given on excellent authority.

DRY-PLATE NOVICE.—For gelatine negatives you cannot do better than coat them first with plain collodion, and then apply a thin varnish of shellac and gum sandarac in spirit, laid on slightly warm to prevent chilling.

CHARLES E. LYON.—Photographs in any one colour are easily produced by a modification of the carbon process, incorporating the pigments with chromated gelatine. The late M. Marion showed a series in many colours—yellow, green, pink, blue, brown, and blacklead—about fifteen years ago at the Photographic Exhibition, reading a paper on the subject at the Society's meeting of May, 1873. The gelatine, in parts rendered insoluble by light, is made to lock up any pigment incorporated with it; the only condition for success is that the colour should not itself be decomposed by the necessary immersion in a bichromate solution. The cyanotype blue prints of Sir John Herschel were instances of photographs in one colour and permanent, for Mrs. Robert Hunt showed one, dated 1852, at our recent exhibition. Uranium prints may be got in a great variety of colours by toning with different metallic solutions.

KEIGHLEY.—Replied by post. We have only to add that by running your eye down the reports of the societies' proceedings you can easily find one in harmony with your own objects, or similarly constituted, and then apply for information as to rules, &c.

S. W. G. (Peckham).—The reddish deposit you complain of in your transparencies is probably due to the sulphate of iron added to the chromo alum bath. Leave this out of your formula, for it is totally unnecessary, and you ought to get over the difficulty. Citric acid and alum is the best clearing solution, and this would even remove the iron stains.

CYCLIST, J. FARMER, and others in our next.

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THE PHOTOGRAPHIC NEWS.

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THE POSITION OF THE EXPOSURE SHUTTER.

It may at first sight be thought strange, after so many years' experience that photographers have had with exposure shutters for the camera, generally called instantaneous shutters, there is yet no universally accepted rule as to the place at which such shutters are best used. The most obviously convenient place to which to affix the appliance is the hood in front of the lens, and this position was almost exclusively adopted for years. More recently other positions—just inside the camera, immediately behind the lens, as close as possible to the plate, and between the lenses of the doublet combination—have all been advocated, sometimes strenuously. Nevertheless, by far the greater number of cameras fitted with instantaneous or exposure shutters will be found to have them in the place originally chosen, just in front of the lens. How is this to be accounted for, if the advantages of the other positions mentioned, or any of them, are so decided as has been often claimed by enthusiastic advocates?

The question is sometimes briefly put thus: What is the best position for the exposure shutter? And then arguments will be brought forward which it is thought conclusively show that some particular position possesses advantages entitling it to be considered as the best. Sometimes, instead of, or in conjunction with, arguments, photographs will be shown that are thought to prove the excellence of a particular place for attaching the shutter. Evidence of the latter kind is seldom worth much when a strict comparison has to be made between two or more modes of working. To show that a good photograph has been taken by one means, does not prove that one equally good might not, under equal conditions of light or chemicals, be taken by other means. It may be found, after all, that there is no simple direct answer possible to such a general question, as what is the best position for the shutter; but that the position in itself has less influence than it is assumed to have, and that the "best" position will depend upon what it is that the shutter is intended to do, and what is the place, mechanically considered, at which its work is most conveniently performed.

In speaking of what it is that the shutter is intended to do, we mean whether or not it is desired to give anything more than a certain, more or less rapid, exposure to the whole of the plate. In some cases it is proposed to give a greater exposure to the foreground of the picture than to the sky, an object that may be accomplished by a shutter working horizontally, and having an opening, if used in front of the lens, wider at the bottom than at the top. Another method of securing the same result is to have a go-and-return shutter, rising and falling, still in front of the lens, so as to leave the lower part of the opening unclosed for a longer time than the upper part. In either of these cases the shutter will of course, if used behind the lens, be placed in the reverse position, the broader part of the opening will be uppermost in the horizontal moving shutter; and the sliding piece will fall to open the lens, and rise to close it, in the vertical go-and-return shutter. With either of these arrangements the farther the shutter is placed from the lens, the more effective will it be in its special work, that of giving greater exposure to one part of the plate than to another; but, on the other hand, the larger must it be. If, for instance, it is set back close to the plate, the opening must be as broad as the plate itself, and ought to be at least as long, unless one part of the plate is allowed to commence its exposure after the work of the light upon another part has finished. For use close to the plate, therefore, a much larger apparatus altogether is necessary than when used close to or between the lenses. This would be so inconvenient, that it is generally advised to use a shutter on the roller principle when it has to be set so far back in the camera. If what we have referred to as selective exposure shutters are used in front of the lens, they must, if their selective action is to come fully into play, be placed a considerable distance in front; and then, again, they must be of large size, the inconvenience of which size and position together must be sufficiently obvious to need no further comment. With regard, then, to shutters of the go-and-return or simple slide order, when arranged for giving different exposures to different portions of the view, their effectiveness in this respect will depend upon the distance at which they can be placed from the lens; but as their bulk must be increased at the same time, a choice must be made as to which of the two considerations is to be deemed the more important, or a compromise made between them.

With regard to another consideration affecting shutters of the same character, the go-and-return, or simple slide opening, whether this opening is in a moving board or in a rolling blind, working at right angles to the axis of the lens, there seems to exist, if we may judge from some of the discussion which took place last week at the London and Provincial Photographic Association, a curious misapprehension as to the effect of position of the shutter in admitting more or less light to the plate. It was argued by some that with a shutter having an opening of a given size, travelling at a given rate of speed, more light reached the plate when the shutter was close to the back of the lens, than when it was set back as close as possible to the plate. This argument derives its plausibility from the fact that when, as was assumed, the opening was as large as the plate, and very much larger than the lens, there is, when close to the plate, only an infinitely short space during which the whole of the plate is exposed to the action of light, whilst when used close to the lens the latter is open altogether for a great portion of the duration of the exposure. The fallacy of the argument arises from overlooking the fact that in

the first supposed case, with the shutter close to the plate, the successive portions of the plate are exposed to the action of the whole of the light coming to them through the lens for just the same period of time, as in the second supposed case the plate is subjected to the action of the whole of the lens, taking the time from the half open to the half closed position. We may allow the excess of time before and after this limit to compensate, which it does, for the loss of light due to the lens not being fully opened during the whole of the period within the limit referred to. That the mere position which a sliding shutter occupies, whether close to the lens or the plate, has no effect upon the amount of exposure received by the film, may be shown in several ways. If we suppose an ideal shutter to be in use, one that opens in an infinitely short space of time, and after remaining open for a specified time closes with the same rapidity as it opened, it is obvious that the whole of the plate will be exposed to the whole of the action of the lens for the specified period, whether the shutter itself be close to the plate, close to or between the lenses, or in any intermediate position. Now let us suppose a shutter of an opposite character, one in which the time from the commencement of the opening to the end of the closing is long in comparison with the effect of the work done. Such an example may be produced by using either a sliding or roller shutter with a very short opening.

Let the shutter move at such a rate that the length of this opening is traversed, say, in the fiftieth of a second. When used close to the plate each portion of the film will be subjected to the influence of the whole of the rays that can reach it from the lens for a space of the fiftieth of a second. If now the shutter is used close to the lens, the rays from each portion of the lens act upon the plate also for the same period of time as in the first case, the fiftieth of a second. When it has thus been shown that in the extreme cases of a shutter with an exceedingly long, and with a very short opening, the exposure is not affected by the position of the shutter, it is scarcely necessary to prove that the same thing will apply to apertures in the shutter of intermediate dimensions.

There are other questions with regard to the position of the shutter which require consideration. When a small opening is used next the plate, the various portions of the picture are exposed not simultaneously, but in succession; and the effect of this may be seen, as was evidenced in one of the photographs exhibited during the discussion to which we have referred, by a greater curvature in the line of a moving body, than existed in a photograph taken with the shutter close to the lens. With such a shutter, used close to the lens, the actual length of time in which movement of any object in the picture has time to show itself by blurring is greater, without the advantage of more light reaching the film. Any such arrangement, however, as the moving of a narrow slit across the path of light is a bad one, and should be avoided as much as possible, the ideal shutter being, as before mentioned, one in which the whole of the lens is exposed for a definite time; and the time during which it is only partially uncovered—*i.e*, during opening and closing—is as short as possible. The difficulty of achieving this result increases with the size of the apparatus; it is, therefore, not desirable to add to that difficulty, especially with cameras of any but the smallest size, by making the shutter as large as it would have to be when placed at a distance from the lens.

DANGERS IN USING COMPRESSED GAS.

A FATAL accident, which occurred last week in Dublin from the bursting of a bottle of compressed gas, shows, at any rate, that those using gases compressed under the enormous tensions now common, should be fully alive to the possibility of dangerous accidents.

It appears that Mr. Thomas Bewley, a partner in a shipbuilding firm in Dublin, was in the act of entering his room while carrying compressed illuminating gas in an iron cylinder two feet long and three inches in diameter, when it burst with such force as to kill him instantly. His left arm was blown off, his chest was lacerated and battered in, and his jaw was blown away. The gas having become ignited by a neighbouring light, the clothes he was wearing were burnt from the body. A gold watch he was wearing cannot be found, and it is believed to be embedded in the body. The room is completely wrecked. Strange to say, that although many people were in the room, no one else was injured.

Now the Brin Oxygen Company—which represents the central point of the compressed oxygen industry—claims safety as a notable feature of their system, even in the face of the enormous pressure of a hundred-and-twenty atmospheres—something considerably over half-a-ton per square inch. They claim immunity from danger; first, on the ground that bursting is insured against by a previous testing of the iron cylinders; and, secondly, on the ground that if a cylinder should burst, it will rip up like leather, causing no dangerous explosion.

As regards the latter, one may very well say that however soft and good the metal of a gas bottle may be, if a torn edge of iron or steel comes forward against any part of the body with an expansive force of half-a-ton on the square inch behind it, any resistance which the human body can offer is as nothing in stopping the course of the torn metal. With respect to the usefulness of the guarantee afforded by the careful previous testing of the bottles, much might be said, as engineers are divided in their opinions as to whether the previous testing of metal vessels intended to withstand pressure is in itself a positive danger or a security. There can, however, be no doubt that in many instances the testing of boilers and similar vessels has been itself a direct cause of bursting, the iron having become weakened during the process. In fact, it may be assumed that in such cases the first movements towards bursting had taken place during testing, but the bursting was postponed by the removal of the pressure, only to recommence during the using of the vessel. All this becomes quite intelligible if one regards the breaking of a piece of iron as a long and slow process, of which the climax only is patent to the superficial observer; the bringing about of the climax often requiring less disruptive strain than that which served to effect the first stages of the rending.

The above considerations seem to indicate that a large margin of safety should be allowed in determining the thickness of iron bottles used for compressed gas; that the outside should be surfaced so as to admit of careful examination previously to and after any testing which may be determined on; also that careful measurement of the cylinders should be made before and after any testing. Moreover, the pressure employed in testing should not be too much in excess of the pressure the vessels are intended to bear when in actual use.

SOME REMARKS ON COLOUR-SENSITIVE PHOTOGRAPHY.

BY H. W. VOGEL.

IN the January 18th issue of this valuable journal I find an answer to correspondents in regard to colour-sensitive (orthochromatic) plates, wherein are mentioned, in a very favourable manner, Obernetter's and my landscapes taken with eoside of silver plates, and exhibited in the last Pall Mall exhibition. The answer says: "These plates were all taken behind a yellow screen." Allow me to rectify that. The opposite is true—the mentioned plates are all taken, with only two exceptions of older date, without a yellow screen. What colour-sensitive plates do in taking distant views, M. Hoffmann has confirmed in his article on taking the highest mountain of the world.

Allow me to mention some other mistakes I find in

English papers upon colour-sensitive (orthochromatic) photography. In the discussion on Capt. Abney's highly interesting paper on "The Measurement of the Sensitiveness of Silver Salts to the Spectrum" (*Photographic Journal*, Dec. 28, 1888, p. 28), I find some remarks from Captain Abney himself, which I venture to rectify. The first concerns the azaline. Mr. Spiller has correctly described that, in the meeting of the Photographic Society of Great Britain, as a mixture of quinoline blue—that is, cyanine—with quinoline red; but Capt. Abney asserted that it is simply a mixture of eosine and cyanine.

As I am the inventor of the azaline, it may be kindly allowed to me to say that Mr. Spiller is in the right. Azaline is a mixture of cyanine and quinoline red, and this mixture sensitizes for green, yellow, and orange of the spectrum, by far better than the mentioned mixture of Captain Abney. This mixture gives a minimum on the D line (Fraunhofer), whilst azaline gives on the same spot a very strong impression.

Captain Abney tells further that he used for his very interesting experiments on colour sensitiveness a colour-table with three colours (vermilion, emerald-green, and ultramarine), and he adds: "I did not use yellow because yellow is only a mixture of red and green, and if you can photograph red and green, you are certain of being able to photograph yellow."

The first sentence is right so far as it is possible to make a yellowish impression on our eyes by mixing green and red rays, but this kind of composed yellow is quite different from the yellow of the sun spectrum, especially in regard to its photographic action; it gives on azaline plates two maxima, one in red, and one in green, no impression at all on the yellow part near the D line (Fraunhofer).

The second sentence is a mistake. Plates prepared with a mixture of eosin and cyanine give, for instance, a good impression from emerald green and vermilion, but a purer one from yellow chromate of lead.

Another fact allow me to point out here. Captain Abney tells that he has used only traces of cyanine or eosine so small that it is useless to make any experiment with regard to the amount of absorption, especially as the mere exposure to light eliminates the dye through bromine being liberated. I agree that, for eosine and cyanine, merely traces are sufficient for sensitizing plates optically, but even these traces have an absorbing power, no matter whether it is possible to observe it by our eyes or not. But another thing: Is it, with quinoline red, the best optical sensitizer after cyanine? Here, is the quantity of dye of very marked influence on the colour sensitiveness? Plates bathed in solutions of quinoline red, 1 in 50,000, are by far less sensitive than plates bathed in solution 4 in 50,000 of the same dye.

Also I have several objections, founded on facts, against the assertion that "the mere exposure (of a dyed plate) to light eliminates the dye through bromine being liberated." I am sure that in several cases the liberated bromine is absorbed not by the dye, but by the gelatine or other bodies present. For in the case of eoside of silver, the bromine is absorbed by the silver itself, and not by the eosine. Further, in the case of quinoline red by the action of bromine, a new body is formed (bromized quinoline red) which also absorbs yellow light and sensitizes plates for it (see my "Practische Spektrumanalyse," second edition p. 365).

Last week I received from England a French pamphlet, written from Mr. Attout Tailfer on his so-called isochromatic plates. It is the same criticised in the last volume of this journal. I would not give attention to this pamphlet, but my friends in England point out to me the fact that my name is mentioned in it in a depreciatory manner. Mr. Attout Tailfer declares at first my "theory" of colour-sensitiveness as wrong. I answer only that I have no need to dispute over the correctness of a theory with manufacturers or stockdealers, especially if this theory is acknowledged by scientific men, like Becquerel in Paris, Helmholtz in Berlin, Eder in Vienna, and even by Captain Abney in London, in regard to the connection between absorption and chemical action. But another fact is, that Mr. Attout Tailfer tries to depreciate my character. He gives some lines of a private letter I may have written in 1885 to a Parisian gentleman, and would prove by this, that I had the intention to introduce eosin plates in competition with his own. I declare this a calumny. I have written to Paris for introducing my azaline plates, invented by me 1884, and that invention does not interfere in the least with the invention of eosin plates. It is not the first assertion of this kind I read from Mr. Attout Tailfer. In the *Moniteur de la Photographie* he pretended to be the first inventor of isochromatic plates, and called me an imitator of a "French" process. I think it is well known that I prepared the first isochromatic plates in 1873.

LAW FOR PHOTOGRAPHERS.

BY S. J. DEBENHAM, SOLICITOR.

CHAPTER XII.—COPYRIGHT—RIGHT TO THE NEGATIVE.

A VERY important question to the photographer is the exclusive right to production of works of photographic art—in other words, to copyright. Before the year 1862 there was no copyright in a photograph or even in a painting or drawing. The Act 25 and 26 Vic., cap. 68, is entitled "An Act for amending the law relating to copyright in works of the fine arts, and for repressing the commission of fraud in the production and sale of such works. The preamble to this Act is, "Whereas by law as now established, the authors of paintings, drawings, and photographs have no copyright in such their works, it is expedient that the laws should in that respect be amended." This Act was partly the outcome of a petition presented at the House of Lords in 1858 (so long was the measure delayed) by the Society of Arts, by the Royal Institute of British Architects, and a number of producers of works of art (including photographers) for the amendment and extension of the law of copyright.

The first section of the Act deals with the right, and the person entitled to exercise it, in the following words:—"The author, being a British subject, or resident within the dominions of the Crown, of every original painting, drawing, and photograph which shall be or shall have been made in the British dominons or elsewhere, and which shall not have been sold or disposed of before the commencement of this Act, and his assigns, shall have the sole and exclusive right of copying, engraving, reproducing, and multiplying such painting or drawing and the design thereof, or such photograph and the negative thereof, by any means and of any size, for the term of the natural life of such author, and seven years after his death, provided that when any painting or drawing, or the negative of any photograph, shall for the first time after the passing of the Act be sold or disposed of, or shall be made or executed for or on behalf of any other person for a good and valuable consideration, the person so selling or disposing of or making or executing the same shall not retain the copyright thereof, unless it be expressly reserved to him by agreement in writing, signed at or before the time of such sale or disposition by the vendor or assignee of such painting or drawing, or of such negative of a photograph, or by the person for or on whose behalf the same shall have been made or executed, but the copyright shall belong to the vendor or assignee of such painting or drawing, or of such negative of a photograph, or to the person for or on whose behalf the same shall have been made or executed; nor shall the vendor or assignee thereof be entitled to any such copyright, unless at or before the time of such sale or disposition an agreement in writing, signed by the person so disposing of the same or by his agent duly authorised, shall have been

made to that effect." S. 4 of the Act directs registration at Stationers' Hall, and enacts that until such registration no person shall be entitled to the benefit of the Act.

The penalty for infringement (s. 6) is a sum not exceeding ten pounds, and may be recovered by action at law or summary proceeding before "two justices." An injunction in such action may be granted, and an account may be ordered. An infringement is committed by any person not being the proprietor of the copyright who shall "repeat, colourably imitate, or otherwise multiply for sale, hire, exhibition, or distribution (or cause this to be done), any such work (painting, drawing, or photograph)."

There can be no copyright in an indecent or libellous painting, drawing, or photograph. By the way, it is worth while to digress a little here, and explain that the production of indecent photographs is prohibited by Act of Parliament, 20 and 21 Vic., c. 83, and earlier statutes. Occasionally we hear of a prosecution. If the photographer desires to retain the copyright of a negative to himself he must obtain the written consent of the sitter, unless gratuitous.

In 1883 a question arose as to the meaning of the word "author" in section 1 of the Act. The London Stereoscopic Company—consisting of Messrs. Nottage and Kennard—employed certain managers at their two establishments to take photographs, but neither of the partners himself did so. One of the managers, thinking that a photograph of the Australian cricketers would sell well, arranged for a photograph to be taken without payment, and sent one of the operators to the Oval to take the negative. From this negative the photograph was in the usual way produced and sold by the firm in the ordinary course of business, and Nottage and Kennard registered themselves under the Act as the proprietors and authors of the photograph. One Jackson having copied it and sold prints, Nottage and Kennard brought an action to restrain the piracy of their copyright in the photograph. It was held that the person who took the negative was the author, and not his employers, and judgment was given for defendant on the ground that the plaintiffs (not being the author) could not register. This was decided by Justice Field, and the plaintiffs appealed. It was argued for the plaintiffs that the author of a photograph is the person who conceives the idea and sends his materials, &c., over to take it, the ultimate result being the effect of the manipulation of many hands. Further, that copyright was in the photograph, not in the negative.

Lord Justice Brett, in giving judgment on the appeal, said: "It is clear that they" (the persons registering) "are bound to state in the registration who are the authors. The question is more than what shall be the name of the person in the register or certificate; because the copyright, whoever be the proprietor of it, is to continue for the life of the author, and therefore, if you put in the wrong person as the author, you put in the wrong life, and you may make the duration different from what it should be." . . . But now we have the "author" of a photograph. I should like to know whether the person who drew this Act of Parliament was clear in his mind as to who can be the author of a photograph. We understand that all the leading photographers have come to the conclusion that they are the authors of the photographs they sell—that is, the people who pay the servants—that they are the only persons who are interested in the photograph at the time it is done; they think they are the authors of the photograph because the photograph is made and formed by the work of their mere servants. I cannot tell whether the person who drew this Act had that idea in his mind or not. . . . Can two people be the authors of photographs? It is difficult to say, but if they are, for whose life is it to last—for the life of one of them, or for the life of the longest liver, or for what? They are the owners of everything about their place of business—the machinery, and everything else; but they may live in Scotland, and their photographic shop may be in London. They may go to the shop once a week . . . . The man who went to the Oval was the man who took the photograph. What had he to do? He had to arrange the group, to put them in the right position and the right focus. But he does not do it all, because there is another man who gets the plate ready, and there is another who, when the thing is ready, takes the cap off. It is difficult to say who is the author of the photograph. Neither of them make the picture, because, after all, that is done by the sun. . . . . After some difficulty I have come to the conclusion that the judgment of the learned judge in the Court below was right, and must be affirmed, the result being that if this had been properly registered it would not have been for the life of the people to whom alone the thing belonged, but by reason of the phraseology of this Act of Parliament it would have been for the life of the person whose life probably it was never intended to make the measure of this right. All that the great photographers of London can do seems to be either to superintend the work themselves, or when they choose their artist to do it, to consider not only his skill, but his state of health."

The copyright in this case did not exist at all!

Lord Justice Bowen said: "Let us suppose that instead of being an expedition to the Oval to take the Cricket Team, it had been an expedition to photograph some phenomenon which might occur in the transit of Venus. Could the British Government, supposing they sent out people on board ship to take the photograph of the transit of Venus, in any sense be considered the authors of the photograph? The only difference between that kind of question and the question we have to decide in the present case is one of degree. There is not a much greater interval or distinction as regards genius between the author of a picture and the author of a signboard, than there is between a photographer who takes a picture of the transit of Venus and a photographer who takes a portrait of a man or a horse. The true definition of "author" for the purposes of this Act was . . . . the man who is most nearly the effective cause of the representation when completed."

No observation was made upon the statement by the appellant's counsel, that if a customer orders a photograph of himself to be taken and pays for it, he is the author of the photograph. Whether this be so or not, he is the proprietor of the copyright. And the result of forgetting this is illustrated very forcibly in a case reported in the PHOTOGRAPHIC NEWS of 28th December last, Pollard *v.* the Photographic Company. The contention raised by the defendant would not have been so surprising had it been really a company which "has neither a body to be kicked nor a soul to be saved," but the case of a private individual contesting this matter to the point of argument in Court on behalf of this supposed right is a singular instance of hardihood. If it be, as stated by the defendant, a usual practice of photographers to sell promiscuously portraits of their customers or sitters, and should any reader have been in the habit of doing so, I advise such to cease at once the practice, as there are plenty of people whose sensitiveness may actuate them to commence proceedings of this nature, and an equal abundance of solicitors ready to undertake a case of the kind. Should, however, any proceedings be taken, the best way will be at once to settle the action, and if the proper steps are taken to do this, no great expense need be incurred. The defendant in a case of this nature incurs heavy expenses by going to trial, as well as perhaps damaging his business by the publication of the report. In fact, the mistake of contesting the matter was perhaps (if a blunder is worse than a crime) worse than the act itself that is complained of. There are persons who would consider themselves complimented by such a proceeding rather than otherwise, but the only safe course is obviously to obtain the consent of the sitter.

However, the defendant, as surmised by the Judge,

considered that the plaintiff not having registered as required by the Copyright Act, could not maintain the action. This, however, was decided by Mr. Justice North to be unnecessary; and he held the plaintiff's remedy is clear, irrespective of the copyright. In fact, it would appear that the Act does little if anything to alter the position, except to create a summary remedy by application to a magistrate.

One remark of Mr. Justice North may not be understood without comment. He said, "The case (Tuck *v.* Priester, cited) is the more noticeable, as the contract was in writing, yet it was held to be an implied condition that the defendant would not make any more copies for himself." The meaning of this is that when a contract is in writing, it is most unusual to import any terms between the parties not comprised in the writing, the writing being held to exclude evidence of any agreement not comprised in it.

It will be noticed that Mr. Justice North held that the effect of the 4th section as to registration is to prevent sitters, if unregistered, from exercising any remedy against the public in general. His words are, "The protection against the world in general conferred by this Act cannot be enforced until after registration." No more need be said on this case, but the judgment was so elaborate, and so fully reported, that it should be carefully studied.

The copyright may be infringed if any part of the registered picture be improperly made use of. The day after the above case was decided an injunction was granted against making use of part of the plaintiff's picture by converting it, or part of it, into an illustration of a lady displaying a dress-holder. In this case the London Stereoscopic Company took a portrait of the Princess of Wales, which was registered, and the defendant utilised the head of this for the purpose of his advertisement; but, inasmuch as the defendant had made a proper offer at once, the plaintiffs had to pay the costs caused by the continuation of the action.

Who is the owner of the negative? I am unable to see on what ground the judge in the recent case, Barns *v.* Marson (reported Photographic News, November 23rd) decided that the customer is entitled to it. It is, no doubt, dangerous for the photographer to print from it for his own benefit, but it appears to me this does not give the sitter a claim to recover possession of the piece of glass which was bought by the photographer for his business, any more than the camera or the lens. These are all, as well as the glass, necessary to the production of the picture, and without them it could not be made; and the glass is merely an incident of the operation, and does not, in my opinion, become the property of a customer because his image is upon it. As to Barns *v.* Marson, the report in the Photographic News does not state that the Judge decided against the plaintiff, though this is to be inferred. If he did so, and gave a verdict for the defendant, it is difficult to see how the judgment could be supported, especially as the Judge stated the defendant should have paid the £3 into Court. It is a pity the plaintiff did not ask for leave to appeal, so that the case might have been carried to the Queen's Bench Division.

In the case above noticed, Pollard *v.* Photographic Company, the Judge admitted that the negative belonged to the photographer. He says: "It may be said that in the present case the property in the glass negative is the defendant's."

Let us consider how the customer could assert his right to the negative. The process for recovering property detained by another is to bring an action for it, formerly called an action of detinue. If within the Metropolitan Police District, and under the value of £15, the owner of the article may have a summons for it before a police magistrate. In either of these cases strict proof of ownership in the claimant is required.

WHICH IS THE BEST POSITION FOR A SHUTTER, BEHIND THE LENS, OR IN FRONT OF THE PLATE?

BY P. EVERITT.*

This question, which has been submitted to us for solution, and elicited some difference of opinion, has induced me to jot down the following remarks as a small contribution to the debate. I do not claim any originality, for most of the ideas have been frequently expressed before. My aim is to bring the question clearly before you, to draw attention to some points which have been overlooked, and if possible to reply to the enquiry.

It is, I think, understood, that the class of shutter is of the curtain pattern. I believe it will be conceded on all sides that such a shutter, if placed in front of the plate, will allow the full power of the lens to work on each portion of the plate as it is being exposed. It will also be conceded that such a shutter placed behind the lens will cut off a portion of the light during the opening and closing of the lens.

These two facts seem to have disposed of the question in some minds, and the conclusion has been arrived at, that a shutter placed in front of the plate must be the better. Such an opinion I do not share, although I am willing to admit that in the case of very brief exposures under special conditions, a shutter placed in front of the plate would give the best result.

In the manufacture and use of a shutter there are other circumstances to be considered besides the one of illumination, and were we to disregard them we might, perhaps, find after all that the shutter did not give us the results we expected of it, and that our choice had fallen on the wrong kind.

The motor, the material of which the curtain is made, the size of lens, and the size of plate are all of them important factors, and besides these there are the questions of distortion and blur which are deserving of consideration.

We will assume for argument sake that we have a shutter in front of the plate, that the opening in the curtain is four inches, and that the length of the plate to be traversed is four inches also. You will require four inches of curtain to protect the plate before exposure, and four inches to cover it after. The minimum length of curtain must therefore be twelve inches, and the length to be unwound to effect exposure at least eight inches. If the shutter is worked at the speed of $\frac{1}{100}$ second per inch, the plate will receive an exposure of $\frac{1}{25}$ second. We will suppose the lens used is a six-inch rapid symmetrical. This has a diameter of one inch. If we placed the shutter behind the lens, and fixed the length of curtain to be unwound at eight inches, the same as in the former case, we can use an aperture of seven inches in the curtain. The speed being fixed at $\frac{1}{100}$ second as before, the exposure would last $\frac{7}{100}$ second. But in this case the illumination is not equal throughout, consequent upon the opening and closing of the lens. For this we must deduct one diameter of the lens which leaves us with six units of exposure as against four units in front of the plate, or an increase of 50 per cent. But the exposure lasted $\frac{7}{100}$ second, as against $\frac{4}{100}$ second, which is an increase of 75 per cent. in time. If we reduce the exposure to four units in both cases, we can do so by shortening the aperture in the curtain behind the lens by two inches. The result then will be, that we obtain the same effect of light upon the plate by an exposure of $\frac{1}{25}$ second with a shutter in front of the plate, as against $\frac{1}{20}$ second if the shutter is used behind the lens.

Again our opponents will say, this being the case, why do you not admit the former position is the better?

We have assumed equal conditions throughout, but I ask, can they be maintained? Suppose the spring we use is worked at its highest tension, and the curtain will bear no more strain, we shall then have attained our highest speed with the shutter in front of the plate. But with the shutter placed behind the lens we have less curtain to unwind, and we can increase its breadth considerably. In other words, we have less to move, consequently more speed; and greater strength of curtain, owing to more breadth, therefore more latitude for increase of tension.

In respect of length of curtain we have room for a gain of more than 30 per cent.; and in respect of strength, measured by the breadth of curtain at the weakest part, probably room for gain of 400 per cent. at least. I arrive at these figures by assuming the curtains are eight inches and six inches long for what is unwound, and three and a-half inches and one and a-half inches for breadth respectively.

* Read before the London and Provincial Photographic Association.

I shall probably be met by the answer that we can reduce the slit in the curtain before the plate to very narrow limits. This brings us to the question of distortion as against blur. It we have a curtain passing across the plate and the slit is narrow, objects will be shortened or lengthened, curved or partially shut out, according to rate of movement in object or shutter in the same or opposite directions. On the other hand, if we place the shutter behind the lens, the exposure, assuming it to be longer, will produce a small amount of blur. I say small amount because we are enabled to strengthen our springs so considerably, if my assumptions are correct, that the fractional difference in time must be very small, comparing the two positions of shutter. Now of these two drawbacks I certainly prefer a slight blur to distortion. Some would say, pictorially, it is an advantage, as imparting an idea of motion, and I do not think they are wrong. I am not certain as to the speed that can be attained with shutters of the curtain pattern affixed to the lens, but I believe I shall be within the mark if I state that exposures of $\frac{1}{100}$th of a second can be given with a lens one inch in diameter. This would meet almost any requirements.

Thus far I have taken the ordinary conditions of a detective camera; and, assuming the conditions correctly stated, I should reply to the question asked, that a shutter placed behind the lens would be preferable. The diameter of lens as compared with length of plate, being determining conditions in the problem were a portrait lens used, the result would be different. I have not had time to work out the question, but I think the shutter in front of the plate would then be best. If, however, we go to larger sizes of plates and lenses of the rapid symmetrical type, there will be an increase of advantage in using the shutter behind the lens, for I find lenses are smaller in diameter in proportion to the plates for which they are used, as we ascend in the scale of size. We must also bear in mind the factors of weight and bulk. A camera would have to be made larger if the shutter were placed in front of the plate, and cameras increase in weight according to the square and not the length of the plate.

Thus I am again brought back to the answer I have already given, which is, that the back of the lens affords the better position for a shutter as compared with the front of the plate.

SOME DEFECTS IN PHOTOGRAPHS CARICATURED.

BY ELLERSLIE WALLACE.*

OF the varied means that have been employed to correct failings, errors, and weaknesses, there has perhaps been none more effective than caricature, or what the ancients might have called the *ridendo castigare mores*. The student of history, if his tastes are not too solid to prevent him, will, upon reading the history of caricature or of the grotesque as it appears in art, often see at a glance how the keen cautery of wit in word or in picture has, in many cases, done more to remove nuisances, and more to render what is bad detestable in the eyes of humanity, than the uttermost endeavours of able and talented men made in a serious manner.

We can easily understand that there are many who would never consent to regard caricatures as anything else than mere idle stuff, fit for nothing but to raise a momentary laugh, and then to be cast aside. Too many, we regret to say, are indeed worthy only of being cast aside, and not even of having an honest laugh wasted upon them. Some also seem to substitute a painful amount of scurrility, unseemliness, and lack of charity for the lively and good-natured wit which constitutes the main feature of a good caricature. Political caricatures of all classes and times of which we have reliable historical record are alike in possessing these disagreeable qualities.

In calling our readers' attention to our illustrations, which, of course, speak for themselves, let us remind them that in the September and October issues of the *American Journal of Photography* we entered at some length into the subject of "Perspective in Photography and the Use of Wide Angle Lenses." We quoted cases that had unavoidably occurred in the practice of experienced operators of our acquaintance, where hideous distortions in portraiture, landscape, and architecture had been caused by the use of wide-angle lenses. Sometimes the same effect had been brought about by there being too little space for the camera, or in other words, the lens had had to be set too close to the subject, and could not be retired to the proper distance. We also gave a list of the best distances to be kept between the lens and the sitter in the portrait gallery, and spoke of the customs observed by painters in the matter. In fact, a considerable part of what we tried to impress upon our readers in the two papers on perspective, was simply to keep the camera well back from the subject, and then to use a lens of long enough focus to give an image of the desired size.

We need hardly say that before committing ourselves to write upon an important matter like this, we reviewed all the photographs we could lay our hands upon at the time, besides a much larger stock stored away in our recollection, and out of this



mass of matter we had no difficulty whatever in finding plenty of examples of the faults alluded to. But shortly after the publication of our articles, we found in the *Fliegende Blätter*, a well-known German comic weekly, some caricatures on the very faults we had been speaking about, which seemed to us so much



to the point, that we have had them reproduced, and give them to our readers to show them that these faults which have been noticed by our photographic journals over and over again, are yet so often seen and are so ridiculously false and bad, that standard papers outside of photographic circles, such as the *Fliegende Blätter*, have deemed them fit subjects for caricature and ridicule.

Even the makers of apparatus are waking up to the necessity of putting persons on their guard when they first take up the

* *From the American Journal of Photography.*

camera, especially if it is one mounted with a wide-angle lens. The manuals accompanying some of our popular detective cameras now have illustrated pages containing faithful transcripts of the enormities which are daily seen as the work of these clever instruments, and prove that if one tries to photograph a high church steeple from immediately across the way by pointing the camera up to include the top, he will obtain a picture rather more resembling one of the pyramids of Egypt than a Christian place of worship ; or that if one photographs one's pet dog too close on, the resulting picture will resemble the long-drawn-out and extraordinary increase of distances spoken of by those who have taken large doses of Cannabis Indica or Hashisch.

That these caricatures in the *Fliegende Blätter*, which have been made in no unkindly spirit, have already worked for good in Germany we have no doubt. We give them to our readers as a pleasant means of clinching the nails we have been driving as regards the paramount importance of proper selection of the point of view, and the lenses with which to make the picture.

HELIOCHROMY.

BY F. E. IVES.

MR. C. H. BOTHAMLEY, in the PHOTOGRAPHIC NEWS, Jan. 11, says : "Recently, Ives has described a process of heliochromy, of which he says, 'I claimed for this process that, unlike any similar process yet suggested, it was based upon a true conception of the nature of light and colour vision, and was a strictly scientific method of accomplishing the object sought after.' Now, as a matter of fact, a strictly scientific process of the same character was described by Dr. Vogel in 1885 ; moreover, Dr. Vogel's process does not differ very greatly from the later process of Ives."

By this time I am well used to having my original inventions and discoveries claimed for others, but I am surprised that so intelligent a gentleman as Mr. Bothamley should have failed to see at once that there is a very, very great difference between Dr. Vogel's process and my own. It is even somewhat amusing to note that while some are professing not to be able to see any essential difference between my principle and that of Hauron, others may be equally unable to see the difference between it and one that calls for the production of more than twice as many negatives, and in no way even remotely suggests my plan of representing most of the primary spectrum colours by colour mixtures. I am sure a comparison of the three methods must make it evident to any unprejudiced person that each one is vitally different from either of the others.

Hauron's principle, as nearly as I have been able to get at it, was simply that of making sets of heliochromic negatives by exposing sensitive plates through "orange, green, and violet glasses," and from these negatives prints in blue, red, and yellow pigments superimposed on a white surface. Although no approved theory of the nature of light and colour vision warrants such an assumption, Hauron assumed that this method should produce pictures correctly reproducing the light and shade and colours of the object photographed.

Dr. Vogel's principle is stated by Mr. Bothamley in the PHOTOGRAPHIC NEWS, September 9, 1887, as follows:— "Vogel proposes to make a much larger number of images, and to use sensitisers corresponding with every region of the spectrum—for example, napthol blue for red, cyanine for orange, eosine for yellow, safranine for green, and fluorescein for bluish-green, the ordinary sensitiveness of the plate being sufficient for blue and violet. In taking the negatives, the intensity of the blue and violet must be reduced by means of a yellow screen. The fragmentary images thus obtained are transferred to stones, and each is printed in a colour complementary to that part of the spectrum to which the particular plate was sensitive. This complementary colour is found, however, in the dye which is used to sensitise the plate." Mr. Bothamley adds: "It is obvious that the greater the number of spectrum regions represented by separate images in this way, the more accurate will be the reproduction of the different shades and variations of colour." In short, Dr. Vogel's principle really calls for a different negative and print for each primary spectrum colour, of which there may be said to be either seven or a thousand, although even at the least estimate—which is quite unscientific—the number is already so great as to make the process absolutely unworkable wherever it is necessary to expose all the plates simultaneously, as in landscape photography. It is also certain that no known colour-sensitisers will sensitise bromide of silver for such narrow bands of the spectrum exclusively. The process is not scientific, because it is impossible.

My own method is perfectly distinct from Hauron's, because I do not expose sensitive plates through "orange, green, and violet glasses ;" and from Vogel's, because I do not make separate negatives for each region of the spectrum, but only three, and in such manner as to secure curves of intensity which correspond to the action of the light rays upon the sets of nerve fibrils which produce colour-sensation. This, in fact, is my principle, which is undoubtedly new and true, and is carried out by exposing colour-sensitive plates through compound colour-screens, which have been adjusted by experiment in photographing the spectrum itself, until they yield negatives having curves of intensity like the curves of a diagram correctly representing the action of the spectrum upon the sets of nerve fibrils in the eye. A knowledge of the true nature of light and colour vision makes it evident that there is no theoretical requirement for more than three negatives, with which to accurately reproduce the colour effect of every part of the spectrum, and of every natural colour, provided that those negatives are made according to this principle.

Already I have secured by this process results so wonderful that a well known scientific gentleman expressed his belief that if they had been shown in Europe instead of America, they would have created such a sensation that the whole world would have heard of it. There is more to follow.

Reviews.

THE AMATEUR PHOTOGRAPHERS' READY-RECKONER, being Exposure Tables. By Viæ. Price 1s. 9d. (*Kendal*, 1889 : *T. Manson*, 37, *Highgate.*)

HERE we have twenty-one pages of closely tabulated numbers—many of them fractional—together with some pages of directions for use ; the whole forming a pocket-book of rather large dimensions. Here is the example given of how to use the tables, it being assumed that the photographer knows the rapidity of his plates, and the ratio of his stop aperture to the focus of the lens. "Suppose it is 3 o'clock on an August afternoon, the scene an open landscape with strong foreground in shape of a cottage, the light diffused (that is, bright light with the sun behind a cloud), the stop F 20 ; we turn to a page calculated for that stop (page 25), and looking in the column marked April and August, under 3 p.m., and following it down until we come to the division for open landscape with strong foreground, opposite the second line marked diffused light we find $\frac{4}{5}$ seconds, which will be the correct exposure."

The book before us is, in fact, a highly complex exposure calendar, and, considering that the author gives exposure times for "copying full-size," without any intimation that there may possibly be some difference in the time required for a subject consisting of black lines on a white ground, and a dim old oil painting, he hardly acts consistently in hesitating to lay down a definite rule as to interiors. He says :—"No calculations will be found for interiors, as the light varies so much in each particular case that tables would be of little practical use, and expe-

rience or enquiry must decide the correct exposure; but about 25 minutes with F 40 stop will be found about correct for an average church with a rapid plate."

To make guesses at numerous variables, then to refer to the tables, take out a number to make a correction for the plates, and a complex interpolation if your stop does not happen to correspond to one of few intensities given, may perhaps prove more useful as a sort of laboratory or school exercise than as an everyday proceediug in the field.

The exposures given range from $\frac{1}{750}$th of a second to 437 seconds, but we find no hiuts as to the measuring of the times.

Notes.

The arrangements for the Midland Counties Photographic Exhibition, which is to be open from February 25th to March 2nd, are, we are informed, progressing satisfactorily, and exhibits will be received up to, and including, the 22nd instant. This is said to be the first open, competitive, and public exhibitiou held in the Birmingham district, and is attracting some attention from prominent townspeople. Over forty medals and numerous certificates are offered, and among the classes we note one for photographs of machinery. The secretary is Mr. Walter D. Welford, Fine Art Galleries, 26, Corporation Street, Birmingham.

In thesc days of keen competition and rivalry, the military authorities find an ever-increasing difficulty in procuring each year the requisite numbers of recruits. Recruiting is now carried on, indeed, like many other trades, by means of puffing and advertising; and few of our readers, probably, are aware how elaborate the system is which recruiting sergeants now follow. Not only are alluring advertisements put in the provincial papers, and attractive coloured posters displayed on the walls in likely neighbourhoods in order to draw recruits, but a series of handbills have been prepared– and with much cleverness, too—showing the advantages of the life "Tommy Atkins" can look forward to, and these "silent messengers" are distributed like tracts.

And now we hear of a yet further development of the advertising system; for it would seem that the War Office authorities are now preparing in large quantities a scries of coloured photographs of soldiers in the principal foot and cavalry regiments, in which the most handsome and effective uniforms worn in our army are brilliantly depicted. On the back of each *carte* is to be printed a list of the special advantages appertaining to service in the regiment, of which a typical representation is photographed on the other side, together with a brief summary of the most gallant exploits in the regiment's annals.

Similar photographs advertising the Royal Artillery, the Royal Engineers, and the Army Hospital Corps are to be issued, it is said, and there can be little doubt that the lavish usc of these photographic puffs will tend to induce recruits to come forward. For it is an undoubted fact, pooh-pooh it as we may, that very many men are led to enlist with the object of wearing a fine uniform A carefully-coloured photograph of the kind described cannot but appeal to such men as these, and the fact that they are to be issued, clearly shows that the Horse Guards people are beginning to understand human nature much more thoroughly than they used to five and twenty years or even fifteen years ago.

Mr. C. H. Talbot, son of Fox Talbot, attends the meetings of the Bath Photographic Society, and takes interest in the proceedings.

Scene.—*Photographer's Studio. A sitter discovered ready posed and trussed for the operation awaiting him. To him enter the photographer with the dry plate, &c.*

Photographer. (*briskly*) Now, sir, pray look a little less glum. Come, now, if you please! Suppose you fix your thoughts on something pleasant. Ah, I have it! Think of your charming wife for a moment.

The Sitter (*gruffly*). You evidently do not know, sir, that I was divorced last week?

Photographer. No, I was not aware of the fact. Still, the affair is easily arranged, and I will ask you under the circumstances to think of somebody else's charming wife. Now, if you please!

(*Left smiling. Quick shutter.*)

We hope it is scarcely necessary for us to add that it was in a Parisian photographer's studio that the above incident happened.

The German Amateur Photographic Society intend to celebrate the fiftieth anniversary of photography by a photographic exhibition, which will show to the public applications of photography to science, art, industry, and life. English photographers are invited to contribute. The exhibition will be opened in the middle of September at Berlin. Notices of intended exhibits should be sent to Dr. Vogel, 124, Kurfursten Strasse, Berlin.

A correspondent writes: "As you have given much valuable legal information of interest to photographers, I should be glad to be satisfied on a point, which, in view of the bad business prospects at this season of the year, is of some importance. I read that in France a creditor has the right to follow the artist into picture exhibitions, and seize his canvases while hanging on the wall. Now what I want to know is, does a similar right exist here?" We fancy our correspondent must be joking, as we cannot believe any photographer would ever be reduced to such sore straits as this would imply. The point is one which few creditors would care to test, so that exhibitors may make themselves perfectly easy.

Commenting some time ago on an essay by Mr. F. Madox Brown on "Historic Art," the *Globe* complained that while there was no lack of portraits of historical personages more or less celebrated, no artist ever thought of painting pictures illustrative of every-day history. "Parliament," said our contemporary, "will authorise the

erection of a statue to a great soldier philanthropist, but it does not commission a painter to illustrate some present-day event for the public good. Some day Englishmen will regret that so little of what is best in their history has been transferred by them to canvas for the edification of generations yet unborn." This is all very well, but as Parliament is never likely to do anything of the kind, perhaps the next best thing would be to have a staff of Government photographers. Of course photography would not be applicable to indoor scenes, though one cannot say what are the possibilities of the flash light; but at all outdoor functions the services of the State photographers would be called into requisition.

At the present moment these are solely dependant for immortality upon any photographer who has sufficient enterprise and energy to go through the annoyances and face the obstacles which beset him at every town. Some excellent photographs, for instance, were produced of the Royal procession to Westminster Abbey on the Jubilee day, but only the photographers knew the infinite trouble the work entailed. The difficulty on such occasions of obtaining a suitable "pitch"—to use the word of the itinerant showman—is enormous, and an infinite amount of ingenuity, of tact, and of good temper has to be exercised to enable the photographer to accomplish his object. There is something anomalous in all this. The photographer does not do his work for amusement, nor does he desire to be an interloper, while the result of his efforts gives pleasure to thousands. If historical events are worth perpetuating, photographers, so far as their work can perpetuate those events, ought to have special attention.

An interesting photographic lawsuit, according to a German paper, is about to be heard at Breslau. Two brothers had their photographs taken by an artist of a neighbouring town, but when the pictures were sent home they were rejected because they were considered unlike. The photographer commenced an action to recover the money, the usual experts put in an appearance, and, in the end, the judge non-suited the plaintiff on the ground that the photographs were not like the originals. The photographer thereupon conceived a plan of revenge by hanging the photographs in his show case and representing them as the portraits of a couple of highway thieves. Naturally, the pictures caused a great sensation; any number of copies were sold, and at last the police, instigated by the individuals who had been thus pilloried, came upon the scene and removed the offending photographs. The artist, however, resisted their action, contending that he was justified in his action by the sentence of the court, which declared the photographs did not represent the features of the persons who sat for them. Hence the proceedings at the High Court at Breslau, which promise to be so instructive.

FIGURE IN LANDSCAPE AND GENRE.

BY GRAHAM BALFOUR.*

THE employment of models in photography is, perhaps, verbally a more exact title for the remarks which I propose to make to-night, but that seems somehow to have a more utilitarian, at once a more mechanical and more practical, ring than can belong to any hints of mine, and therefore I have asked you to listen to a few suggestions on the use of figures in landscape and genre.

This limitation will, at any rate, serve to show that I refer only to those photographs which are taken as pictures for their own sake. I do not deal with illustration of places or people, nor with scientific work, but solely with original photographs taken for the intrinsic beauty or interest of the subject, as visibly expressed or actually suggested in the print, and carried to the utmost perfection possible to the means employed.

I assume that the pictures are satisfactory in composition and tone, that they are correctly exposed, happily developed, and suitably printed, for none of these points am I now going to discuss.

In landscape the necessity for figures is a vexed question, and one with which I at first intended to begin this paper. But it is too wide and important a subject to touch merely as a side issue, and I will here simply state my own opinion that, with two or three obvious exceptions, landscape without the figure of man or beast is a mistake, and that the result of such an omission is want of purpose and of interest.

Genre painting, at any rate, always includes figures, except in those pictures of still life, drawn mostly from the dinner-table and the larder, which are so uninteresting in colours, and in photography fortunately are seldom seen. The exact content of genre is defined by Littré as painting other than historical or landscape, and certainly those are the three classes of the old division of the art. But portraits I would now place in a class by themselves, or, at any rate, exclude from the following remarks, and with the still-life portion of genre I have evidently no concern.

Thus for genre, as the domain of character and incident, I presuppose figures, but the border-line between it and landscape with figures is notoriously hard to draw. Probably no scientific frontier is possible: roughly, the division is made by the size of the figures and the expression of the face accordingly as it is visible or otherwise. I attempted a classification on the basis of visible expression, but it would not hold, and fortunately an exact definition is here unnecessary. The same rules apply in each case: on the size of the figure chiefly depend the uses to which we put it, the purposes for which we employ it. The smallest figures are generally introduced as a spot in composition, or to save the picture from being entirely inhuman and desolate. Slightly larger figures which are still too small to exhibit the expression of the faces, yet tell their story by gesture or attitude. Most of the rules relating to facial expression apply equally to gesture, and therefore I pass on, merely noticing that the smaller the figures are, the less effect do they produce, but, at the same time, the easier are they and less intractable; for when the face is not seen the figure is much simpler to pose, and even if the attitude is slightly strained or self-conscious this fault is less conspicuous, and any shortcomings of costume or model are less glaring. Thence we pass into the debateable land where the figures are of exactly equal importance with their surroundings, and the boundary question is mostly settled by prejudice. Beyond this comes the region where figures are all in all, and the landscape dwindles away into nonentity. I believe that the whole of this continent is under the same laws, but that the different rules differ in importance in various provinces. To drop metaphor, it is manifest that the larger and more distinct the face is, the greater is the care required in dealing with it.

Most of the general rules of art which can be laid down for the guidance of photographers can be discovered by common sense, and most of the crimes committed in the name of photography are due rather to want of reflection than to deliberate depravity. Many photographers, especially the scientific workers, have a horror of art-rules, which they consider altogether unnecessary and arbitrary. It is a fact that once a truth has been decanted into a certain form of words, it has necessarily ceased to be the whole truth, for there is always some leakage and some change in the process. All formulated maxims are very condensed records of experience, and are of little other use than to serve as hints and suggestions, mostly on the prohibitive side. Law-making is the first conscious stage of any art, but unless the set forms are sooner or later altered, modified, adapted, and at times broken, that art is incapable of any further progress. Nevertheless, in the deadest formula always there has once been a germ of life, and to preserve this and render it once again useful is the best service any critic could perform. But my point is, that most of the rules of art were not in the beginning mere pedantry and charlatanism, but fresh, vital, and pregnant discoveries.

* Read before the Camera Club.

Rules, again, are supposed to be cramping and destructive of life and enterprise. An art that is as full of stupid sign-boards as Mr. Du Maurier's picture of Hampstead Heath is neither pleasant nor profitable. I only hope that I may never say anything that will discourage euergy or new departures. Exneriment is the life of art, especially of a uew art. Genius generally disproves a few rules. If you think you see a new line, consider it fully, then have a dash at it, then see where you have got to. Only, if you fail, for art's sake do not ask anyone to believe that you have suceeeded, or to follow you. There are wrong ways as well as right ways, and if you ean discover which is which, it is only a waste of time to start on the former. Let us proceed to see what directions we ean lay down for photography.

1. The first thing to inquire in any art is, What is its aim, and what ueans has it to earry out that aim? If we diseover these means aud their eapabilities, and do not attempt to overstrain them, we are not likely to go far wrong iu that art.

Now every photograph, so far as it is a photograph in any present sense, has been produced by two ageneies—by the joint aetion of mau and his apparatus, by the humau and artistic element, and by the mechanical and scientific element.

It is thus plain that therc are two sets of limitations iu photography, and eonsequently two sets of rules, which have to be takeu into account.

I will first take the material limitation, the restricted powers of the camera and lens. Now the worst point about a lens is that it has little or uo imaginatiou, but is so very matter-of-fact. It secs truly, but it can see nothing but what is just in frout of it iu au actual, material shape. Thus (*a*) it can only deal with the present; the past is useless to it, and though a perfect observer and recorder of passing events, it is uscless for retrospect. It writes chronieles, not history. (*b*) It can do no ideal or imaginary work.

Next let us consider the restrictions of the artist himself. The human eye and brain preside over all art. Using other means thau the camera, they can call up the past and reclothe it in visible form, or give outward embodiment to ideas which have only existed in the mind, or select certain out of many objects iu the scene before the eye, and represent these alone to the exclusion of all else. But the human retina is in some ways less perfect than the leus and gelatino-bromide plate. As far as light is eoneerued, they are fairly equal, though the right kind of light is cumulative for the plate, which thus in time records what the eye can never see. But as far as art is concerned, the chief difference lies in the power of receiving instantaueous impressions. The lens and plate can record attitudes and effects which the eye can never perceive; and what the eye cannot see iu nature, it naturally refuses to recognise iu art.

Thus from artistic photographs we must exclude, on the one hand, what does not exist in outward uature, and, therefore, can never itself be transmitted through the leus; and, on the other hand, certain actually existing facts discovered by the lens, yet which the eye cau never see, and consequently would never seleet for a picture.

Now it may be asked why we should concern ourselves with the nature of the means, and why we may not use any results we cau obtain, and be thankful?

As to the limitation of the human eye, I cau only say that art in its present meaning depends upon the human observation of nature. If you develop an art based on instantaneous photography, you embark in an altogether new aud distinct enterprise, and you have my best wishes for your eujoyment and success. But you have no counection with art as it now exists.

As to mechanical limitations, the argument that the end is all in all, and that any means may be employed to reach it, is the one which has been heard oftenest in the battle between the two styles of wood-cutting, the old and the new, the schoole represented respectively by Bewick and the *Century Magazine*. The essential feature of wood-engraviug is, of course, that it is the portion of the wood block cut away which is rendered white in the print, whereas in metal plates every cut is printed black. Consequently the white line has been treated as the characteristic of the wood-cut, and upon it the old craftsmen relied for their effects, while the new school, on the other hand, has set itself to produce masses of half-tone with a great variety aud delicacy of gradation. The former declare that this may be beautiful, but it is not of the nature of genuine wood-cutting. The young men answer, "That may be true, but what do we care? As long as our results are admirable we will continue to produce them by any means in our power."

I am not responsible for the defence of the new wood-cutting, but, as a matter of fact, I consider it to be quite legitimate, because the white line is not so absolutely esseutial a part of the prints from wood-blocks that any reproach is due to the artists who neglect it. To the outsider, any one mode of cutting the wood, if it is fairly within the power of artist and tool, seems as good as another, if the impressious are equal. As long as the change of method does not result in a deteriorated product, greater freedom of working conditions must be a benefit to the art at large.

But with us in this instance it is otherwise. Reality is so invariable a conditiou of photography that it is inextricably bound up alike with end and means. A photograph cannot be a photograph at all iu my present seuse unless it has beeu taken from a real object. It is no case of alternative treatments, which both issue in a legitimate result; but here, if the makiug is conducted on wrong and dishonest principles, the thing made is iuherently bad.

I do not wish to iutroduce any irrelevaut philosophy, but may remark that all this artistic morality is quite different from the private morality of the operator, and that transgression of it merely vitiates the product in which such artistic fraud appears. I bring this in because I believe that a good deal of harm has beeu done to art by the supposed identity of æsthetic and ethical morality; I am certain, at any rate, that a great deal of nonsense has beeu talked about it, but here I am careful to recognise the distinctiou, and speak only in terms of art. An art has certain limitations, that is obvious. If it go beyond them by some triek, and produce a result which eaunot be what it pretends to be, and only passes because it is a result possible to some other art, that is artistic dishonesty. Not only must it be in the loug run unprofitable and disadvantageous, but it cannot have any real and honourable life of its own.

This, of course, does not exclude "dodges," double-printings, and the like, which are but remedies applied to the shortcomings of our tools, provided always that the results are more and not less true to nature than they would otherwise have been, and are consisteut with the means which must have been employed to produce them.

Now let us leave these rather dreary generalities, and examiue in detail a few concrete offences against Reality. This will fall into two divisions—Human, the reality visible to the eye; and Mechauical, the reality confrontable by the camera.

As to Human Reality, there are certain subjects to which it is advisable or necessary to give very rapid exposures, such as animals, the use of which I shall recommend later on. Now, in instantaneous pictures we have to be very careful of our attitudes. Whence man originally derived the idea of the gait of horses, such as we see expressed in pictures, I do not know. I suppose they are, after all, "impressions," that having, like a Japanese artist, carefully studied the animal in motion, the painter theu sat down to produce the four legs in attitudes which should give a general effect of its action, and some one early version was adopted as the patteru which, with occasional slight modifications, was followed for centuries. So little capable was the human eye of following sueh rapid motion, that as you will find in the Badminton volume on Racing, Dick Christian, a man conversant with horses all his life, stated and firmly believed a theory that, after a jump, a horse always alighted on its hind legs.

Some of the attitudes discovered by photography were entirely novel and ineongruous, possible only to rapidly-moving bodies, and that for a brief iustant; others do not differ so widely from the accepted couventionalties; and these, being the representative aud typical parts of the action, we are gradually being educated to adopt. I have noticed, for example, that Mr. Gow is always very careful in the horscs in his fine battle pictures to employ attitudes alike truthful and graceful, though I do not know anything about his methods.

But unfortunately this fact leaves the success of a good many of our photographs to mere chance, since a moving anima in a promineut spot may come out in a ludierous neck-and-crop attitude, at once ineongrouous and apparently impossible. Even the walk of a cow, for example, I havo always found to be more ungainly than would have been imagined. Homer's "trailing-footed" oxen are certainly better seeu at rest than in motion. Wherc the figures are very small, the defect is so inconspicuous as to be outweighed by the advantages of the figures; but for pictorial effects it is better if possible to avoid those attitudes which eaunot be maintaiued long enough to become visible to the human eye; and if there is no help for it, wo must just take our chances, and pick our results.

(*To be continued.*)

PATENT OFFICE LIBRARY

COLLODIO-BROMIDE EMULSIONS.

BY F. C. BEACH.*

My experience with the carbonate of ammonia developer was rather unsatisfactory. I mixed the solution accordiug to Mr. Brooks' directions; it had a strong odor of ammonia, which I presumed was the alkali intended to briug out the picture, but somehow it failed, and it was only by great patience and perseverance that I succeeded at all. Mixing it as directed, and pouring on and off the plate, it took at least five minutes before the faint show of an image appeared, and by constantly workiug over the plate I mauaged to secure a slide in about twenty minutes somewhat over dense in the shadows, which I regarded was due to too slow development.

I mixed up half an ounce of dried carbouate of soda—not the ordinary crystals—in ten ounces of water, and applied two or three drops to the same developer, when used on another plate, and, to my gratification, the image appeared rapidly and aequired the requisite density and brilliancy in the time I thought it ought to. Remembering that I used to employ the soda on Mr. Newton's plates long ago, and meeting Dr. Higgins, who also advised it, I have ascertained that it is much better than ammonia, and puts the relation of exposure to developer on a solid basis. We have no fickle alkali like ammonia, but a certain fixed alkali which may be relied upon to act as you expect it should, every time. Mr. Newton advises using the pyro dry; I obtain just the same results in slide making by usiug it preserved in solutiou with sulphurous acid and sulphite of soda. It prevents the developer from getting muddy, which it is sure to do if you are compelled to prolong the developer. I believe the only person suggesting the use of hydrokinone on those plates is Captain Abuey in his work on "Photography with Emulsions." I have tried it, and think if anything it works quicker than pyro, and produces as equally good results.

Therefore, for Brooks' emulsion, I can recommend the following developers:—

Stock Solution No. 1.

Carbonate sodium (dried)	230 grains
Sodium acetate	120 „
Potassium bromide	120 „
Water	10 ounces

No. 2.

Sulphurous acid and sulphite soda, pyro solution after my formula based on the streugth of forty-eight grains of pyro to the ounce, or any other pyro solution based ou the same strength.

To develop a slightly over-exposed plate, add twenty minims of the pyro No. 2 solutiou (and the same amount also of No. 1) then fill the graduate with water until the whole measures half an ounce.

You thus have a dilute developer to begin with. The image will appear in a few seconds (probably ten) after the developer is applied, aud will be fiuished in about a minute or perhaps three. Theu the image is examined by transmitted light, and when the desired density is reached the developer is poured off and the plate washed under a gentle stream of water for a few seconds, just enough to clear it of the developer. If the water runs too strong it is apt to split the film and carry it off the plate.

Then comes the fixing in less than half a minute with the cyanide, which is most rapid, leaviug the high lights beautifully clear, and the dense portious exactly as you saw them before fixing. The cyanide is quickly washed out under the tap, or by soaking the plate in water. In a few minutes the plate may be dried by heat over a lamp or near a stove, then varnished, and it is ready to mount. Here there are two important advautages over gelatine, the non over-fixing out of the dark portions, and the rapid drying. If the developer works slow, and the image appears to be slightly under-exposed, simply add a few drops at a time at short intervals of the No. 1 solution, until the details appear to come out sufficiently.

I rather prefer the hydrochinon to the pyro, because it keeps better, and you can use the same developer over again. It appears to give the plate equally as good a colour as pyro.

I mix a solutiou as follows:—

Hydrochinon C. P.	15 grains
Sodium sulphite C. P.	40 „
Distilled water	1 ounce

* Continued from page 8.

Put 1½ drachms of the above into the graduate, add 20 minims of the No. 1 or soda solutiou, and fill with water until it measures 4 drachms, then apply to the plate This process is especially useful in making slides from negatives having thin skies, and when it is found that sky of a slide is veiled or fogged, it may be readily removed by the use of an alcoholic solution of iodine.

Mr. Brooks states that the solution should be prepared as follows:—

Iodine	20 grains
Alcohol	1 ounce

Drop a few drops of the above into an ounce of water; if the solution should appear cloudy, a little more water added will clear it; pour on and off the plate from a developing measure for a minute or so, aud if one plate seems more fogged than another, pour on and off that part; the high-lights will assume an opalescent appearance. When this has taken place wash well under the tap, and again pour over the cyanide solution. The image will then clear up, and the fog will be removed from the high-lights. This manipulation can be repeated until the desired effect is obtained. If properly exposed and developed, the slide should have a brown tone by transmitted light.

Mr. Dunsterville gives the following for toning and strengthening, which I havo uot had time to try

To tone the transparency take—

Platinum tetra-chloride	1 grain
Nitric acid	1 minim
Water	4 ounces

and immerse the plate. Watch carefully, as the toning proceeds very rapidly. As soon as the wished-for colour is produced, take the plate out at once and wash well and quickly. Should the toning have gone too far, the warm colour may be restored by flowing again over the plate the alkaline developing solution, and the toning done over again morc carefully. Should the picture appear too thin after toning, it may easily be intensified to any degree by the following solution:—

Pyrogallic acid	30 grains
Citric acid	30 „
Alum	30 „
Distilled water	15 ounces

To each drachm of this add two or three drops of a 20-grain solution of silver nitrate.

Should the picture appear too deuse after toning, it may be reduced by flowing again over it the cyanide fixing solution.

I may remark, further, that these plates can be developed with a weak ferrous oxalate developer restrained with bromide of potassium as easily as gelatine plates. I have been thus explicit, as regards details, in order that any amateur wishing to make those beautiful pictures may have a practical guide that is reliable, and I trust some of our members will try working the process.

It is well known that the perfection of the collodio-bromide process in this country was largely due to the exhaustive experiment carried on by Mr. Henry J. Newton, and I have deemed it but just to him and all American workers to include in this paper his formula for an unwashed collodio-bromide emulsion, as now given to me by Mr. O. G. Mason, of Bellevue Hospital, who, as some of you may know, is still using Mr. Newton's formula. The collodion is prepared as follows:—

Alcohol } Ether }	Equal quantities

Pyroxyline (guncotton), six grains to each ounce of alcohol and ether used. Compounded as follows:—Put the alcohol in a bottle of sufficient capacity, then add to each ounce 16 grains bromide of cadmium, then add to each ounce 12 grains pyroxyline, and lastly add as much pure concentrated sulphuric ether as alcohol used. Let the collodiou thus made stand several days to ripen and settle.

To silver the emulsion, prepare for each ouuce 12½ grains nitrate of silver crystals by pulverizing in a mortar, put it in a flask or bottle, and add for each two grains of silver one drop of water, and apply gentle heat, preferably over a water bath, until dissolved. Then add to this dissolved silver four drops nitric acid for each ounce of emulsion to be made, and while the mixture is yet warm—not over 100° F.—add the proper amouut of bromized collodiou as previously given. Let the whole stand six hours, then add to each ounce of bromized aud silvered emulsion one grain of tannic acid. At the expira-

tion of six hours for clear brilliant work, or twelve to eighteen hours for a more sensitive plate, after adding the tannic acid, add for each ounce of emulsion three grains of finely pulverized chloride of calcium, and shake the mixture until the calcium is dissolved. The emulsion improves by age and frequent shaking. He says nothing about the developer, but I presume he employs the soda and pyro developer always recommended by Mr. Newton.

(*To be continued.*)

Patent Intelligence.

Applications for Letters Patent.

1278. HENRY NORTON BUTLER GOOD, 35, Southampton Buildings, Chancery Lane, London, for "Improvements in Photographic Cameras."—23rd January, 1889.

1334. JOHN STUART and GEORGE HARROP, 47, Lincoln's Inn Fields, London, for "Improvements in connection with Diaphragms or Stops for use with the Lenses of Photographic Cameras."—24th January, 1889.

1365. WILLIAM JAMES LANCASTER, 6, Livery Street, Birmingham, for "A New or Improved Lamp for Photographic Work and for other purposes."—24th January, 1889.

1438. WILLIAM JAMES LANCASTER, 6, Livery Street, Birmingham, for "Improvements in Portable Stands for Photographic and for other purposes."—26th January, 1889.

1439. JOHN WILLIAM TURNER, 4, Clayton Square, Liverpool, for "Improvements in Photographic Cameras."—26th January, 1889.

Specifications Published.

3,352. EDMUND JOHN PASSINGHAM, of 14, Tyrrel Street, Bradford, in the county of York, Photographer, for "A New and Combined Apparatus or Desk for Retouching Photographs."—Dated, 5th March, 1888.

The patentee says:—

I form the apparatus by hinging together four boards or plates; the base-board or plate being provided with supports held to the board by clips, the said supports being free to work in the clips, so that, on raising them, the board is held at an angle of inclination; and to the upper side of the last-named board is hinged a mirror, which may also be elevated and supported by similar supports.

To the mirror supporting-board or plate is hinged another board, which is kept in an elevated position by supports similar to those before described, and through the board is cut an opening in which is inserted a piece of ground or semi-transparent glass, the glass being over the mirror, so that the light is reflected through the glass and negative placed thereon, which may be retained in position by a clamp.

A cover is hinged to the last-named board, the sides being connected by the triangular pieces of opaque, flexible material for excluding some of the light in the room falling on the negative secured over the glass by the clamp, the upper board or cover being kept in position shown by supporting bar.

Proceedings of Societies.

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.

ON Wednesday evening the members of the above Society and their friends were entertained by Mr. ANNIBAL PINHEIRO with an exhibition of Brazilian scenery photographically illustrated by lime light. All the subjects shown were taken personally by Mr. Pinheiro, and the truthfulness with which the different phases of life scenery were depicted reflected highly upon the exhibitor's ability. It was also highly instructive to the members present, as the photographs had been taken on different makes of plates, and they were enabled to make comparisons.

Mr. S. W. ALLEN occupied the chair, and the lantern was under the careful supervision of Mr. W. Windsor.

Next Wednesday evening Mr. W. M. Kitchen will demonstrate on "Transferrotype" (Eastman process).

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

THE ordinary fortnightly meeting of the above Society was held at the Institute, Bixley, Friday, Jan 25th, Mr. PRINGLE in the chair.

The minutes of the previous meeting having been read and passed, Mr. Sanderson was duly elected a member; two new members were proposed.

Mr. DRESSER showed a new album by the Eastman Co., and some prints on Fry's paper which had been developed with hydrokinone.

Mr. PRINGLE showed a number of prints by the cold-bath platinum process.

Mr. CROWE showed a transferrotype print placed upon opal.

Mr. PRINGLE then gave an address upon "Practical Photography."

The next meeting will be held Feb. 8th at 8 p.m.

HAWAIIAN CAMERA CLUB.

A NUMBER of the amateur photographers of this city met yesterday evening at the rooms of the Chamber of Commerce, Honolulu, and organized as the "Hawaiian Camera Club," with the following officers:—

President—Mr. C. Hedemann.

Vice-President—Mr. George W. Smith.

Secretary-Treasurer—Mr. A. W. Richardson.

A committee was appointed to draft bye-laws and report at a meeting to be held four weeks hence. The objects of the organization are, generally, mutual improvement in the photographic art, the collection of views taken by amateurs, &c. Similar societies are in existence throughout the United States and in the Australian Colonies. Visitors from one to another are always made welcome, and the societies hold communication and exchanges with each other. There are about fifty amateurs in the Hawaiian Islands, which ought to be enough material to make the organization prosperous and useful. The public has an interest in it, as one function assumed by the Camera Club is the holding of exhibitions.—From the *Pacific Advertiser*.

SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.

Special Lantern Slide Exhibition.

THE Committee on Papers and Publications send us the following report:—

The work of two successful amateurs was shown on Friday evening, January 18th, 1889, at a special exhibition held at the rooms of the Society, 122, West 36th Street. The exhibition opened with Mr. Charles Simpson's illustrations of the "Open Air Statuary of New York," which comprised forty-three views of about forty different statues. In speaking of his work, he remarked that it was the most difficult piece of photography he had ever undertaken. He made all the views with the detective camera and at different times. Of one he made nine separate exposures before he obtained a picture that was at all satisfactory. The chief trouble was the exceedingly dark colour of the bronze figures (especially when they faced the north) in bringing out the details sufficiently. Again, very undesirable backgrounds would appear when a position was selected which would make the statue show to its best advantage. It was also surprising to note how scant a record was kept by the city of the dates when the statues were put up, the names of their sculptors and designers, and any other interesting information connected with them. He had had great difficulty in getting the information. It had taken him about one and a-half years to make the collection. There were only two statues of Presidents of the United States in New York City. The pictures were quite interesting as showing the number and variety of statues in New York, and the work reflected considerable credit on Mr. Simpson for the time, perseverance, and energy he had expended. Following his views were about fifty beautiful slides by Mr. James E. Brush; these included some wonderful pictures of Niagara Falls in "Ice Chains," as the programme stated, and a great many fine landscapes in the White Mountains. One was an enlarged view of the profile on the Profile Mountain, which he had enlarged directly upon the lantern slide plate from the small image on the negative. The result was to bring out the details remarkably clear, making the profile appear much larger, as if one was looking at it with a telescope. It was said that it looked much larger on the screen than one could see it with the naked eye. To enlarge so successfully requires fine lenses and great care in focussing. Another view was of the steamer *Bristol* of the Fall River Line, recently burned at Fall River. It appeared like a shadow of its former self.

Altogether the exhibition was a decided success, as was shown by the frequent demonstrations of applause by a large and appre-

ciative audience, among which were many ladies. In the latter was noticed two daughters of the Secretary of War, Mr. Endicott, one of whom, it is understood, is quite an enthusiastic amateur.

The lantern was operated by Mr. F. C. Beach and Mr. Frank F. Cobb, while Mr. J. Wells Champney, seated in the audience, announced the titles of the pictures, making, as he usually does, interesting and instructive comments thereon.

Mr. Brush also explained some of the difficulties he met with in taking a few of the pictures.

Mr. A. L. Simpson kindly assisted in seating the audience and otherwise aided the committee.

Mr. Beach announced that the absence of President Canfield was due to a slight but painful accident that had happened to him a few days ago.

There will be a commemorative meeting on January 31st, on which occasion prominent and old photographers will make addresses; and on February 12th photogravure processes by Mr. Ernest Edwards will be explained.

Bath Photographic Society.

A meeting was held at 10, Quiet Street, on the 30th ult., Mr. W. Pumphrey, President, in the chair.

There was a large attendance to hear Mr. Philip Braham, F.C.S., discourse on "Light, its Chemical Action, with especial reference to Photography."

The Lecturer said that the question of photography now-a-days was of such vast importance, that no branch of industry failed to benefit by it. To-morrow, he said, would be the fiftieth anniversary of Fox Talbot's discovery of "Photogenic Drawing" being communicated to the Royal Society, and there were some present who could look back to the time when photographic processes were in their infancy. What is light? What is electricity? he continued, is a question anyone can easily ask. He could only reply that light is motion, darkness is stillness. At present we regard light vibration in the all-pervading ether, a material in existence, and that ether has several attributes and qualities which can only be scientifically realized, because no one can say which is absolutely the case, but almost all experiments are explained by its means. Photography is not a science; it is an art. Music is not a science; it is an art. Painting is also an art. In science we must measure and weigh all our experiences; whereas with art, the canon of art is subject to change by time. Art cannot do without science, but science can do without art. He once heard a gentleman say that science was a bar to imagination, but that could not be substantiated, and proved his ignorance of science and scientific workers. Light travels with a velocity over 180,000 miles per second of time. The earth is only 24,000 miles in circumference, a small quantity in comparison. Electricity has been shown to travel at a similar velocity. Light travels in direct lines, and the experiments to be shown will demonstrate this; also in its passage through various media, such as water, it is deflected in accordance with their surfaces. I have here the means of throwing a powerful beam of light from an oxyhydrogen jet. In the path traversed by the rays we will interpose an empty sphere, and you see there is no difference, the light passes through; but when I fill the flask with water, the beam is brought to a focus just beyond the sphere; if the liquid were denser, the focus would be nearer still. I have here a hollow glass vessel with plano-spherical surfaces; when I fill this cell with water, there will appear a nearly perfect image upon the screen. I may also mention that a number of photographs have been taken with a liquid lens. You will notice that the spot, which in the case of the empty cell was at the top, is now at the bottom. We suppose there are a number of rays passing, and that these have become changed. What is the change? We put it down to refraction. Now what is refraction? I will interpose this glass lens, and place a star-pattern screen in front of the condenser, and by a suitable lens we get an image of the star through an empty cube upon the screen. Now I will fill this cube, or rather glass-sided vessel, with water, and replace the star with a line. No appreciable difference takes place, but if I turn the cube slightly, the position of the image of the narrow slit is changed. Now we take a hollow prism, and, as water is poured in, the lines become shifted towards the base. The lines, too, are not only deflected, but coloured. A lens acts like an infinity of prisms, and is governed by the acuteness or otherwise of these prisms. The aim is to produce an achromatic lens. Here is a prism composed of three densities of glass—the lower, a heavy lead glass, the middle portion of flint, and the upper of crown. This illustrates dispersion, and in the making of lenses the dispersion of one glass is counteracted by another. The refractive index and the amount of light dispersion known, a lens almost perfectly achromatic can be constructed. Very few are absolutely perfect in the balancing of chemical and spherical aberration so as to produce an image of any object. It is also a question whether the human eye is perfectly achromatic.

Now we come to the chemical action of light. Light is the mainstay of all animated nature, as instanced in the interdependance of plants and animals consuming the oxygen of the air, and exhaling carbonic acid; vegetation consuming the carbonic acid, assimilating the carbon, and setting the oxygen free by the action of sunlight. In photography we have to deal with chemicals purely. Some have an idea that light is deoxidizing in some cases and oxidizing in others. A few scientists think the effect to be electrical on the small particles or molecules acted upon. Here is a bulb filled with hydrogen and chlorine. It is possible the lime light may be too slow, so we will use magnesium to bring about a combination of the gases at present only mixed in the flask. (Experiment performed—explosion occurred.) Nitric acid decomposes in the light, giving off fumes of a yellow gas in the space above the liquid. Many a druggist has damaged his eyesight when withdrawing the stopper of such a bottle. Do they know that is due to light? In some experiments with Mr. Gatehouse, I clearly demonstrated that the action was not on the acid, but the vapour. No exposure to sunlight affects a tube entirely filled with HNO_3, but if a space be left, light soon renders it charged with gas above atmospheric pressure. What is chemical action? We only know that an effect is produced, and put it down to chemical action. Here are some tubes containing sulphide of calcium. When the light of burning magnesium is impinged thereon, they become phosphorescent. We have now a number of streaks of light, but we cannot say a change of a chemical nature has been produced. Now it is a fact that phosphorus is the least phosphorescent of any substance; it gives no light in the dark without oxygen, and when there is slow combustion. Yet the word phosphorus is derived from the supposed property of its beaming light. Is the effect chemical, or is it electrical? With regard to these phosphorescent tubes, the particles may be electrically charged, and go back to their original state by slow discharge. In some experiments with Mr. Friese Greene they not only got an effect by electricity, but also by magnetism. Photographic gelatine plates were placed between the poles of a powerful magnet, and on development showed a similar action to light, but also a spot of great intensity which occurred not in the line joining the poles, but considerably distant from them.

The Chairman, in thanking the lecturer for his able discourse and interesting series of experiments, said there remained plenty of work for those who were eager for research, especially in the direction of colour photography. That was the desideratum of the time. Opticians gave them forms of lenses almost perfect, but before colours could be obtained in the camera he imagined a complete revolution in the chemicals used would be necessary. The vote accorded, the Chairman made several announcements, and said he felt in his duty to state publicly that through the generosity of a member all expenses incidental to the formation of the Society, which were considerable, had been defrayed; therefore there was no leeway to make up.

A discussion upon the lecture followed, in which Messrs. Friese Greene (London), J. Dutton, J. A. R. Rudge, P. Braham, the Chairman, and the Hon. Secretary took part, but no new points of interest were introduced.

Liverpool Amateur Photographic Association.

The usual monthly meeting was held on Thursday, January 31st, at the Royal Institution, Colquitt Street; Mr. B. J. Sayce, the retiring President, took the chair. The minutes of the last meeting were read and confirmed.

Mr. Sayce then in a few words introduced Mr. A. W. Beer, President-elect, who took the chair.

A hearty vote of thanks to the retiring officers and members of council was then passed on the motion of Mr. T. B. Banner, seconded by Mr. William Sharrock.

Mr. B. J. Sayce responded on their behalf.

Messrs. Chas. Adamson, Rev. T. A. Bartlett, M.A., John Forshaw, junr., W. C. Hepworth, Fred. M. D. Howard, J. R. Jackson, N. C. Jellico, Dougald Matheson, H. B. Millar, Chas,

Pearson, H. B. Powell, M.D., and F. A. Schierwater were elected members of the Association.

Mr. A. W. BEER then delivered his inaugural address.

The HON. SECRETARY read communications respecting a new journal, to be called the *Photographic Societies' Reporter*, Wood's Washer, and Cartwright and Rattray's "Exposure Note Book;" he also exhibited, at the request of Messrs. Wood, "Krügener's Book Camera," as introduced by Messrs. Marion.

The President drew attention to a circular of the Wirral "Footpaths Preservation Society," whose objects he recommended to amateur photographers.

Mr. W. TOMLINSON then read his interesting paper on "An Easter Trip to the South of France and Northern Italy," which was illustrated by a large number of lantern slides, from photographs taken on the trip.

The limelight lantern was under the able management of Mr. P. H. Philips.

At the conclusion a unanimous vote of thanks was tendered to Mr. Tomlinson.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on the 31st ult., Mr. W. E. DEBENHAM in the chair.

Mr. E. CLIFTON drew attention to the report in the daily papers of the recent fatal accident in Dublin from the bursting of a cylinder filled with hydrogen gas.

It was thought by the members that in the absence of details beyond the bare recital of the facts contained in the newspaper report, it would be impossible to arrive at any correct conclusion as to the cause of the accident.

The CHAIRMAN thought that it was probable the cylinder had not been tested previous to filling it with gas.

Mr. J. J. BRIGINSHAW said Brin's Oxygen Co. refused to fill any cylinder until after it had been tested by them and stamped accordingly.

Mr. W. COBB showed some silver prints sent to him from a photographer at Hull, printed from negatives taken with artificial light.

The CHAIRMAN, remarking upon the excellence of the photographs, said it would be interesting to have some particulars of their production.

Mr. W. COBB promised to get this information.

Mr. E. P. EVERITT read a paper, "Which is the Best Position for a Shutter—behind the lens or in front of the plate?" (see page 85). The paper was intended as a reply to the discussion of the previous week in reference to the experiments made by Mr. T. Kerr, the results of which were shown at that meeting.

Mr. KERR exhibited a box camera he had made, having three sets of grooves by which the shutter could be used, either in front of the plate, or before or behind the lens. A spring curtain shutter was used, the tension of the spring in each case being the same. He gave particulars of some further experiments he had made, using a bicycle wheel with two squares of white paper attached. A metronome was used to insure the revolutions being the same at each exposure. Some further trials were made by photographing an endless band having bars across, fixed at regular intervals: this was worked by a small steam engine Mr. Kerr set up for the purpose. The results of these experiments were passed round.

Mr. KERR said they confirmed him in his opinion that close behind the lens was the best place for a shutter for instantaneous work. In this position less distortion and movement would be shown than when the shutter was immediately in front of the plate.

Mr. W. BEDFORD said it appeared to be a question between distortion produced by movement of the object, or that caused by the movement of the shutter from the exposure not being simultaneous when the shutter was used in front of the plate, unless the shutter followed the direction of the moving object.

Mr. A. HADDON referred, in illustration of this, to some photographs that had been exhibited at one of the meetings, in which some horses leaping were sharp, while the fixed hurdles were not.

Mr. S. G. B. WOLLASTON said some of the horizontal bars in the negatives exhibited appeared as if they had not been exposed at the same time.

Mr. A. COWAN said it was quite evident from the negatives shown that distortion was greater when the shutter was used in front of the plate.

For photographing still life, Mr. W. BEDFORD was in favour of the shutter being used in front of the plate.

Mr. A. COWAN remarked that all the results before them had been made with a shutter using the same aperture. He contended that in comparative experiments of this kind, the opening of the shutter when behind the lens should be regulated by the size of the cone of rays it intersected.

The CHAIRMAN said the question put to the last meeting was: "In which position a shutter—used close in front of the plate or just behind the lens—gave the most exposure, the rate of speed and the aperture of the shutter being the same in each case." He was of opinion that practically there was no difference whatever. Take as an extreme case, for example, a pinhole lens, using a shutter with a 4-inch aperture, travelling at the rate of four inches in one second, with the shutter close behind the lens, the aperture would take one second to travel across the opening which would be uncovered the whole of that time; consequently, the whole of the plate would receive that amount of exposure. With the shutter close in front of the plate, commencing at the top, the top of the plate would receive the whole of the light for one second, the time the 4-inch aperture was travelling over it, and so on downwards; the whole of the plate in this manner receiving the same amount of exposure, excepting that the lower portion of the plate would be exposed one second later than the top portion. The conditions would be the same when a lens of larger diameter was used (say four inches). He (the Chairman) drew diagrams on the black-board of the two examples he had selected in support of his argument, showing that in the two cases assumed, the effect of light upon the plate was the same in each position of the shutter.

Mr. J. J. BRIGINSHAW said the conditions with regard to the pinhole and the 4-inch lens were not quite the same, it having been proved to demonstration that a lens must have a certain portion uncovered before any image would be formed on the plate.

The CHAIRMAN explained that he was assuming the case of a lens more than covering the field, not one only partially in action.

Mr. G. Atkins was elected a member of the Association.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

AN open meeting of the above Association was held on Monday evening, the 4th inst., at the Society's Rooms, Cavendish Chambers, Market Street, when, notwithstanding the inclemency of the weather, the rooms were well filled by members and friends—over seventy ladies and gentlemen being present.

The President, Mr. HENRY BLANDY, L.D.S. Edin., in his opening remarks, referred to the courtesy of Prof. Clowes, B.Sc., upon his consenting, by request of the committee, to repeat his lecture, "A Visit to the Land of the Midnight Sun," to the members of this Association. He had himself already heard it, and he could say that it was very enjoyable. Mr. G. A. Ball had kindly consented to show the slides with his oxy-hydrogen limelight, and, being well conversant with his ability as a lanternist, they should know they would be put through in a masterly manner. He would not detain them any longer, but would introduce to them the lecturer.

Prof. CLOWES, who was very heartily received, said that he hardly knew how to address them as a society of photographers, as he was, in this art, only a novice; but he would call their attention to the difficulty of obtaining good results from the deck of a vessel, and other unfavourable situations incident to a trip in Norway. His experience taught him to give preference to paper negatives, as being far more portable and not liable to break. He then proceeded to detail the incidents relative to the life and manners of the people, and some very fine views were thrown upon the screen, including some with the sun shining at midnight—the reflection on the water being exceedingly fine.

A vote of thanks closed the meeting.

CAMERA CLUB.

ON Thursday, January 31st, Mr. GRAHAM BALFOUR, M.A., read a paper entitled "Figure in Landscape and Genre" (see page 89).

Mr. FRANCIS COBB occupied the chair.

The lecturer treated chiefly of the limitation of subject imposed by the means used in photography in regard to the use of models in landscape and in figure work.

A note from Mr. Lake Price upon the subject was read, and also a few words from a letter sent by Mr. H. P. Robinson.

A slight discussion followed, and the proceedings terminated by a very hearty vote of thanks to Mr. Balfour for his able paper.

After the meeting, some apparatus by Messrs. Broughton was exhibited.

Thursday, February 14th, will be a members' lantern evening.

Sheffield Camera Club.

The first annual dinner of this Club was held at the Masonic Hall on February 1st. Mr. Turner, the steward, provided an excellent repast, Dr. T. H. Morton, President, was in the chair, and amongst those present were Mr. B. W. Winder (Vice-Chairman) Mr. F. Harrison, Rev. W. Seed, Mr. G. T. W. Newsholme, Mr. Learoyd, Mr. Howarth, Mr. Ellinor, Mr. Rawson, Mr. Gilley, Mr. W. Nicholson, and Mr. H. J. Hardy (Hon. Sec.).

After the loyal toast had been duly honoured, Mr. Ellinor proposed "The Sheffield Camera Club," and coupled with it the name of the President. Although not a practical photographer, he held the art in high estimation, and was wishful to know something of the Society which had its advancement in view.

Dr. Morton, in responding, gave a short address on the present state of photography, and a description of a typical society.

Mr. Howarth proposed "Local Scientific Societies," and spoke of the advantages the study of astronomy had gained by the use of the camera.

Mr. Frank Harrison, M.R.C.S., President of the Sheffield Microscopical Society, in responding, mentioned the utility of photography in medicine and surgery.

Mr. Learoyd, President of the Sheffield Pharmaceutical Society, also replied in an able speech.

Mr. Walter Nicholson, artist, gave the "Health of the Council," and related some amusing incidents when meeting the camera in his excursions. He understood the difficulties in taking a landscape photograph, and thought the point of view should be very carefully considered. The difference of a few inches often made a picture, or spoiled one. He was not very fond of instantaneous views of figures. Some persons were taken with the leg uplifted, and he felt that it gave a picture an ungainly, restless appearance. He believed there was a great future for photography.

Mr. Newsholme gave "The Visitors," and Rev. W. Seed and Mr. Nield responded.

During the evening recitations were most effectively given by Mr. Winder and Mr. Gilley.

The musical part was well sustained by Messrs. F. Harrison, Mr. Bradshaw, and Mr. Waddington.

N.B.—The ordinary monthly meeting was held previously to the dinner, and the formal business transacted.

The President's address was as follows :—I have much pleasure in rising to respond to the toast you have so cordially and enthusiastically drunk. The Sheffield Camera Club, which has honoured me with the presidential chair, has not been established sufficiently long to render an audit of its accounts a difficult matter ; but you will see from the short report that there is a balance in favour of the society, and without wishing to be unduly complimentary, the work done during the past few months has been very satisfactory. I wish in the remarks made this evening to touch upon the present and future of this or kindred photographic societies ; and let me notice in passing the extraordinary number of associations now existing, and, probably, if all the members were polled, it would not represent a twentieth part of the devotees to our fascinating art. In 1878, the societies in the United Kingdom numbered fourteen, including a benevolent association. Now, in 1889, we learn from the Year-Book there are no less than seventy-five, and others are in process of formation. Similar institutions are springing up in the colonies and India and other countries. The literature of photography has kept well up with the general advance. As regards the capabilities and object of photography, they are too well known to reiterate here, but I would hazard the question, "What is a good, typical photographic society ; what its scope, aims, and requirements ; how does it fulfil the intention of its promotors, and satisfy the members ?" In a few words let me answer, if only inadequately. In the first place, a society like this should be able to impart instruction, and that, at least, of such excellence, that a member can intelligently follow and take part in the discussions. I assume this a duty especially when there are no means of education in the locality. It is rather surprising that the technical school here has not photography on its curriculum. The London City Guilds recognise its usefulness, and hold examinations, conducted by Captain Abney, F.R.S. ; but, with the exception of Professor Chapman Jones, at the Birkbeck Institution, Mr. Farmer, and one or two more, there are few actual teachers of photography, although many gentlemen who are competent, as C. H. Bothamley, T. C. Hepworth, Jerome Harrison, Valantine Blanchard, Lyouel Clark, and others. What would be the feeling of a person who had not attended a chemistry course, and who went to hear a paper on the allotropic modifications of carbon, oxygen, and boron, or listen to a lively discussion on the morphology of a mammalian vertebræ, unless he had some knowledge of zoology and anatomy ? My impression is that the decadence of many societies other than photographic is due to the want of timely preparatory instruction. The new member attends one or two meetings, then leaves a sadder, but not a wiser man. Some will, perhaps, say photography is easy now—anybody can pick it up. I overheard a tourist saying to another—it was at Bettws-y-coed—some years ago, "All you have to do is to clap your camera down here, and the thing is done ;" and he gave the stone wall a sharp hit with his stick. Perhaps he was describing the instantaneous process, which was the talk at the time. Well, I admit photography to a certain extent—the mechanical part—is easy ; but is the uncapping a lens, using a standard developer, and taking a print on ready prepared paper from the negative, sufficient to satisfy the aspirations of an enthusiastic amateur ? I trow not. He looks for art composition, yet with faithful portrayal of nature. He finds an extensive range of chemical and physical phenomena in the different methods of development ; the laws of light and optics in his lenses and exposures ; and he secures by the aid of photography a true record of microscopical objects and astronomical facts ; and illustration of travel as well as health-giving exercise when searching for the beautiful. These sentiments require the fostering care of every society. I may say that, in addition to elementary instruction, suitable subjects for discussion ought to be provided at regular intervals, and all members invited to contribute their share to the common stock. Laboratory experiments should be encouraged. Some societies are doing capital work in this respect. Outdoor excursions should be a prominent feature ; nor is the social element to be ignored. Man is naturally a sociable being, and thrives best when surrounded by a congenial sympathy. As regards exhibitions, now frequent, and mostly competitive, prizes being offered, there can be little doubt that a medal or other reward is an incentive to produce good pictures ; but when the highest award is continually given for an indefinite period to the same work, it rather checks the production of new efforts. Again, as the printing methods are now so various, one would expect the pictures to compete in class according to the process selected—say platinotype with platinotype, silver chloride with similar, &c.; and in judging, it should be known whether a picture is made from one negative direct, or by means of two or three, copying and enlarging, &c. Perhaps the Photographic Convention to be held in London this jubilee year of photography may arrive at some uniform system on these points. In conclusion, the programme of the Sheffield Camera Club is not printed yet, but I trust the executive will be able to carry out the following items this season, viz., lantern entertainments, some elementary or practical class instruction, papers at each monthly meeting, and excursions during the summer ; also a scheme proposed by Mr. Howarth, and which has worked well at Birkenhead, *i.e.*, a photographic survey of the district, geological, historical, &c. The fulfilment rests in a great measure with the members. As the stability of any edifice depends upon the cohesion of its particles, so will the permanence of this Club depend on the steadfastness and efficiency of each individual and the unity of all. We can then hope to aid materially the progress of those arts and sciences to which photography is closely attached.

Talk in the Studio.

Tenth Annual Exhibition of Meteorological Instruments.—The council of the Royal Meteorological Society have arranged to hold at 25, Great George Street, Westminster, on March 19th to 22nd next, an exhibition of instruments connected with atmospheric physics invented during the last ten years, especially those used for actinic and solar radiation observations. The

exhibition committee invites co-operation, as they are anxious to obtain as large a collection as possible of such instruments, &c. The committee will also be glad to show any new meteorological instruments or apparatus invented or first constructed since last March, as well as photographs and drawings possessing meteorological interest.

PARIS EXHIBITION, 1889.—The executive council of the British section have received an intimation that the Northern Railway of France, acting in connection with the London, Chatham, and Dover and South Eastern Railways on this side, will convey goods for the exhibition, between London and Paris, at one-half the usual rates. Exhibitors will also have the privilege of purchasing from the companies mentioned above return passenger tickets for themselves and their workpeople, available during the whole of the year. These tickets will be issued at the ordinary rates. The arrangements necessary for carrying these propositions into effect have not yet been decided upon, but full information will shortly be furnished to the exhibitors.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN. — The Annual General Meeting will be held on Tuesday next, February 12th, at 8 p.m., at the Gallery, 5A, Pall Mall East. Paper by J. W. Swan, F.C.S., "Hydrokinone as a Developer."

SPECTRUM OF MAGNESIUM.—By G. D. LIVEING and J. DEWAR (*Proc. Roy. Soc.*, 44, 241-252).—When an electric arc is formed between magnesium electrodes, most of the lines produced by the spark-discharge are observed. The larger number of lines with an arc discharge may be due not to lowness of temperature, but to the greater mass of incandescent matter, and to a wider range of temperature at different portions of the discharge, recombinations occurring at its edge. The electric discharge itself may also give rise to vibrations distinct from those due to heat. The seven bands in the green are due to the oxide, as they are only produced in the presence of oxygen or its compounds. If a piece of burnt magnesium wire be heated in the oxyhydrogen flame, the spectrum of magnesium is produced, the metallic lines appearing if the hydrogen is in excess. The triplet near M, which is produced when magnesium is burnt, is found to be produced in the arc between magnesium electrodes and in many other cases when oxygen is present, but not in an atmosphere of nitrogen or hydrogen, hence it is due to the oxide. Vacuous tubes are found to be very untrustworthy for the ultra-violet spectra, as the water-spectrum and lines of nitrogen are nearly always present, and the spectra sometimes vary unaccountably. A pump is described in which rubber connections and free contact of the mercury with air are avoided.—*Journal of the Chemical Society.*

GELATINOUS STATE OF ALBUMINOID SUBSTANCES.—By V. Michailoff (*J. Russ. Chem. Soc.*, 1887, 19, 666—690; 1888, 20, 35—72, 159—179, 274—360, 380—388).—After giving the history of this and similar subjects (colloïdal matters in general), the author shows the conditions under which white of egg from different sources exists in various solutions, precipitates, and gelatinous coagulates, and in coagulates obtained by heat, how these different modifications are formed and transformed, and describes at some length their properties (chemical and physical), especially those of Tarchanoff's "tata-albumin" and its behaviour towards solutions of different salts at different temperatures, as well as the results obtained on dialysis (see Abstr., 1887, 856). The mutual actions of different kinds of albuminoïd substances are also studied, and it is shown that albumins are acid, and globulins basic compounds. Gelatinisation of albumin in the first phase is due to hydration; in its subsequent phases to dehydration, which is more or less complete according to the conditions.—*Journal of the Chemical Society.*

PHOTOGRAPHIC CLUB.—The subject for disoussion on February 13th will be "Lenses."

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," should now be sent to Mr. Spiller, who is alone responsible for all which appears under that heading.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

CYCLIST.—The most portable form of camera is not always that to be preferred when the time of setting-up is taken into account. A light slinging basket with waterproof lining would possibly answer your purpose, and protect the camera from vibration. Wrap up the lens in soft cotton wadding and paper, and stow it inside the camera.

J. FARMER.—For printing on opals, a special frame is required. That described by Messrs. Ashman and Offord is generally approved. See page 190 of the YEAR-BOOK for a full description with wood-cuts. Also, at p. 162 of the same, you will find the details of Pizzighelli's direct platinotype process.

A. M. M.—1. The action of dilute sulphuric or nitric acid in stripping a collodion film from glass is, perhaps, not quite clear. No further chemical action is possible, and we are inclined to think that the loosening is caused by slight shrinkage. 2. After Ganot's work you might consult Balfour Stewart's "Physics"; also the articles Heat, Light, &c., under specific headings, in Watts' "Dictionary of Chemistry," contributed by Prof. G. C. Foster, Sir Henry Roscoe, and the Editor; and, for old experiments, Vol. I. of Gmelin's "Hand-book of Chemistry." 3. Borax acts merely as a mild alkali in the gold toning bath, like the phosphate and tungstate of soda. There is no specific function exerted by the boric acid. 4. The affinity of gold for hyposulphites is almost as strong as that of silver, so that the interchange is not rapidly accomplished. The effect of hypo is, therefore, to *slow* a gold toning bath to which it is added. 5. A preliminary coating of collodion keeps the varnish more to the surface, and helps it to dry quicker. By its use, less skill is required to prevent markings. 6. When intensifying a carbon print with permanganate of potash, the pigmented gelatine partially reduces this body to brown MnO_2, which, having more influence upon the thicker layers, confers proportionately greater density in these parts. 7. Ferrous sulphate is inferior to alum for a clearing solution, and is apt to cause stains in the after-washing process. Like alum, its action is probably due to its being an acid salt. 8. Read Mr. Conrad Beck's lecture on "Photographic Lenses," and the subsequent discussion in the *Journal of the Society of Arts* for February 1st, where you will find a good account of astigmatism and the modes of overcoming it.

FAC ET SPERA.—The *Photographic Times*, 423, Broome Street, New York; *Anthony's Bulletin*, 591, Broadway, N.Y.; or in *Wilson's Photographic Magazine*, 853, Broadway, N.Y. The first is published weekly, the others bi-monthly.

P. C.—The disposition of apparatus for enlarging by daylight is shown by the wood-cut on p. 168 of the YEAR-BOOK. By reading this account you will make a fair start with your experiments.

DUNCAN GRANT.—You will hear from the publishers.

SUBURBAN.—Mr. England is undertaking the Society's dinner arrangements for Monday. Write to him at 7, St. James's Square, Notting Hill, W.

DOUBTFUL.—The instances to which you refer are open to challenge, and show the mischief of appending the word "copyright" indiscriminately to photographs, whether they have been registered or not. The fee or payment is one shilling for each photograph, which must be specified; and there is no annual charge of the kind you suggest, which would cover all the work of the year.

AGRA, N. W. P.—The American vest camera was a novelty in 1886, but we have not seen it advertised of late. You might enquire of the Eastman Company, 115, Oxford Street, W.

W. L. M.—For coating bright machinery before photographing, take a ball of putty and rub it in circular fashion over the bright parts to destroy the metallic reflections; or another method is to paint temporarily with neutral grey—a mixture of white lead and Frankfort black.

W. FORGAN.—They may be had of Messrs. Marion and Co., 22, Soho Square, W.

C. KENNEDY.—You are going back to the developed print process, and must use, therefore, gallo-nitrate of silver, or else you will not obtain sufficient density. Try a cold saturated solution of gallic acid mixed with acetic, and a few drops of 30-grain silver nitrate solution added as required.

M. CAPELLI.—1. Apply to Mr. Alexander Cowan, The Chase, Southgate, N., who devised just such a machine as you require. 2. Try the addition of a little ammonia to overcome the greasiness of the plates.

Several other correspondents in our next.

THE PHOTOGRAPHIC NEWS.

VOL. XXXIII. No. 1589.—*February* 15, 1889.

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EXPLOSION OF A COMPRESSED GAS BOTTLE.

ADDITIONAL information which comes to us from Dublin as to the bursting of an iron bottle containing compressed gas for illuminating purposes serves to emphasize all we said last week as to the need of careful precautions with regard to the vessels, and, indeed, suggests further considerations for the prevention of like disasters.

It now seems that there is excellent reason to believe that the compressed gas was in reality a mixture containing oxygen—indeed, the evidence of Mr. Ruthven at the inquest seems to leave but little doubt on this point—and if we assume that, while the deceased gentleman was carrying the bottle, some portion of the mixed gases escaped, became ignited, and that the bulk of the mixture burned *inside the cylinder*, we can readily believe that no commercial gas-bottle would stand the additional strain thus put upon it. Indeed, we have known the cylinder of a compression gas engine to burst violently under the strain resulting from the combustion (*i.e.*, explosion) of a mixture of gas and air so weak in gas that it would not explode, when brought in contact with flame under the normal pressure; although, in this case, the pressure must only have been a small fraction of that in Mr. Bewley's bottle, assuming that the burning actually took place inside.

It appears quite hopeless to think of making the iron cylinders so strong as to sustain the enormous pressure resulting from the inside explosion of the highly compressed gases now used, the degree of compression being so much greater than in the case of any of the ordinary eudiometric or kinematic experiments of the laboratory, where oxyhydrogen gas is exploded under pressure. Hence the use of a compressed explosive mixture in the iron bottles should be discountenanced—indeed, if necessary, prohibited by law; but no prohibition can absolutely guard against the accidental admixture of combustible gas and of oxygen.

We believe that but few persons are rash enough to use combustible gas and oxygen mixed and compressed into one bottle, although, about twenty years ago, it was not so very uncommon. We remember once being in a laboratory, when the compressed mixed gases were burning at a Hemming's safety jet screwed on an exceptionally strong and heavy bottle in which the pressure had originally been six atmospheres, but which pressure was probably reduced to three. The flame went back, but the bottle did not burst, and there was but little noise, as the only vent was the Hemming's jet, from which a very high-pressure current of steam came immediately afterwards, but very soon ceased. An explosion of oxhydrogen gas in a closed vessel strong enough to resist the rending strain is noiseless.

In speaking of the subject of the bursting of compressed gas bottles, we may refer to the celebrated case of the compressed oxygen bottle which burst in the laboratory of the Royal Institution, but which fortunately killed no one. In this case the iron of the bottle became ignited inside, and burned in the oxygen until the growing pressure of the heat and the consumption of the iron brought matters to the bursting point.

Those having to do with compressed gases should carefully note all we stated last week, together with the recommendations there made, and besides an absolute prohibition of the use of the compressed mixed gases, there should be well-considered precautions against accidental admixture; but the fact of accidents occasionally happening with compressed gases need not prevent their use, but should make those interested take such precautions as to prevent disasters in the future.

The verdict of the jury was accidental death from the mixing of gases, with a statement that there was no evidence as to how the gases became mixed, and a recommendation for Government testing and stamping of gas cylinders.

A correspondent writes:—"The cylinder had been charged with the two gases by Mr. Bewley, according to the evidence of Mr. Ruthven his assistant, and Mr. Bewley had been engaged, on the day of his death, in conducting certain experiments with the assistance of Mr. Ruthven up to about 1 o'clock p.m., and alone by himself later in the day; during which experiments, Mr. Ruthven swore that Mr. Bewley had struck wax matches and applied them to the orifice of the cylinder after opening the valve at the orifice slightly each time. When Mr. Bewley commenced these experiments, the pressure in the cylinder, Mr. Ruthven says, was 1,200lbs. to the square inch, as shown by the gauge, this pressure having been reduced to 400lbs. when Mr. Ruthven left Mr. Bewley alone, about 1 o'clock. The explosion took place at 4.25 p.m., and the cylinder had not been recharged in the meantime, as the filling apparatus stood in another part of the works, and the evidence showed that no refilling or charging of any cylinder whatever had taken place in the interval between one o'clock and the time of the explosion. The cylinder, therefore, burst not at high pressure, but at a low one, not more than one-third the pressure existing in it early in the day, and probably much lower, for any experiments Mr. Bewley had made after Mr. Ruthven's departure would probably continue the lowering process that Mr. Ruthven swore had progress while he was present from 1,200lbs. to 400lb. Mr. Ruthven's description of what took place each time Mr. Bewley applied the wax match showed a series of small explosions at the orifice of the cylinder, and the most likely explanation of the unfortunate explosion is that so long as the pressure within the cylinder was sufficient to keep the explosions following the wax match applications outside, all was safe, although risky; but when at length the pressure in the cylinder had been sufficiently reduced to allow the flame of the explosion at the orifice to penetrate into the cylinder, the terrible explosion took place that cost poor Mr. Bewley his life. Dr. Miles showed that there were no grounds for the theory that

Mr. Bewley's watch had been blown into his body, no injury to the surface of the body being evident beyond the removal of the skin on a portion of the left side of chest, exposing the muscles. The fatal injury was fracture of the base of the skull, and injury to the spinal cord, the other injuries being the blowing off of the left hand, and fracture of the fifth rib, left side."

We have read several other accounts which somewhat differ as to details—indeed, details seem to be almost a matter of conjecture—and one of the most interesting is the following from Mr Greenwood Pim, who says :—

"I would ask permission, as the inquest on the late Mr. Bewley has now concluded, to add a few words to the article under the above heading in this week's PHOTOGRAPHIC NEWS. It was then established that the lamentable accident was in no way connected with the pressure in the cylinder. The facts deposed to showed that by misadventure a mixture of gases was put into the bottle, and that one or two minor explosions occurred at a lecture in consequence. The bottle was returned as containing mixed gas, and Mr. Bewley drew off a portion into another cylinder, and it is conjectured must have been testing it with a match, which caused the terrible explosion. That fire occurred was proved by the burning of portions of the hair, &c.; and that the pressure could not have caused the catastrophe, by the fact that the bottle at the time contained only something less than half an ordiuary charge. Previous to the investigation, which took place after your article was in type, opinion was divided as to the cause of the explosion. Hence I am desirous of reassuring those who are in the habit of using such bottles that the sad accident need not—assuming reasonable caution be exercised—deter them from availing themselves of this most convenient method of illumination."

GAEDICKE'S MONOCHROMATIC DARK-ROOM LAMP.

THIS instrument has more than once been mentioned iu our columns, and it will be remembered that not long ago Mr. Carl Norman, of Tunbridge Wells, exhibited one at a meeting of the Photographic Society of Great Britain.

The essential feature of this apparatus is the utilisation of monochromatic yellow light resulting from tinging a Bunsen burner flame or a spirit lamp flame with a sodium salt, and the idea is carried into practice by providing a number of asbestos rings, one of which is charged with a sodium salt, and fixed about an eighth of an inch above the tube of a Bunsen burner, or a little over the wick of a spirit lamp, care being taken that the ring is not placed so high in the flame as itself to become red hot, in which case it will not only be destroyed somewhat rapidly, but make the flame sufficiently actinic to affect the plate under development.

The Gaedicke dark lamp is perhaps the neatest and best of the dark room lamps now made, hence we were pleased to receive one for review from Messrs. Marion & Co., with an intimation that they are agents for Great Britain.

The lamp sold for gas is packed, with all its belongings, in a small cardboard box; but for travelling, the spirit lamp form is likely to be more acceptable. The circular sent out by Messrs. Marion and Co. makes a misstatement regarding the spirit form, which makes the instrument show to less advantage than it should fairly.

It is said that "the consumption of the spirit lamp is slightly more costly, because only pure alcohol can be burnt in it. Methylated spirit would give glimmering particles in its flame." The writer evidently has the so-called "Methylated Finish" in his mind—that is, methylated spirits containing a certain proportion of gum sandarac. This tends to clog the wick of a spirit lamp, and gives a flame which often has luminous spots or streaks at the margin; but methylated spirit gives as clear and non-luminous flame as pure spirit.

HELIOCHROMY.

BY C. H. BOTHAMLEY.

MR. IVES (page 87) takes exception to two statements in my article on "Progress in 1888," viz. (1) that Vogel's process of heliochromy is scientific, aud (2) that it does not differ very greatly from the later process of Ives (p. 27).

My main objection was raised against the claim which Ives made (PHOTOGRAPHIC NEWS, 1888, p. 789) that his process, "unlike any similar process yet invented, was based upon a true conception of the nature of light and colour vision, and was a strictly scientific method," whereas Vogel in 1885 described a scientific method of accomplishing the same end, an outline of which was published in leading English and American photographic magazines.

Mr. Ives now asserts that Vogel's process "is not scientific, because it is impossible"! Surely an assertion that a process published in *Wiedemann's Annalen*, the journal *par excellence* of experimental physics, by a chemist, physicist, and photographer so eminent as Dr. Vogel, or any suggestion direct or implied that Vogel is not acquainted with the most advanced views as to the nature of colour aud colour sensations, is too palpably absurd to need any refutation. Anyone who reads Vogel's account of his process, and has what Newton called "a competent faculty of thinking in philosophical matters," will, I do not doubt, agree with my original statement that it is strictly scientific—*i. e.*, that it is based on the established principles of orthochromatic photography, and the nature of colour sensations and their relation to pigment colours. To assert that it is impossible to carry out is merely to beg the question. Moreover, it is well known to European photographers that processes of photo-chromo-lithography which follow the lines laid down by Vogel are now in actual use, and produce very satisfactory results. Vogel takes six negatives and a corresponding number of stones on plates as a minimum; but if he used twelve, twenty, or even more, the problem of printing from this number would not greatly discompose a modern chromo-lithographic printer.

Agreement with or dissent from my statement that Vogel's process does not differ very greatly from that of Ives will of course depend on the significance attached to the words "very greatly." Mr. Ives states that there is "a very, very great difference" between Vogel's process and his own, and that these and the older process of Du Hauron are all "vitally different." Now Vogel himself (*loc. cit.*) regards his own process simply as a modification and improvement of Du Hauron's. So far as I am able to form an opinion, all three processes are based essentially on the same fundamental principles, and the differences are mainly in the manner in which these principles are put into practice. Ducos du Hauron used one sensitiser, three screens, and three pigments; Vogel uses five sensitisers and ordinary plates, one screen, the intensity of which may of course be varied, and a number of pigments corresponding with the number of sensitisers—*i. e.*, with the number of spectrum regions represented; Ives uses one method of sensitising, three compound screens, and three pigments. Further, as far as the published accounts enable one to judge, Ives' process differs from that of Ducos du Hauron only in the fact that modern progress in the science of optics has enabled him to adjust his screens and select his pigments with much greater accuracy. Vogel's process is equally in agreement with modern science; he varies his sensitisers, Ives varies his screens. Possibly Ives' method gives better results than Vogel's; possibly not. This is a point which can only be decided by careful and *impartial* comparison of results.

The main points of the remarks which gave rise to Ives' reply and this rejoinder was a statement of my opinion that there are photographic experimenters who are not acquainted with, or fail to give proper credit to, the work of previous investigators in the same field. This opinion I have as yet seen no reason to change.

FRENCH CORRESPONDENCE.

French Photographic Society—Sensitive Paper upon Cloth—Suppression of Red Light in the Dark Room—Transparencies for the Lantern—International Congress—Lamp for the Magnesium Flash Light—New Solvent for Prussian Blue—Reproduction of the Electric Spark upon Sensitive Plates—Contretypes by the Aid of Collodio-Chloride of Silver.

French Photographic Society.—The last meeting of this Society presented nothing that was very striking, and we shall soon have summed up what was there brought forward. In the first place, the idea—or, rather, the project—was discussed of organising a grand *fête* on the occasion of the fiftieth anniversary of the invention of photography. It was decided, in this connection, to invite the presidents and vice-presidents of the principal photographic societies of Paris to join the committee of organisation. In this way the manifestation will have a more general character. It will doubtless be decided to postpone the *fête* until the time when the International Photographic Congress takes place.

Sensitive Paper upon Cloth.—The presentation of this substance is due to Messrs. Sengel and Dobler. The cloth paper made by them is of two kinds—ordinary albumenised paper, and ferro-prussiate paper. The paper is simply cemented on to the cloth; for certain purposes this gives more solidity, and is especially useful in prints destined to serve as documents for reference in workshops, building yards, &c.

Suppression of Red Light in the Dark Room.—M. Balagny, after many experiments, has found himself led to the conclusion that the simultaneous employment of two glasses, one of cathedral green, and the other of yellow glass, ground, superposed one upon the other, enables him to dispense with the ruby red light. He remarks—and this coincides with our own experience—that all light, even the deepest red, causes fogging, and that there is no more of this with the combination, so much less offensive to the eye, that has just been mentioned. There is the further advantage of much more light, so that we can better see what we are doing. M. Balagny is perhaps right, practically speaking, but we doubt whether it is strictly correct to operate in the manner he describes, when we wish to obtain clear results. During the same meeting M. Balagny showed a print of the Eiffel Tower on a 14 by 11 inch plate, taken from the level of the Seine, with a single rectilinear objective by M. Balbreck. The picture, taken when the tower was 790 feet high, shows no distortion.

Transparencies for the Lantern upon Gelatino-Chloride of Silver Emulsion, by M. Audra.—These transparencies, exhibited upon the screen by M. Molteni, are not superior to the many similar ones produced upon gelatine. We prefer films of collodio-chloride of silver, the grain of which is so much finer. M. Audra recommends, among other formulæ, the following. The ordinary iron developer, with an addition of 10 per cent. of a ten per cent. solution of bromide; or in place of this the ordinary hydrokinone developer (a solution that has been used before) and a like addition of bromide. We persist in our opinion that, for transparencies, collodio-chloride of silver will always take the lead of any gelatine emulsion whatever. We have previously described a process, by the aid of which the printing and transfer to glass of the image, either for the stereoscope or for the lantern, is very easily effected. Our process yields direct impressions, but if it is desired to print by development, there are negative collodio-emulsions which will give every satisfaction in this way.

International Congress of Photography.—A further meeting of the members of the preparatory committee of the Congress has taken place; and the questions to be submitted to the examination of the Congress have been definitely settled. They are pretty nearly those which we have before indicated. The date of the Congress could not be definitely fixed, as it is to depend upon the time at which the members of the international jury have to meet; and only the administration of the exhibition knows when this meeting is to take place. At the time of the last full sitting of the committee, several scientific leaders took part in the discussion, notably MM. Janssen, Wolff, members of the Institute, &c.

Lamp for the Production of the Magnesium Flash Light simultaneously with the Opening of the Lens.—This ingenious arrangement is due to M. Drouin. It consists in a simple, portable petroleum lamp, the upper part, or wick tube of which, bears a stem having at one end a little platform, destined to hold the powdered magnesium, and at the other end a pipe communicating with the caoutchouc tube, which, divided into two branches, proceeds from the pneumatic ball in connection with the exposure shutter. It results from this arrangement, that when the ball is compressed, the pressure acts simultaneously upon the air which brings the powder and flame into contact with each other, and combustion thereby ensues; and upon the exposure shutter, which is thereby opened. In this manner we can operate in a studio or apartment which is already lit by daylight, and at the same time use the magnesium flash light. It dispenses, in a word, with the necessity for leaving the lens open during the whole operation. We are in an era of progress, when all these little details may prove of importance.

New Solvent for Prussian Blue.—In a communication recently addressed by M. Guignet to the Academy of Sciences, he mentions several solvents of Prussian blue, amongst which we remark molybdic acid, which is, it appears, gifted with the property of dissolving ordinary Prussian blue in large quantity. This has led us to think of the use that might be made of this acid as an energetic "blue solvent," destined to take the place, if necessary, of that composed of oxalic acid and caustic potash; but we shall only be able to speak with authority after having made some experiments.

Reproduction of the Electric Spark upon Sensitive Plates.—M. Trouvelot, in the last number of the journal *L'Astronomie*, has published an interesting article relative to the effect produced by the electric spark, upon a plate interposed at the positive pole, and upon another plate placed at the negative pole. In the two cases the images are different; but they display the same kind of lines and ramifications for each pole, so that we may recognize the directions of the current, according to the design marked upon the plate. M. Trouvelot concludes from this observation that there is an important application that may be made of this evidence in the science of meteorology. The photographs published in *L'Astronomie* in connection with this subject are really very curious. From what we understand, it is not photography, but the effect produced upon the plate by the electric spark; it is equal, in fact, to an instantaneous photograph obtained without the aid of an objective, and by direct contact with a luminous positive.

Contretypes, by the aid of Collodio-Chloride of Silver coated upon Gummed Paper.—The method which we have indicated for the printing of transparencies by transfer, with collodio-chloride of silver, may be applied with complete success to the preparation of contretypes—reproduced negatives—whether for the sake of multiplying the latter, or for the purpose of having a reversed image, as necessary for collotypic purposes. It is advantageous to the worker, either in printing a positive or a negative, to be able to avoid the necessity for placing two glasses in contact, on account of the want of perfect flatness which is generally present. In the process with which we have occupied ourselves, there is always a sheet of paper in contact with a plate of glass, from which proceeding we obtain as close contact as possible, and in consequence of this perfect adherence, an absolute fineness, an entire similitude with the original negative. We may add to this advantage the not less appreciable one of being able to modify the

original, if necessary, to a certain extent, by a longer duration of exposure given to one or other of the collodio chloride images. It is of course understood that in the formation of the negative image there must be considerable over-exposure in order to obtain a thoroughly intense negative, in which the faintest details of the original negative are preserved. LEON VIDAL.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

SEVENTEENTH ARTICLE.

BY W. M. ASHMAN.

PERHAPS the most disappointing fact which a beginner has to note in his first attempts at photography is that the percentage of successful pictures is so small, in spite of his great assiduity and careful preparation. And besides this, he will learn that the more he cultivates his perceptive faculties to appreciate the good work of others, the more dissatisfied will he be with even the best of his own productions.

As a rule, amateurs would succeed far better if they studied the chief characteristics of good work more thoroughly, before commencing actual practice, for they would then frequently destroy their negatives, instead of allowing themselves to be tempted to print from them, and then, after some thoughtful consideration of the chief points of failure, set diligently to work to try again. Very often it happens that more favourable circumstances and greater convenience of time and place would have materially assisted them. But by far the more common causes of failure are to be found in a disregard of the advice of men of experience, whether given in a friendly talk, or through the medium of the photographic press, and in persistently holding to the mistaken notion that there is very little to learn in order to attain to a fair amount of proficiency, without any very close application or careful study of each successive step. The problem presented for solution is simply to define, after each trial, the exact cause of whatever failure may be evident; and to this end we will consider as far as practicable the qualities essential to a good negative. It does not take much discernment to see that a photographic negative (by whatever process it is taken) may be regarded as a film possessing more or less of translucency in almost imperceptible gradations, from absolute transparancy here and there, to approximate opacity in certain small portions. This gradation is practically produced by the presence, in varying proportions, of an opaque compound of silver, the result of the reducing agent or developer, following the action of light upon such salts as the bromide, iodide, or chloride of that metal. Take the case of an unsafe illumination of the dark room, or an accidental brief exposure to a weak artificial light; upon development the whole surface assumes the dark grey of reduced silver, which extends more or less through the film, according to the duration of the development and the energy of the light.

The yellow colour often seen when looking through dry plate negatives is the result of a staining of the gelatine which holds the silver salt in position, and is not the colour of the silver itself. Such stain is due to oxidised pyrogallol, and is removable, which process is termed clearing, and will be dealt with in due course.

When a plate is acted upon in the camera, or by super-position through another plate bearing an image, those portions which receive the largest amount of light are of course affected to the greatest extent; hence in the case of a sitter the development is usually watched with a view of noting the appearances of the several parts of the subject, as to the order in which they show themselves. So we are able to judge with some degree of accuracy whether the plate has received the proper length of exposure. The strongest light would naturally proceed from such white objects as the collar, shirt front, white lace or dress, or highly reflective surfaces like silver and other ornaments, and therefore these we should expect to see first of all, just before the face; then the high lights of the face would come up, followed by the rest. After this the details of costume and the darker parts of the picture, leaving only the deep shadows, which should be defined clearly upon the plate as light patches or markings amid the various degrees of blackness representing the effect of the light, and so the process goes on, until, as looked at by the reflected light of the dark room, no further action appears to take place. Upon examining the condition of the plate at this stage by transmitted light, holding it in front of the dark room lamp or window, the parts which just put in an appearance will exhibit considerable opacity; and should this not be the case the process of development must be continued until that point is reached. If this cannot be done without the production of a visible, by reflected light, black veil over the whole of the light patches, and markings constituting the deep shadows of the picture, it is an undoubted sign that the exposure has been too prolonged. On the other hand, if upon looking through the plate the dense portions appear as very opaque patches, unattended by surrounding details of less force, the exposure has not been of sufficient duration. In a properly exposed negative there should be a gradual scale of intensities exhibited by transmitted light, commencing with those parts most strongly illuminated, represented by the deepest black, and descending by almost imperceptible stages to the darker shadows, which after fixing appear very nearly like clear glass. If we fail to develop these intermediate degrees of intensity, technically called details, our negative, when printed, would yield little else than a black and white representation of the object photographed, and would be rightly called defective from insufficient exposure. But in the case of the plate darkening all over, under the prolonged action of the developer, before sufficient strength has been acquired by the high lights, the picture would appear to be of almost the same opacity throughout, and the print taken from it would show by its want of contrast that the negative had received far more exposure than was necessary; such a negative or print is technically known as flat.

The first-named defect, under-exposure, can seldom be remedied, and then only by experts, who, by judicious use of accelerators, may, perhaps, ultimately succeed in producing a negative from which passable prints may be taken by a skilled printer. But as in any case success is likely to prove somewhat problematical, beginners are not recommended to adopt any other course than that of exposing another plate on the subject for a longer period. Over-timed plates may, with less difficulty, be turned into good printing negatives when the fact is recognised very early in the process of development; first, by the addition of an active restrainer to the solution, such as a ten per cent. solution of potassium or ammonium bromide, or in extreme cases that of sodium citrate; and secondly, by prolonged action and patience on the part of the photographer.

Of the mechanics of development something will be said in another article, but the present object is to impress upon the beginner the great importance of a clear understanding on the points just indicated, as all future progress depends upon the knowledge of what a properly timed and properly developed negative should look like.

There are numerous causes of failure which it is tolerably certain will be experienced at some time or other by all who enter upon the attractive and beautiful art of photography. We can only describe some of these, and give such instructions as will enable those unacquainted with their appearance to quickly recognise them. Sufficient has been said about keeping sensitive surfaces, such as plates or paper, in perfect safety, and it will be enough to mention that ordinary dry plates, after an exposure in the camera, or otherwise, are not changed in appearance;

but an action has taken place which enables something in the nature of an image to be developed on them provided certain conditions are complied with.

The theory of the undeveloped image is hardly a subject likely to trouble the mind of the beginner; but it may be said that the most popular hypothesis regards the invisible change as one in which the haloid salt of silver undergoes a decomposition, parting with some of its halogen, which, in its turn, reacts upon the rest thus:—

$2AgBr + light = Ag_2Br + Br.$

Silver Bromide=Silver sub-bromide + Bromine.

There are differences of opinion regarding the precise action which takes place. Details concerning these opinions we can dispense with in the present series, it being sufficient just now to remark that the energy of the light makes the silver compound assume a tendency to respond to the reducing power of whatever agent is employed in the form of a developer, and that this tendency is always more or less according to the amount or duration of the energy. In the process of development, then, our reducing agent exercises a greater influence on silver sub-bromide (Ag_2Br) than it does on the unexposed portions represented by AgBr, and this influence is one of reducing the acted-upon molecules to the metallic state. According to Dr. Eder's "Modern Dry Plates,"—"Free halogens, chlorine, bromine, or iodine, whether in solution or in the form of a gas, destroy the sensitiveness of every form of bromide of silver, when allowed to act on a plate before exposure to light, or if, after exposure, they destroy the previous action of light, and there is no means of reproducing the latent image." This power is of great use in controlling the action of development in cases of too prolonged an exposure as above referred to; hence soluble bromides and chlorides are restrainers more or less energetic according to the degree of concentration employed.

It is not always easy at first to trace the cause of want of sharpness in the outlines of an image." Upon holding a finished negative up to a strong light and closely examining it, as if the observer were trying to look through the film, certain well marked lines may sometimes be seen to be doubled, although in every other respect the picture may appear clear and brilliant. Of the two lines thus marked out of one, one may be very faint and the other strong, which shows that the subject has moved towards the end of the exposure. Where part of the negative only shows this, it is evident that the sitter and not the camera is at fault. In the case of a view, the want of sharpness must be attributed either to the movement of the camera, or to bad focussing. In the latter case lines are not doubled, but blurred. Where a shutter vibrates the camera, the lines are generally traceable as more doubled than blurred. If a print from a negative shows this peculiarity, the negative should be examined, and, if it is all right, then the fault lies in the insufficient pressure that has allowed the paper to slip during examination. Care must also be taken to secure the camera firmly to the stand as already pointed out, or this movement will often occur, even with a slow shutter or by the simple removal of the cap.

Plates which have to be forced in development in order to get sufficient detail sometimes pucker at the margins, or the film appears covered with blisters when the final process of washing takes place. The defect is usually termed "frilling," and is seldom met with when the instructions given by the makers of the plates are carefully attended to. Soaking the negative for a longer period in a saturated solution of chrome alum is the antidote, and its virtue is more pronounced when treatment follows immediately after the process of development. In very extreme cases, when the temperature is abnormally high, it may be necessary to soak plates a short time in chrome alum solution before starting development. This will be found to greatly prolong the latter process, but may be the means of saving a valuable negative.

FIGURE IN LANDSCAPE AND GENRE.

BY GRAHAM BALFOUR.*

Next we come to Mechanical Reality—things which must not be attempted in photographs, because the camera can never confront them. These may be unattainable, either because they have no bodily existence, or because they always elude the camera.

I will first take an instance of the latter.

Mr. H. P. Robinson has told us ("Landscape Photography," p. 44) that he once wished to introduce a stuffed heron into a landscape, but finally decided against it, though apparently he could not himself quite understand the reasons on which he instinctively acted, and even fancied that he was making quixotic concessions to unworthy critics. Also, in Pall Mall the year before last, there was an elaborate, evenly lighted photograph of a stuffed lark leaving its nest. I heard the public admiring it, but it was most palpably unreal to the least observant expert. Now I do not believe that the critic's annoyance really rises from the fact that the bird is always badly stuffed, and does not accurately represent nature, but that the result is always unreal in that we never do see the wild bird at such close quarters, and with so much detail, as the photograph of the sham displays. We never see a heron standing quietly in a pool within a few yards of us, while we admire at our leisure heaven and earth and it. When we do get close to a heron, we come upon him suddenly, and all we really see is a confused flapping, a long neck doubling up, and a long pair of legs trailed rapidly away out of our sight. Or something unexpectedly goes up like a firework from under our feet, and that is all we see of the lark now leaving her grassy nest. From our knowledge of birds we may reconstruct and explain these scenes, but we see little more of them at the moment than of the separate positions of the legs of the trotting horse, and for the same reasons they are as unreal to us at close quarters. We do not see the bird at rest, because it will not stay; we cannot see its exact motions, because it flies off too rapidly. These facts, however, are not at first so obvious to us because we can inspect birds at rest through a telescope, and thus form truer conceptions of them than of instanstaneous movements which we can only see in photographs, and cannot verify in nature.

Secondly, come the subjects which are unreal, because they do not exist in the flesh. From what I have said it is natural that I should regard ideal studies as unmeaning in photography. An ideal study means an abstraction—a face or figure representing some one abstract quality or emotion from which all other sentiment has been withdrawn. How is this to be represented in a picture which we know to have been taken from a concrete human model, dressed in garments made by the costumier, and sitting in front of a portrait or R. R. lens? It is a contradiction in terms. Most of these studies, it is true, I suspect of having been taken first and named afterwards, and no doubt Resignation, Despair, or Patience on a monument could be adequately illustrated by most amateurs from their own collection of portraits. It may also be an agreeable excuse for exhibiting a beautiful woman in a fancy dress, posed in an attitude which displays her to advantage. But I do not see how these re-named portraits can claim to be ideal. We do meet embodied qualities walking about in the every-day world; it is only in dreams like Spenser's "Faëry Queen" that we encounter them, and into dreamland no material cameras are passed. No doubt some rare individuals may now and then be taken almost as representative of some especial attribute; but even with these the illusion is never perfect—no human being is a mere abstraction, but something much better and more complex. I believe that the best expression of an actual portrait is all that we can ever hope to render, and that only by a stroke of good luck added even to the best management.

On the other hand, I may add, parenthetically, that what unfits the camera for ideal work does not disqualify it for character-studies, in which individual character and details of personality are to be brought out as much as possible. These require skill in eliciting expression such as is only to be found in the best portraitists, and great dexterity and insight, but the results are among the surest title-deeds of photography to a place in art. A portrait may also be a good character-study, but the difference between these two is that the former must be a good likeness of the individual—must represent his habitual expression—whereas the character-study need only

* Continued from page 90.

make the most of some picturesque expression of which the face is at any time capable, whether it be characteristic or not.

The portrait of an imaginary person, again, is another matter, and is as far astray as the ideal study. Mr. H. P. Robinson has told us of his conversion (by a critic) from this form of offence, and I need not dilate upon its depravity. It is, in its very conception, unreal to a fatal degree. Characters from Shakespeare—Rosalind, Portia, Hamlet; from Tennyson—Maud, Elaine, Rizpah; or from any of the poets or novelists, are absurdities in photography. They never lived on this dull earth; where could they have been photographed upon gelatine or collodion? At best the pictures could only represent some clever people acting the parts with complete success. The painter can depict them, because he sees them with the inner eye in the region of the imagination, where they were born and dwell; but even for him it is dangerous to approach a favourite hero or heroine, whose worshippers have already formed for themselves a conception of their idol. Even the painter is apt to be dominated by his model. I think I am not mistaken in instancing out of thousands of greater failures a picture by a painter of the highest promise, Mr. J. W. Waterhouse, in last year's Academy, of the Lady of Shalott. It was admirably painted as far as skill went, and represented in a boat among reeds and willows a curious, fair-haired girl, to whom no objection could have been raised but for her pretensions to the Shalott title. My fancy is that the artist had been struck by certain possibilities in a model's face, which were still to be seen in the picture, but the task had been too much for him. He had not been able to import enough imagination into his work, enough expression, enough transfiguration into the features, and it remained a clever picture, but never became the Lady of Shalott, with her lovely face and her weird carol.

Now, if this be frequently the case with the painter and his free-ranging art, how can the camera transform the model into the heroine? A photograph of the individual from whom a great writer had drawn a character would be most interesting in other ways; but even had he described the original as literally as he could, there would yet have been the medium of his imagination which could not be interposed between the lens and the person photographed.

We may console ourselves by reflecting that these ideal and imaginary studies must have been most difficult, and it is something to be absolved from attempting the impossible. Think of the self-consciousness of the model! How could we get any one to pose for a representative of the Spotless Hero or the Perfect Beauty, of the Graces or of the Virtues? Unless, indeed, we tried "Piety," and adopted the suggestion made to Rogers, when he announced that he would never have another portrait of himself painted except in an attitude of prayer. "Yes," said Sydney Smith, "I suppose with your face in your hat."

My censure for impossibility would fall on photographs of contemporary creations, of Anna Karenina and Daisy Miller, of Daniel Deronda and Richard Feverel, but into my other examples comes the further easily recognised vice of anachronism. It would, to vary a law phrase, be an impossibility upon an impossibility to have a photograph of an imaginary person who was supposed to have existed in the ages before photography was invented. Thus a photograph of Ivanhoe would be even worse than one of Aurora Leigh. But I will take the best instance possible of this class, a photograph representing Don Quixote, by Mr. Lake Price, to whom I apologise for picking out his work as an example. *Corruptio optimi pessemi.* It is the best work on wrong lines which is the most misleading. You saw it here lately. A wonderfully good model was procured; the details were excellently carried out, and the composition and execution were beyond any praise of mine. But it was not, you knew it could not be, the real Don Quixote, and with that all its charm and all its value fell to the ground. Anachronism, of course, would equally upset photographs purporting to represent historical personages, even were models secured exactly resembling people as well known to us as Van Dyck's "Charles I." or the "Philip IV." of Velasquez.

So far I have spoken of anachronism chiefly as it used to be found in exhibition catalogues; in the pictures themselves it is mostly a matter of costume, for faces are not necessarily identified with any one period. In costume the temptation to anachronism is greatest because the necessity for keeping to dresses worn at the present day specially hampers photographers. Whole classes of figures and incidents are thus forbidden to us even as accessories, such, for instance, as were habitually introduced by Cattermole, or are now painted by Sir John Gilbert, to say nothing of the classical figures of Claude and Turner. Modern dress is notoriously a stumbling-block to painters, and it is even more vexatiously in our way, for to them it is sometimes possible to make something of the colour, while adopting unobtrusively the most recent fashion in form, as in some of Mr. Whistler's or Mr. J. J. Shannon's pictures. We, on the other hand, can only render the cut and trimmings, and these fix the date within a few weeks if they are of the latest Parisian mode. To take an actual example, the other day I saw the date of a wedding group settled by the hair and dresses. Now, while on the one hand we avoid anachronism, on the other it is better not to indicate the date of our work too exactly. Although we cannot alter or make typical the face of a model, yet we can do something towards generalising a gown. I mean that it is better to use those simple useful forms which have been worn for generations, and which do not attach closely to any one brief date. I may well be asked to name any instance of such extraordinary constancy and stability, but I think that most rustic garbs and the homeliest kind of women's dresses present no salient marks of recentness or temporary fashion. Such are the shawls once worn over the head by the lower classes almost everywhere, or the kerchief which at times took its place; but there are also classes of men and women whose dresses are adapted to their callings, and can thus never be widely varied. This is more especially the case with those engaged in the earliest occupations of all, the tilling of the land and the care of animals. The groom, the huntsman, the sailor, the hedger, the milkmaid, the haymaker, the butterwoman, the henwife, these types remain fairly constant, and these typical dresses are moreover, a great aid in telling a story with clearness. If costume is to be in fear of anachronism on the one hand, on the other it must never create a sense of incongruity. This is in part an offence against reality. A person in the finest clothes seen bareheaded on a moor strikes us as a phenomenon never seen in nature, if not actually inconceivable. But, on the other hand, the object may be only too real and too true, and yet, like an advertisement on the Great Pyramid, incongruous and discordant with the whole sentiment of the picture. There it becomes vulgarity, in so far as it betrays an imperfect conception of an ideal, a confusion in which an inferior note is struck, inconsistent with the higher harmony at which we aim.

Incongruity is, perhaps, the last of the errors which can be attributed to losing sight of reality. I may be told, however, that there are other photographs, taken from actual models, which are no less unreal than those which I have been abusing; that elaborate groups, acting out little episodes—such, for instance, as some by Mr. H. P. Robinson—are unreal, for had they been genuine and spontaneous, the persons engaged would have broken off when the camera drew up in front of them. "If it were so, it were a grievous fault," but the defect would only lie in the execution. It would only argue the absence of the master art, the art of concealing art. Their fault would be one which could be improved away, a self-consciousness or want of spontaniety, one which it would be possible to cure; the errors I have attacked are fundamental, and can only be remedied by extinction.

I hope I have not wearied you, in regard to reality, with incessant repetition of a truism, and solemnly insisting that two and two make four, and that what is not within reach of a camera is, *ergo*, out of its reach. If I have not said what was too obvious, I hope that neither have I been insisting on a moral now useless. Certainly we are not at present overburdened with ideal work in our exhibitions, or with any pictures which are brimming over with imagination. There is a phrase, introduced, I believe, from America, of "flogging a dead horse": and even to assist at that pastime is not exhilarating. But in the first place there are signs of life about the beast yet; few exhibitions are entirely wanting in photographs which transcend reality and possibility. But my metaphor has broken down, for I do not want the monster to get up and go on, but to die quietly. Secondly, I hope there will be much more activity of imagination in the future; and if this be so, it is important that the old misconceptions and stumbling blocks should be removed, and a start made on the right lines.

To resume. We established reality as an absolutely indispensable condition of photography, and on this ground we found that ideal studies, imaginative portraits, anachronism of dress or person, and incongruity were to be avoided; but incongruity,

as we said, was partly a falling into vulgarity, and vulgarity we will now examine.

II. It is very hard to give any really simple definitions of Vulgarity, for it is one of those things of which it has been said, "I know perfectly well what it means, so long as you do not ask me to define it." If you press me, I cannot think of any better definition than a base material ideal, ahd to that I might add, mostly due to ignorance or sloth. Mr. Quilter is not polite, but he goes to the point when he says Mr. Frith paints life as if it were a Sunday-school treat. Vulgarity and its antidote can only be so generally and vaguely described that it is hard to get any practical good from the description. Here, moreover, it is hardly necessary for me to eaution you against the grosser forms of vulgarity, and the distinctions thus become all the more fine-drawn, diverse, and theoretical. The general remedy prescribed by Mr. Matthew Aruold for his vulgarised middle-class Philistines was culture, the knowledge of the best that had been thought and said. In art, at any rate, this prescription will be very effectual, if we take it in the form of knowledge of the best that has been painted and drawn and earved. I forget who the great modern painter is who always keeps in his studio a fragment of Greek sculpture. "When I am in doubt about any of my work I always try ft beside this, and if it will not go with this I know it is wrong."

Any one who has studied Classic Art and the Old Masters, and has taken the lesson to heart, is not likely to be vulgar, into whatever faults he may fall. The study may not be of much direct use to him, except in draperies, but it cannot fail indirectly to influence his style, as Mr. Lambert showed in his excellent lecture on Pheidias. Of course, it is very possible to be pedantic and priggish, and dull and unpractical, but there is a vital principle at stake; the right and the wrong are worlds apart, and you can see the distance in a moment by two examples, each the best of its kind. You remember Focardi's statues at the Itallan Exhibition,—"You Dirty Boy!" and the two street Arabs selling newspapers, "I was First, Sir!" Take those gamins, place them betide the Parthenon frieze, and gauge your taste by the result.

Unfortunately our remedy of drawing fresh inspirations from the old masterpieces rather fails us at one large and wholesome source of pleasure. The ancients are of very little account in Humour, and healthy laughter is rather apt to be improved out of the world by modern culture. Greek wit is to us in its original form, with one exception, deplorable stuff; perhaps it is that jokes require recutting for each generation. And now in thsse days from lnughing at Leech we have come to smile at Du Maurier, and probably our ultra-refined grandsons will read their *Punch* with muscles and sense of hnmour unmoved. The most vigorous hnmour of to-day proceeds from America, and not from—well, not from Boston. Such hearty laughter as is left proceeds too often from the strongholds of vulgarity, and if that were to have the monopoly of laughter, I fear the future would belong to it. But surely that is not necessary: there is plenty of good fnn in art which is not vulgar. Mr. Charles Keene, Mr. Hrrry Furniss, and the late Randolph Caldecott all within the last few years have caused laughter neither faint nor unworthy.

To take a single instance among photographs. Mr. Sutcliffe's variously-named picture of "Excitement," the rear view of boys looking over a wall. That is admirable art, very good fnn, and excellent taste. The limits must in each case be found by individual refinement, and I can think of no single definite restriction other than that of sympathy: no joke should ever be an undeserved scoff. Forcardi, in a durable statue, degrades humanity into apedom, and asks us to admire the cleverness displayed. There is not a particle of love or tenderness in it, and I do not believe that any man ever did great work without love in his heart.

Before I leave Vulgarity, there are just two points which I would like to mention.

The first is to protest against the humorous misapplication of quotations, debasing the poetical curreney, to adapt a phrase from George Eliot. A burlesque of a paltry thing may reveal its worthlessness, but to ridicule what is really noble and beautiful so as to depreciate its worth is an outrage. The is a great temptation to raise a laugh in order to enliven an exhibition, and I am far from saying that there are no exceptions. Let us only be snre about each instance. There is nothing to be gained by pretending that everything is sacred, but even that humbng is better than holding nothing as unfit for jest.

In the second place, of animals I snall have more to say by-and-bye; here I would only protest against treating them in a vulgar spirit, for they have a character, a dignity, and a nature of their own. Landseer was a great animal painter, but his failing lay on the side of investing animals with too human an expression; in Ruskin's words, "Looking for sentiment or jest primarily, and reaching both by a feebly romantic taint of fallacy" (Mod. P., v. 263). As often happens, his shortcomings are more easily imitated than his merits, and that ultra-humanising and degradation of animals are to be condemned which reach, I hope, the lowest depth in publishing a photograph of a dog with a pipe in his mouth, or a cat in an old maid's cap.

III. Now, after these strictures on unreality and vulgarity, it may be asked, "What are we to do, then, to make pictures by photography?"

As I have said, my whole aim is to ery up originality, and to put down thonghtless and uneducated work. Now that I have explained these prohibitions of mine, I had much rather insist on their positive side, and couch them in an affirmative form,—Be Real and Be Refined. To these I will now add a third,—Be Expressive.

The more we use the camera, not merely to record whatever is in the way where it happens to be set up, but to work ont and give embodiment to an idea, or to render some chosen incident or phase of life, the more art shall we get from it. By selection and adaptation the mind of the photographer is visibly expressed, and in this personal utterance alone lie the springs of interest and vigour in art. Therefore, to cultivate our power of expression, to be able first to make up a story and then to depict it intelligibly, is the best way of developing the artistic capabilities of photography.

It is true that this story-telling is a born gift, but it generally exists in germ, and may be developed by practice and cultivation. In the right surronndings, a very slight incident will go far, and the true artist, who always has his eyes open, is not above helping his memory by a note-book.

A pennyworth of example is worth a pound of preccpt. I will not refer you to any photographs, or distress the modesty of some here, whose names I might mention and whose blushes I should raise, but I will take the painter, Frederick Walker, as the best and most immediately profitable example. He died, you know, quite young, to the great loss of English art, before he was enough at home in oil-painting to allow his fancy free scope, so that for our purposes I would refer you more especially to his water-colours. Here is a photogravure of his picture of geese at Cookham: it is a liberal education in figure treatment. There are more figures in it than a photographer could well introdnce, at any ratc in one exposure, but there is not one which is not full of life and suggestion. I can only fall back on quotation, and in the words of a enlogy, which was perhaps misprinted in one of our most esteemed journals, declare that "it makes a picture to water the teeth of any photographer." Look at the man on the left carrying the oar which makes so useful a line, and telling of the river close by, calls up such a host of fancies and associations: the other man, again, probably a keeper from the Hall, sent on a message, put his head in at the door for a gossip, but cannot stay; and, above all, observe the perfect family group on our right,—the infant poised on the mother's arm, while she talks to some one out of sight, and the two children, the younger losing interest first and beginning to play, while the elder, throwing back her hair, still listens to the talk. These are all mere accessories to the main subject, the girl and the geese, and only in the elder child is the face seen at all; in the others the expression is produced simply by gesture. Take all these figures in, and then turn and consider what the picture would have lost if they had been omitted, and the girl had driven her geese through a village lifeless and deserted, as if stricken by the Plague.

Walker's chief fault was over-idealising his young ploughmen and mowers into Greek gods, but that danger need not frighten you; it will be well if the camera does not exaggerate the clumsiness and heaviness of the rustic. But in story-telling I think he is pre-eminent; for that reason I have begun with him as an example. Among the Old Masters Carpaccio had much the same gift, but unfortunately his work is hardly to be seen out of Venice, and I dare say you would prefer something more recent. Hogarth, of course, is full of such sketches of character, but he is rather too tremendous and too much in earnest for our easier and kindlier art, and in pastorals it is really only in the latter half of this century that there has been realism enough to render these pictures serviccable to us even as suggestions. But in Randolph Caldecott, again, and many of

our recent English illustrators, there are excellent examples and easily accessible. These men did each bit of their work with love, as if they had tried what fresh and charming conception they could give to each detail of it without detracting from the effect of the whole.

No incident, if appropriate, can well be too slight. A child stopping behind its companions to tie a lace, a pair of old women meeting or parting, a wagon leaving a village with children a-swing at its tail; these, and the like incidents, will make all the difference to a photograph: people will care to dwell over it, and looking at albums will no longer be the last resort of the bored or tedious guest.

(*To be continued.*)

Notes.

Among those expected to discourse at the forthcoming Conference (Camera Club) may be mentioned Professor Bothamley, Captain Mantell, Mr. Lyonel Clark, and Mr. A. A. Common.

With respect to his article in the last issue of the NEWS, Dr. Vogel writes:—"Please rectify an error, in type, in my last article in your issue, Feb. 8th, line 30 from down. It must be said there:—'But another thing is it with quinoline red, the best optical sensitizer after cyanine.' Also the signs of interrogation after this sentence and the following are erroneous."

We have heard of cases—happily rare—in which the well-to-do photographer, who has a fine studio and spacious business premises, sneers at his humbler brother, who works out of doors, taking the portraits of holiday-makers at sixpence-a-piece. Dr. Vogel, however, in the *Photographische Notizen*, defends our outdoor fellow-workers against those who take no account of his labours, and he humorously suggests that our out-door friend may exercise a satisfactory moral influence—for might not the money which is paid to him be otherwise spent at the public house? Speaking of wandering professionals, Dr. Vogel mentions that on the Rhone at Geneva he saw, during the past summer, a photographic boat, with glass house and dark-room, an arrangement by which the proprietor can dodge competition by quietly shifting from place to place; and Dr. Vogel pictures the proprietor contentedly looking out from the door of his floating castle, undisturbed by that English amateur photographing him and his belongings, and laughingly offering him copies.

One of the novelties of the times—and one alike useful to amateurs and professionals—is the system of binding up mounted photographs, just introduced by Mr. Zaehnsdorf, and he sends us a book of ready bound up mounts for review.

On taking out a lacing which goes through and through close to the back, the whole system falls to pieces, and we find we have two covers, an arched back and a number of mounts, each of which is doubly-hinged near the back edge by a strip of calico.

The advantage of the system is the ease with which the book can be taken to pieces for mounting the photographs on the individual leaves, and the rapidity with which it can be put together again or re-arranged; indeed, an amateur who makes a point of mounting his photographs on Mr. Zaehnsdorf's special hinge-edged mounts (the hinge part is called the "guard" in bookbinding, we are told) can always make up an album of any special selection at a few minutes' notice.

The double-hinge arrangement enables the album to be opened so as to lie quite flat on the table, a point of some importance; and another advantage is that the mounts and cover are by no means expensive, the album of twenty-five 10 by 8 mounts, sent for review, being published at five shillings. The mounts are of English manufacture (Goodall's), and each batch is tested for deleterious ingredients by Mr. Foxlee before being sent out. The London agents are the Eastman Company, of 115, Oxford Street.

A gentleman was showing his photograph to some friends the other day, when the universal opinion was that it was not a bit like him. "Where did you have it taken?" asked one. "Oh!' it wasn't done at a regular photographer's. My brother, you know, is a superintendent of police at ———, and while I was staying with him I was photographed in the prison by the man who takes the portraits of the prisoners." What an obvious comment presents itself in the value of likenesses as furnished by the police!

"What is that mark by the side of my nose!" exclaimed, the other day, a lady examining one of a packet of cabinets which had just arrived from the photographer's; "it looks like a mole. I'm sure I never had a mole there, and yet I suppose it must be right, for I see the whole dozen photographs have the mark in exactly the same place." The good lady knew nothing of photography, and was unaware that the "mole" was a mark on the negative.

It is curious to find, on the authority of an artist who called on General Boulanger for the purpose of sketching him, that out of a large box full of photographs, all sorts and sizes, none were much like him; though most of them were familiar to the public. As the General is a thorough believer in the value of advertisements, and no man has been photographed more for the purpose of advertisement, the want of resemblance is singular, to say the least. The artist's own sketch is certainly not an atom like the portraits which have been published from photographs, and the conclusion one is forced to come to is that the photographs must have been doctored so as to produce an ideal Boulanger, and one that would be acceptable to the romantic French public.

The habit which the General has of keeping himself out of public view, and of suddenly disappearing, support this hypothethis; but we read that he has no less than three doubles—that is to say, three individuals who are made up exactly like him. We are tempted to ask whether the doubles are made up after the ideal Boulanger as re-

presented in the photographs, or after the real man with the melancholy face and spectacles as drawn by the artist.

This artist, by the way, says of these photographs, that General Boulanger must have known they were unlike him, if he only took the trouble to look at himself in the glass. We are by no means so sure of this. Every man has an ideal picture of himself which he sees when he looks in a glass, and he really has not the least idea how he appears to other people. If the photograph is truthful, its truth is a disagreeable revelation which he is inclined to repudiate; if it flatters, it is a pleasant surprise, for he finds he is better looking than he imagined.

The genial Mr. James Payn assures us that it is by no means unprecedented in the annals of photography for customers to present themselves before the camera in designedly unfavourable attitudes, and in poses of the most deliberately unpicturesque description. They will even, he goes on to declare, close one eye, draw the mouth on one side, put out the tongue, screw up their faces, and, in short, do their best to make themselves less presentable than Nature has made them. When the photographer begins to remonstrate, as he naturally would under the circumstances, the eccentric "sitter" is in the habit of replying—we again quote Mr. James Payn—"Never you mind what I am doing. I don't want to be beautiful, I want to be ugly! I have written to my Jemima Ann (or Eliza Jane, as the case may be) to say that I am very much altered, from fits and that sort of thing, and I hope she will find me so!"

And what do you think is the reason of this strange behaviour in the studio? Why the proceedings we have described constitute a recognised way (according to the author of "Lost Sir Massingberd") of getting out of an engagement without incurring the risk of an action for breach of promise. Eliza Jane, or Jemima Ann, having received the misleading *carte* of her crafty follower, is only too glad to cease keeping company with a lover whose expression has apparently undergone so marked a change for the worse; and her false young man finds, much to his delight, that his trump *carte* has won the trick!

So at least, we repeat, Mr. James Payn assures us, and his experience is, we know, so comprehensive and so varied that he is not to be lightly contradicted. At the same time we cannot but think that his circumstantial statement implies an artless simplicity on the part of Jemima Ann and Eliza Jane, which can surely not be at all common in servant-gal-dom. Again, for this photographic trick to succeed, the sweethearting must be wholly carried on through the medium of the post; and this, we fancy, is a state of affairs which would be rarely found to be in existence in kitchen courtship.

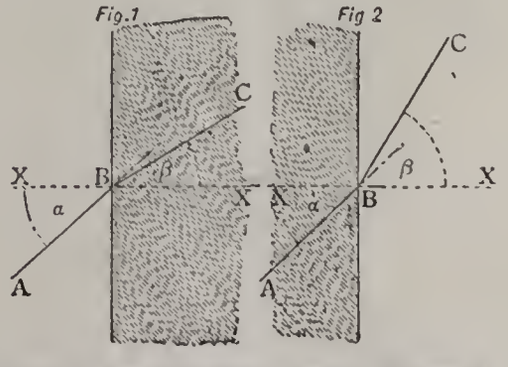
To be engaged to a young man with whom she cannot keep company, or to have a follower who is unable to follow her, would be, to most plain cooks and amorous housemaids, a most unsatisfactory condition of things, and for this reason also we doubt if photographic annals will furnish many cases of the kind Mr. Payn so amusingly describes. And this is, so far, satisfactory; for who shall say, if photographers were really in the habit of thus taking distorted *cartes* and cabinets—"And the same with intent to deceive,"—that they would not lay themselves open to an indictment for conspiracy if Jemima Ann or Eliza Jane should elect to "have the law" of her false, faithless lover?

THE CONSTRUCTION OF PHOTOGRAPHIC LENSES.

BY CONRAD BECK.*

THE paper you have done me the honour to ask me to read to-night will, owing to the extent of the subject, be very incomplete. It is of course, in a single evening, impossible to do more than indicate a few of the main principles that are involved in the construction of photographic lenses; and if in some of my preliminary remarks I weary you by the repetition of matter that "every schoolboy knows," I must ask you to excuse me, as I feel that the only safe way to approach a subject of this kind is entirely *ab initio*.

The theory which has explained the majority of the phenomena of light is that it is produced by vibration in a medium we call ether, which is assumed to permeate everything. Although this theory may be superseded—or more correctly, developed—it is quite sufficiently certain for us to accept its results for the purposes of this paper. The vibration is held to be a wave motion which takes place at right angles to the direction in which the light is moving. The distance between two consecutive crests or hollows of the wave is termed a wave length. This wave length does not depend on the intensity of the light, and for the same coloured ray it is always the same when travelling through the same medium when entering it for another given medium. But should this ray pass into another substance of greater density—as, for instance, from air into water—its wave length will be shortened, and will give rise to the phenomena called refraction. Without, however, entering fully into the causes, let us merely examine this fact we call refraction. We can at once see, by the very simplest experiments (as, for instance, placing a stick in water), that the light which comes from an object in a denser medium is bent on its journey, and as rays of light in one medium alone are experimentally proved to move in straight lines, this alteration of direction or refraction must take place at the surface of the two media. Precisely the same result ensues when light passes from a lighter into a denser medium. But it is observed in the two cases that the direction of the refracted ray is different. In fig. 1, where the ray passes from a lighter into a denser medium,



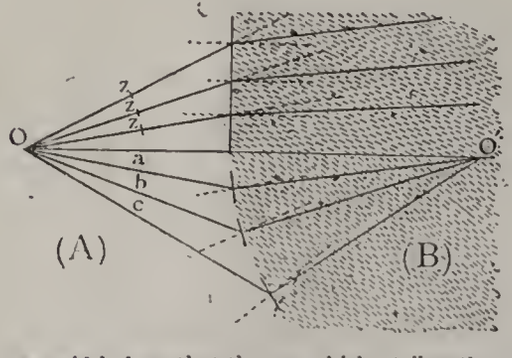
it will be noticed that the refracted ray turns towards the perpendicular to the surface which divides the media, whilst when it passes from a denser into a lighter medium it turns away from this perpendicular, or the normal as it is called. We find, by experiment, that if we take the ray which cuts the dividing surface at right angles it will pass direct into the second medium without refraction, and that rays which impinge on this surface at different angles are refracted to a different extent. It only remains to discover whether there is any law which these re-

* A communication to the Society of Arts.

fractions follow which can determine at what angle any ray will emerge in a given medium when entering it for another given medium. It is curious to find that Ptolemy, in the 2nd century, made observations of the angles of incidence at a surface, and their corresponding angles of refraction. Vitello, a Polish mathematician, in the 13th century, did the same, but the law of refraction was not discovered until 1621 or so, by Willebrod Snell. This law (which is established by experiment) states that when we are dealing with two media of different density, the sine of the angle of incidence, divided by the sine of the angle of refraction, is equal to a constant quantity, which is called the index of refraction; and it was also observed that the incident and refracted rays lie in one plane. The angles of incidence and refraction are the angles which the incident and refracted rays make with the normal; thus, in figs. 1 and 2, the angle of incidence is the angle ABX (α) and the of refraction is the angle CBX (β).

Let us now consider light coming from a point O in one medium (A) fig. 3, say air, and entering another medium (B) which we will suppose denser, say glass. Light will impinge on the dividing surface, which for the first case (upper portion of fig. 3) we will consider flat, at all angles. Let us first

Fig. 3.



note, as we said before, that the ray which strikes the surface at right angles goes through it without refraction. All other rays will be more or less bent, and the law of refraction shows us that those in which the angles of incidence is greatest have greater refraction in proportion than rays of smaller angles of incidence, for if we differentiate $\frac{\text{Sin } \alpha}{\text{Sin } \beta} = \mu$ we shall see that as the angle of incidence is increased the amount of refraction, or the difference between β and α is increased much more rapidly. In the second case, suppose instead of a flat surface we take a series of small facets and place them at right angles to each ray, then these rays will all pass through into the glass without refraction; thus, if we have light coming from the centre of a circular surface, it will pass through it without refraction.

Next (fig. 3, lower portion) let us place our series of facets in such positions that, instead of destroying the refraction of the several rays, we increase it. Let us do this to such an extent that, instead of having a diverging series of rays, we make them converge towards the axis. Now, by properly arranging our plates we can make the three rays, *a*, *b*, *c* (fig. 3, lower portion), converge to the same spot. But since the number of rays is infinite, we shall need to place a series of plates so small as to be merely points. These points will trace a curve, and the form of this curve will be the necessary shape of the dividing surface of the two media, in order to cause a bundle of rays proceeding from a point, O, to converge to some point O', in the denser medium.

Now this is just the proposition we have in photography. It is required to converge the light emerging from one point of the object to a single point on the photographic plate; but as a rule the object is at infinity, and light impinges on the surface in a parallel bundle. The practical photographer must not be misled by this word infinity; it is a relative term, and a distance of twenty feet, for instance, when compared with a distance of two or three inches, is practically at infinity, *i.e.*, we can treat all light which starts from such a distance as travelling in parallel rays. Now the curve which would bring parallel rays to one single point is a conic section, and Descartes showed that if lenses could be made whose sections were ellipses or hyperbolas, they would accurately accomplish this. But, alas! all practical men know that it is impossible to make these surfaces true enough for optical work. One true surface we can make, and that is a spherical one, and this is the one which, for want of a better, we are obliged to adopt. To make it clear why a parabolic or elliptical surface cannot be made, I will merely draw your attention to the fact that, in order to grind or polish a lens surface, a tool must be made of the exact shape of the lens required, the lens must then be ground with emery or some other material until the glass assumes precisely the shape of the tool, and in order to accomplish this it is essential that the glass be moved over the tool in several directions, and that it is at the same time touching the tool over its whole surface during the operation. In practice it is found that the more irregular the motion within certain limits, the more likely the surface of the glass is to be ground equally all over. As an example, let us suppose we wish to make a lens of elliptical shape, the only way in which the glass can be moved in the tool while it remains in contact over its whole surface is by its being revolved on the axis of the ellipse. It is evident that if this be done, as the periphery moves more rapidly than the apex, more will be ground off the edge than the centre, and a true curve cannot be obtained.

What, now, is the effect of using a spherical surface? The rays no longer all meet at one point, and the larger the surface of the sphere we are considering, the more difference is there between the points to which they converge. The error which thus arises—due to the fact that it is necessary for us to use spherical surfaces—is called spherical aberration, and I propose to show what are the devices by which we reduce it to a minimum.

There are only two cases in which it is possible for us to obtain no aberration for light passing through one single surface, and both of these are useless for photographic purposes. The first case we have already mentioned, when the object is placed in the centre of a sphere, but, as we saw, this gave no refraction; the second case is when the distance of the object from the centre of the sphere is equal to a certain quantity—viz., the refractive index multiplied by the radius of the spherical surface. For photographic lenses the radiant point is almost always at a great distance, and its rays being, therefore, parallel, cannot enter any surface as if they emerged from a point comparatively near to the centre of the spherical surface, as this would be.

I shall not weary you by going through the mathematical steps which determine the exact amount of aberration for rays due to refraction through a single surface, but the amount is given by the equation.—

$$\Delta f = \frac{\mu - 1}{\mu^3} (\rho + D)^2 \left\{ \rho + (\mu + 1) D \right\} \times \frac{\gamma^2}{2}$$

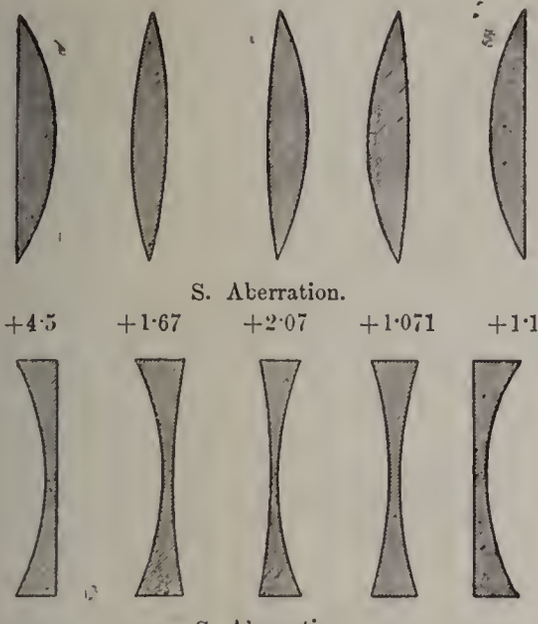
Where f is the reciprocal of the distance of the point to which the rays converge from the refracting surface, ρ is the curvature of the surface γ the semi-aperture, D the reciprocal of the distance of the radiant point from the surface, and μ the index of refraction. In dealing with this equation we must not take the absolute aberration, but take it with reference to the focus, and there is not time to-night to discuss the way in which it varies.

I have previously mentioned that in order to bring a bundle of parallel rays to a point, we require an ellipse or hyperbola; it should be the former when the rays enter a denser from a lighter medium. It is interesting in this connection to note that the most perfect projection lens in existence, the human eye, has for its first surface (the cornea) a portion of an ellipsoid, whose section would thus be elliptical.

We assume, therefore, that the nearer a surface tends towards the elliptical form, the less aberration it will possess, and it is evident that a convex surface is nearer to an elliptical form than a flat surface, and will therfore give less aberration, whilst, at the same time, it has greater refracting power. And we can further see that the nearer we make this convex surface approach the given ellipse (which is determined by the refractive index) the more we destroy aberration. If now we take two refracting surfaces and form what we call a lens, we at once ask ourselves, can we not, by properly combining the two curves, destroy aberration entirely, and yet leave some refraction, for we see that the two do not vary in proportion? We find that we can make lenses of the same refractive power, but with widely differing aberration; but in spite of this, we cannot entirely destroy it, with the kinds of glass that we now possess. We should require a material with a refractive index of at least 4, the possibility of discovering which is altogether beyond our most sanguine hopes.

It is therefore impossible to entirely correct aberration in one lens. We can, however, largely modify it. I have made a diagram showing the relative amounts of aberration which

Fig. 4.



arise from lenses of various shapes, and you will see that the lens with the greatest amount of aberration possesses four times that of the best form. As a general rule, we can remember that when parallel rays enter from a less refractive medium—say air—into a denser medium—such as glass—the more curved the surface turned towards the parallel rays, the less the aberration; the flatter the curve, or the nearer it approaches a flat surface, the greater the aberration.

I have placed at the top of this diagram a series of convex lenses, all of the same focus, giving their aberrations, and below them a series of concave lenses, also of the same focus (only negative), giving their aberrations. If, now, we take a convex lens and place it next to a concave lens, with just the same relative aberration, we shall neutralise the aberration, but since the focus is the same, the refracting power will also be destroyed, and the compound lens will have no power to affect light passing through it. But suppose we take a convex lens with the smallest amount of aberration, and combine it with a concave lens of the largest quantity of aberration, although we get the refraction neutralised, we shall get the aberration far more than corrected, and can reduce the focus of the concave lens, and with the focus, the aberration, which is dependant on the focus, to such an extent that the aberration is corrected, and we shall then have left a considerable amount of refracting power, although, of course, not so large an amount as in a single convex lens.

Let us then see to what conclusion we have arrived. We have found that light is bent on entering a medium of different density, that we can nearly bring this to a point, but not wholly, by a single spherical surface. That a lens will, to a certain extent, correct the error thus formed, but not altogether, but that a combination of two lenses will completely do so.

(*To be continued.*)

Correspondence.

AZALINE AND ORTHOCHROMATIC PHOTOGRAPHY.

Sir,—With reference to Dr. H. W. Vogel's letter in last week's News, permit me to say, in answer to his first paragraph, that I accept his correction, and admit my error in describing Messrs. Vogel and Obernetter's prints and negatives shown at the last Pall Mall Exhibition as 'having *all* been taken behind a yellow screen." I wrote from recollection, having, it seems, especially admired the two plates to which this description correctly applied; but now I ask your readers kindly to modify my statement, and for "all" to read "some."

On the second point—What is azaline? I think Dr. Vogel may have misunderstood me; for, on the 11th December last, when I put this question to Captain Abney at the Photographic Society's meeting, I had never seen it, and was merely quoting an extract from Mr. Bothamley's communication, in which he (Mr. C. H. B.) said that "Azaline is understood to be a mixture of cyanine, or quinoline blue, with quinoline red." Dr. Vogel now says that the above description is correct; but to this I cannot agree, having since procured some of the "Azaline Tincture" from his appointed agent, Mr. J. R. Gotz, and carefully examined the same, I can find nothing but erythrosine or eosine, which Captain Abney also says is contained in it. So here we are at variance, the English evidence all pointing to the efficacy of the eosines, of which, for orthochromatic purposes, M. Attout-Tailfer was the first and true inventor, and Dr. Vogel coming afterwards with what appears to be the same thing under another name.

Azaline or azalèine being the name first given to Magenta red dye, I half expected to find some salt of rosaniline in the tincture, but there is no trace of it to be found therein.

John Spiller.

London, February 12th, 1889.

DR. VOGEL ON ISOCHROMATIC PHOTOGRAPHY.—WHAT IS AZALINE?

Sir,—In an article which appears in your last issue Dr. Vogel states that "Azaline," invented by him in 1884, is a "mixture of cyanine and quinoline red," and that Captain Abney is wrong in stating that it contains eosine.

Perhaps you will kindly allow us to state that the so-called "Azaline," which is sold in this country by Dr. Vogel's agent, consists simply of a solution of eosine in alcohol. In the printed instructions which accompany the mixture, directions are given for its use with ammonia and alcohol, as in Tailfer's patent. This pretended "Azaline Tincture" is, it is stated, sold under Vogel's "British Patent," No. 7,963, June 15th, 1886, which, as will be seen on reference to the specification, does not contain a single word about eosine, the valuable properties of this product as a colour-sensitizer for gelatine emulsion plates not having apparently been recognized by Dr. Vogel until a somewhat latter date,

B. J. Edward and Co.

The Grove, Hackney, London, February 11th, 1889.

Proceedings of Societies.

Photographic Society of Great Britain.

The annual meeting of this Society was held at 5A, Pall Mall East, on Tuesday evening last, the 12th inst., Mr. James Glaisher, F.R.S., President, in the chair.

The minutes of the last meeting having been read and confirmed, the report of the Council was read, commencing with referring to the activity displayed during the past year in the theoretical and scientific aspects of photography; the names of two members, Capt. Abney and C. H. Bothamley, being particularly mentioned in connection with investigations of orthochromatic photography. After enumerating the papers that had been read, and the subjects that had been discussed in the course of the year, an analysis was given of the number of exhibitors and subjects at the Society's annual exhibitions in recent years, from which it appeared that there was a general falling off of numbers in the last year. The adoption of the report having been moved by Mr. John Spiller, and duly seconded,

Mr. T. SAMUELS said that there was an omission from the report of a subject that he thought should have received a notice from the council. One of the references contained was one that members would not like to hear: it was the large falling off in the number of non-member exhibitors. That was to be accounted for by the action of the council in deciding not to grant medals. He understood that the plan, when proposed, was regarded as an experiment. He thought that members were justified in expecting a reference as to the opinion of the council, whether that experiment was to be looked upon as a success or not. Did they intend to do the same next year?

Mr. J. TRAILL TAYLOR said that Mr. Samuels seemed scarcely to recognise the fact that the council of the past year had ceased to exist.

The CHAIRMAN said that at the then present moment there was no council, and that the old council could not indicate the action that might be taken by the new council which was about to come into office.

Mr. SAMUELS repeated that he thought it an omission in the report that the council had not given the Society the benefit of their views upon the experiment that had been made.

Mr. W. BEDFORD said that Mr. Samuels had raised an important point. As to the action of the future council, he thought they should have some idea of the opinion of the members whether or not medals should be given at the Society's Exhibition. If the members at that meeting expressed their opinion one way or other, no doubt the future council would be guided by it. He hardly agreed with Mr. Samuels that the outgoing council could have expressed an opinion on the subject in the report. Any opinion so expressed could only be that of a majority of the retiring council. He had been very much in favour of withholding medals, but he had hoped that the system would have had a fair trial. He thought that it was not well to refuse to grant awards, and at the same time to make a charge to non-members for wall space. He thought this subject should receive attention; other exhibitions did not make this charge. He welcomed other exhibitions, but he thought that the Photographic Society was in a position not to look upon its exhibition in a merely commercial light.

Mr. W. S. BIRD agreed that the question of whether or not medals should be given at the exhibitions was one for the Society itself. When the subject came before the outgoing council, there was an immense majority in favour of the abolition of medals. Finding himself in such a minority, he had thought at the time that he must be in the wrong in considering medals desirable. He suggested that a paper on the "Management of the Photographic Society and its Exhibition" would be very useful at a future meeting, and the discussion would afford an opportunity for eliciting the opinion of the members upon the question of medals.

The CHAIRMAN said that several of the gentlemen who had formed the majority against medals had expressed to him their surprise at the result.

Mr. W. S. BIRD, the treasurer, then read his report, in which the present satisfactory financial position of the Society was pointed out. It was stated that in spite of a falling off of £30 in the amount of subscriptions, and of £20 less received for admission to the Exhibition, there was an increase of £138 in the capital of the Society—a considerably larger increase than had accrued in any preceding year. In expressing his thanks to Mr. Addenbrooke for having taken his duties during a part of the year 1887, he explained that the auditors for that year had taken rather a severe view of the liability of the Society for illustrations in the *Journal*, and the value of some outstanding assets, in the form of advertisements in the Society's journal, and arrears of subscriptions, and as these had yielded more than they had estimated, there was, on the whole, nearly £50 to place to the credit of the Society on those accounts. The auditors of that year, 1887, Messrs. Debenham and Mackie, had, with entire correctness, insisted upon the quarter's rent due at Christmas being included in the liabilities. This had not previously been done, and the effect was to make the 1887 balance appear smaller, and that for the present year larger by comparison. The present balance in favour of the Society was £665 12s. 6d., and he had received authority from the council to add £150 to the Society's investment in Consols.

Mr. H. M. SMITH wished to propose, for the consideration of the new council, the question of affiliating provincial societies with themselves; he was confident that very many would take advantage of such a plan.

The CHAIRMAN said that he had mentioned the subject, and had no doubt that it would come before the new council.

Mr. T. SEBASTIAN DAVIS moved the adoption of the very excellent report. The financial position of the Society was a source of great satisfaction to them all.

Mr. W. E. DEBENHAM, in seconding the adoption of the report, explained that in the estimate which he and his co-auditor, Mr. A. Mackie, had had to make in 1887, they were in some respects thrown upon their own resources, and in matters where they were without proofs, had not felt at liberty to take a very sanguine view of the situation.

A vote of thanks to the treasurer was carried unanimously.

The CHAIRMAN then said that the report spoke of the care of the auditors, Messrs. Debenham and Mackie. They did well to be on the safe side, and he proposed a vote of thanks to them, which was carried unanimously.

Thanks were also unanimously given to Capt. Abney as editor of the *Society's Journal*, and to the scrutineers, Mr. J. D. England, Mr. J. R. Gotz, and Mr. Chas. Sawyer.

The CHAIRMAN expressed the sorrowful feelings of the Society at the loss of their honorary secretary, Mr. W. F. Donkin, who had without doubt perished in a scientific expedition in the Caucasus.

The report of the scrutineers was read, and showed the following members as officers of the Society for the ensuing year:—

President—Mr. James Glaisher, F.R.S., F.R.A.S., &c.

Vice-Presidents—Capt. W. de W. Abney, C.B., &c., Messrs. H. P. Robinson, J. Spiller, F.C.S., F.I.C, and H. Trueman Wood, M.A.

Hon. Treasurer—Mr. W. S. Bird.

Council—Messrs. G. L. Addeubrooke, W. Bedford, W. Blanchard, Lyonel Clark, F. Cobb, W. Cobb, A. A. Common, F.R.S., F.R.A.S., A. Cowan, T. R. Dallmeyer, Capt. L. Darwin, T. Sebastian Davis, F.C.S, G. Davison, W. E. Debeuham, W. England, J. Gale, Chapman Jones, F.C.S., F.I.C., Capt. A. M. Mantell, J. Traill Taylor, Leon Warnerke, and S. G. B. Wollaston.

Mr. J. W. SWAN then read a paper on "Hydroquinone as a Developing Agent," in the course of which he expressed himself as strongly impressed with the opinion that of all developing agents hydroquinone is probably the best. Recognising that the full chemical name of the substance, paradihydroxybenzine, and even its usual name, hydroquinone, were too long for photographers who had shortened hyposulphite of soda into hypo, and pyrogallol into pyro, he adopted another perfectly orthodox name, quinol, by which title he should name it in the rest of the paper. In estimating the various merits of different developing agents, he would select, as the one most desirable, that of energy, by which he meant the power of bringing out the faintest impact of light, and of giving full effect to the sensitiveness of an extremely sensitive plate. Other desirable properties in a developer were, that it should act only where light had acted, and so not produce fog; that, in so acting, a certain amount of density, up to opacity, should be producible; that it should be possible to modify its effect, so as to compensate for over-exposure; that it should not have injurious effect upon the film which formed the vehicle for the sensitive substance; that the colour of the image should not be deceptive; that its action should be reasonably rapid; that it should be innocuous; clean in manipulation; stable, and cheap. Besides these, there was one more important than rapid development, and that was the property of giving gradation of density perfectly proportionate to the degree of the action of light. A number of negatives in pairs, one of each pair being developed with alkaline pyro, and the other with quinol, were passed round. The first pair was to illustrate what the author called energy, and showed the power of reproducing the faint details to be equal with the two substances. The next pair showed power of resisting development where light had not acted, and was in favour of quinol, the pyro developed plate having a coppery fog in the shadows. The third pair showed similar difference in favour of quinol, with plates that had been long kept—nine years—the quinol plate showing no evidence of surface fog. The negatives up to this point had been developed with solutions calculated to have the utmost energy compatible with clean work, both with pyro and quinol. The remaining illustrations showed the effect of varying the proportions of sulphite of soda, and of bromide, in the solution. Mr. Swan concluded by expressing a hope that those who had not yet given quinol a fair trial as a developing agent would be led to do so.

Mr. A. COWAN suggested that the examples shown should be

left for examination at the next technical meeting of the Society, when there would be more opportunity for noting their characteristics.

Mr. Swan replied that the negatives were absolutely at the disposition of the Society.

Mr. T. S. Davis understood that the negatives had had one uniform time of development; if the pyro had been allowed longer, there would probably be a stain.

Mr. Swan said that the developers were compounded to act in the time that had been allowed. He had other examnles of negatives in which great density was wanted. These had been very much over-exposed, and the developer varied to suit.

Mr. A. Mackie observed that of the samples of hydroquinone that were handed round, one bearing no distinguishing label was yellow in colour: were they all equally good?

Mr. Swan replied that the yellow sample probably contained some preservative substance.

Mr. Friese Greene, in view of the importance of the subject, proposed the adjournment of the discussion, which was agreed to, and it stands over until the next ordinary meeting on the 12th of March. The negatives will, however, be on view at the technical meeting on the 26th inst., and hopes were expressed that members would bring negatives to the meetings, illustrating their work with quinol as a developer.

Mr. S. B. G. L. Wollaston suggested that members should bring prints as well as negatives. He was not sure that the abused pyro developed plates would not priut the best, in spite of their appearance.

In connection with the Photographic Society of Great Britain, we may mention that a united dinner of this Society and the Solar Club took place on Monday last, when no less than eighty-four were present. A festive evening was passed under the chairmanship of Mr. J. Glaisher, the President of the Photographic Society.

West Kent Amateur Photographic Society.

The usual fortnightly meeting of the above Society was held in the Institute, Bexley, Friday, February 8th, the President, Mr. Pringle, in the chair.

The minutes of the previous meeting having been read and confirmed, Messrs. Clare and Dempsey were duly elected members of the Society.

Mr. Hawkins exhibited some specimens of shots with a hand camera.

Mr. Reeves showed a negative and prints.

Mr. Pringle showed some specimens of a new variety of collotype printing. The prints shown were characterized by their extreme sharpness and delicacy of detail.

Prints to the club album were contributed by Messrs. Pringle, Hawkins, and Jones.

Mr. Pringle then continued his address on "Practical Photography," this time referring to various priuting processes. In the course of his address he compared the relative merits of platinum and bromide printing, and maintained that as good results could be obtained with the latter as with the former. Not only this, but bromide had one great advantage over platinum, insomuch that weak negatives properly managed would give good priuts—an impossibility with platinum.

Mr. Austen gave the members a few hints on using alpha paper.

A vote of thanks was awarded to Messrs. Pringle and Austen.

The next meeting, on the 22nd inst., will be a lantern evening.

Coventry and Midlands Photographic Society.

The usual monthly meeting of this Society was held on Feb. 6th, Mr. President Andrews in the chair.

The most important business for consideration was the question of the formation of a Lantern Section, and Messrs. Sturmey, Ambrose, and Dew (Secretary) were elected a sub-committee to take charge of the lantern work of the Society. With a view to increasing the interest taken in this branch of photographic work it was decided that, at the next meeting, an exhibition of slides by the members should be held, to which friends should be invited.

Mr. W. D. Welford was then called upon to give his paper on "The Lantern at Home." He commenced by briefly touching upon the manipulations necessary for the production of the slides, and, treating the subject in a humorous manner, went on to describe how the optical lantern could be made the means of giving amusement, pleasure, and instruction combined, at a family or other evening party, laying particular stress upon the necessity of keeping the audience or spectators interested, which could be done by an adroit mixture of fact and fiction in the narrative. Slides by the lecturer illustrating "Child Life," "Scenes on a Farm," and other subjects treated in the paper, were thrown on the screen, and at the conclusion of the paper, which was listened to appreciatively, a hearty vote of thanks was passed to Mr. Welford.

Some slides by Messrs. Ambrose, Owen, and Dew were also shown.

Lewes Photographic Society.

An ordinary meeting of this Society was held at the Glee Room, Cliffe, on the 5th inst.

The President occupied the chair, and the evening was devoted to a discussion on "The Making of Lantern Slides," and some good slides were passed through the lantern by the President, and Messrs. Foxall, Corder, and Morris.

The President also showed some bought slides, for comparison with those of the members, and it was the general opinion that those of the members were equal to the bought slides.

In the discussion on the developer, the respective merits of pyro and hydroquinone were put forward, but the latter seemed to find favour with most of the members.

Mr. Foxall will read a paper on "Carbon Printing" with demonstrations, at the next meeting, to be held on March 5th.

Sheffield Photographic Society.

Mr. B. Taylor was chairman of this Society's meeting on Tuesday night, January 4th, in the Masonic Hall.

A discussion came on along with the minutes regarding the conversazione, it being proposed by Mr. Lowe, "that some person be appointed to scrutinise the exhibits, and give his criticism of them to the members at the next monthly meeting."

The difficulty of finding a censor among the members was very apparent. This was overcome by its being finally arranged that several of the members should send in short anonymous papers of criticism to the secretary, and that he should read the same at the next monthly meeting.

For new members, three gentlemen—Mr. Richardson, Mr. Harrop, and Mr. Smith—were balloted for and elected unanimously.

The lantern slide competition was contested for by five sets of six slides each, which were displayed on the screen by the aid of the lime light, and Mr. Furniss was voted the winner for a very even and well arranged series.

The whole thirty slides were dispiayed on the screen a second time, and commented upon.

Messrs. Davy and Forsdyke were complimented for the able and excellent way in which each set of slides were treated, by their management of the lantern, &c.; this closed the proceedings of the meeting.

Devon and Cornwall Camera Club.

A meeting of this Club was held at the Freemasons' Hall, Cornwall Street, Plymouth, on Wednesday evening, when Mr. R. Murray was in the chair.

Mr. A. A. Carnell gave a demonstration, "Contact Printing on Bromide Paper." He informed his audience that, as they were all aware, during the winter months great difficulty was experienced in printing on ordinary sensitised albumenised paper. The variations in daylight were such that in dark days the negative might sometimes be left in contact with the paper for considerable periods of time, with the frequent results of curious stains and markings, ruining the negative as well as the silver print. He intended, therefore, showing them a simple, easy, and cheap way of overcoming this difficulty by using bromide paper. Of this there were several varieties, and he had heard good accounts of, among others, those prepared by Eastman, Morgan and Kidd, Hunt and Thornton, Fry, &c. But he especially intended to bring to their notice two papers prepared by the Ilford Company. These were Alpha and Ilford slow bromide. He produced two negatives—one dense, the other thin but full of detail—and he purposed making two prints from each negative on both Alpha and Ilford bromide; developing one set with ferrous-oxalate, and the other with

hydrokinone and caustic potash. He had only tried the latter developer for the first time a few days back, but he already much preferred it to any other. The gas having been turned down, the lecturer proceeded to give exposures, varying from four seconds for the slow bromide paper under the thin negative, to thirty-five seconds for Alpha under the dense one. These were successfully developed, the general opinion being in favour of hydrokinone. In reply to questions, the Lecturer stated that he thought printing on bromide paper during the winter months quite as cheap as by the ordinary way on silver paper, taking into account the damaged negatives and spoilt prints occasioned by the latter process. With the Alpha paper, which he strongly recommended, one could get any colour, from dull olive green through pink to black, by varying the exposure and toning, which latter could be done at leisure after development. The hydrokinone could be used five or six times, and thus an entire batch of prints could be developed in the same solution; he therefore considered it cheaper than any other developer.

Mr. Carnell having been thanked for his lecture, some conversation took place as to the possibility of making experiments with the magnesium flash-light, and it was eventually decided to hold a meeting for that purpose on the 20th inst.; a committee being appointed to make the necessary arrangements, provide draped models, &c.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

LAST Monday evening, February 11th, a large number of the members and friends of the above Association assembled at the rooms, Cavendish Chambers, Market Street, for a smoking concert, a most enjoyable evening being spent. A very interesting programme was successfully carried through. The violin solos by Mr. R. Hodges were performed in a masterly manner, and the rendering of the songs by Mr. H. E. Matthews was perfect. Programme:—Pianoforte duet, Bros. Ryde; songs, "Sally in Our Alley," Mr. G. W. Taylor; "Anchored," Mr. T. W. Bridges; "The Last Milestone," Mr. H. E. Matthews; piano solo, Polish dance, Mr. A. Smith; song, "The Sailor's Grave," Mr. T. Hammond; song. "The Star of Bethlehem," Mr. H. E. Matthews; song, "The Diver," Mr. T. W. Bridges; violin solo, "Il Trovatore," Mr. R. Hodges; song, "The Longshoreman," Mr. Stennet; song, "Pretty Jane," Mr. G. W. Taylor; piano duet, "Jockey Polka," Mr. A. Smith and Mr. T. Hammond; song, "Furicula Furiculum," Mr. T. Hammond; violon solo, "Fugue," Mr. R. Hodges, and solo, "The Emporier"; song, "How di do, Dear Boy," Mr. Peatts; piano duet, Bros. Ryde; song, "Will o' the Wisp," Mr. Stennett; song, "Nancy Lee," Mr. T. Bridges; song, "Drawing Room Song," Dr. Crow; song, "Beautiful Love," Mr. Platt; song, "Little Brown Jug," Mr. T. W. Bridges; song, "The Last of the Boys," Mr. Stennet.

BOLTON PHOTOGRAPHIC EXHIBITION.

THE following is a list of the Awards:—

Competition No. 1. (For members only.)—For the best six photographs taken since last Exhibition: First prize—a silver medal with gold centre—John Johnston, M.D.; a second prize—a silver medal—Walter Staton.

Competition No. 2. (For members only.)—For the best six photos: First prize—a silver medal, with gold centre—Walter Staton; second prize—a silver medal—John Lomax.

Competition No. 3. (For members only.)—Prize for the best and most artistic photograph, entirely the work of the competing amateur, preference given to print from untouched negative, won by John Johnston, M.D.

Competition No. 4. (For members only.)—For the best series of six lantern transparencies; size, 3¼ square: First prize—a silver medal, with gold centre—Walter Knowles; second prize—a silver medal—James Leach; William Laithwaite was highly commended.

Competition No. 5. (For members only.)—A gold medal, given by Mr. John Taylor, for the best six prints taken by members who have not practised photography more than three years, won by A. L. Entwistle.

Competition No. 6. (For professionals.)—A silver medal, with gold centre, for the best series of six portraits, won by B. Wyles and Co., Southport.

A silver medal for the best landscape or marine view; also for professionals, W. A. Skill, Lincoln.

In this professional competition, J. P. Gibson, of Hexham, was highly commended.

The professional competitors are E. Kay and Son, Bolton; Weatherley Brothers, Bolton; F. Proctor, Bolton; R. B. Berry, Farnworth; J. P. Gibson, Hexham; Arthur Winter, Preston; G. W. Wilson and Co., Aberdeen; J. Sinnett, Burton-on-Trent; Friese Greene, London; G. Renwick, Burton-on-Trent; A. Clarke, Bangor; J. E. Shaw, Huddersfield; and Frank M. Sutcliffe, Whitby.

The judges were Mr. A. W. Beer (President of the Liverpool Photographic Society), Mr. W. A. Watts (Secretary of that Organisation), and Mr. R. Crowe, of Liverpool.

CAMERA CLUB.

ON Thursday, Mr. J. E. AUSTIN read a paper on "Enlarging." Mr. E. FERRERO occupied the chair. The lecturer illustrated his remarks by reference to large diagrams showing the operations with the solar camera, and daylight enlarging to the sky and to reflectors.

Mr. AUSTIN held that mirrors were greatly to be preferred to opal and white paper reflectors. He further exhibited a series of direct enlargements on Alpha paper, enlarged from whole plates up to 30 by 24 inches.

In the discussion which followed, Messrs. Blanchard, W. A. Greene, Nott, Shipton, Rodgers, Corbould, Davison, Elder, Beck, Foulerton, and the Chairman took part.

A detective camera sent by Messrs. Hinton and Co. was exhibited, also some enlargements lent by Messrs. Fry and Co.

The subject on Thursday, February 21st, will be "Films," when communications on the subject from Messrs. Tolley, G. Mansfield, H. H. O'Farrell, and Captain Barnes will be read or given at the meeting.

WEST LONDON PHOTOGRAPHIC SOCIETY.

A WELL attended meeting of this Society was held at the Addison Hall on Friday, 8th inst., the President in the chair, when Mr. J. D. England read a paper upon "Flash Light Photography."

The LECTURER said that although he purposed giving them a demonstration on taking portraits by flash light, they must not be led to suppose that he was *au fait* in portraiture, and that his experiments were principally confined to testing plates. He had, however, recently made many trials with the various flash lights, and believed there was a large field open to amateurs and professionals, and a new source of pleasure to the lovers of photography generally. Two years ago, Dr. Piffard, of New York, first announced the result of his experimeuts in this direction. He succeeded in taking instantaneous photographs by means of a mixture of magnesium powder and gun-cotton, and since that time, thanks to the improvements in the necessary apparatus, instantaneous portraiture had become possible under what would a few years ago have been deemed impossible conditions. The use of flash light photography had been invaluable in aiding scientific research. Julius Sach had obtained photographs showing the successive stages of the development of the buds and flowers of a certain cactus. In the studio it had also been of service to the photographer, for portraits were constantly taken certainly evidencing the fact that good work could be done by its aid. The light might be obtained: firstly, as introduced by Dr. Piffard, by means of exploding a mixture of gun-cotton and magnesium—gunpowder might be substituted for the gun-cotton, but was not quite so effective; and secondly, by using several expensive mixtures containing powdered magnesium as one of their constituents. These preparations, however, were of a dangerous nature, and the experimentalist should exercise caution in using them; and further, where sulphide of antimony is used the fumes given off by combustion were very dangerous. With some samples of magnesium the lecturer was unable to obtain a flash. This occurred when old powder was used. The standard flash light, as generally used, was produced by throwing magnesium powder through a flame. The important feature of the production of the light was the size of the particles of powder, which ought to be as fine as possible to insure perfect and sudden combustion. Sufficient attention was not generally paid to this point. Oxygen might be thrown through the tube instead of atmospheric air, but the advantage in doing so was not great. The quantity of powder necessary would vary, but five to ten grains was sufficient with a rapid lens and a rapid plate to pro-

duce a fully exposed negative. In portraiture the light should be placed high to the right or left of the camera at a distance of five or six feet from the sitter. The plate and lens should work as rapidly as possible, so that a small quantity of magnesium might be used, thereby shortening the exposure, and not allowing time for the sitter to move the eyes. A great many articles on the subject stated that the gas should be turned down before the exposure was made. This the lecturer thought to be a great mistake, and tended to produce a startled expression. A reflector or white screen should be suspended about two or three feet from the sitter on the shadow side, and if the sitter be placed four or five feet from the background a sharp shadow will be avoided. A good background might be improvised by suspending a woollen blanket, while a linen sheet would make a good reflector. If what he had said that evening resulted in inducing others to take up an extremely interesting department of photography which he had brought before their notice, he should feel amply repaid for any little trouble he might have incurred.

At the conclusion of the lecture, which had been illustrated by many beautiful experiments, Mr. J. D. England exhibited a variety of flash lamps.

Mr. J. A. Hodges said, as the information might be useful to members, he would ask Mr. England which he considered the best form of lamp to use?

Mr. J. D. England said there were many forms equally satisfactory, but personally he preferred Hinton's, which produced a large and luminous flame.

Mr. Hargreaves wished to know whether the fumes of burning magnesium were injurious to picture frames and similar articles?

Mr. England thought no injury need be apprehended—any deposit could easily be removed with a light dusting brush.

Mr. Hart then proceeded to give a description of his lamp, and demonstrated its action.

The President then informed the meeting that Mr. Bonnetto had been unable to complete his promised paper in time for that evening. He had, however, very great pleasure in introducing to them a gentleman whose name was a household word among photographers (Mr. Warnerke), who was now on a visit to this country.

Mr. Warnerke (who was received with enthusiasm) said that when he received their President's request to make some communication to the new Society he had only just returned from Russia, and consequently he had not had leisure time to prepare an elaborate paper for the occasion. However, he had brought with him a flash-lamp which he had used many times on his journey, not knowing that the subject for discussion that evening was to be "Flash-Light Photography." The lamp was devised by a friend of his (a Russian gentleman) Mr. Gratcheff, and although it was not so elaborate in design as some which had been shown, it was capable of doing good practical work. Its remarkable feature was its extreme portability. As they saw, it could conveniently be carried in the pocket. In shape it was like a small metal pill box, about 2 inches in diameter; a small elbow tube passed through the side, to one end of which was a tube with pneumatic ball; the upright portion of the tube received the magnesium. The box was then filled with asbestos, and a disc of wire gauze completed the apparatus. Although the principle of this lamp was the same as many others, it had some special points; the quantity of magnesium required was extremely small; as much as would lie on the end of a nib of a pen was sufficient for ordinary purposes. This was a great advantage when using the lamp in a small apartment; many lamps, on account of the quantity of smoke they produce, were very objectionable. Two lamps, judiciously placed, would be found to give the best results, and would prevent heavy shadows. Mr. Warnerke then, by means of a detective camera and two of his lamps, took a portrait of the President and the two Secretaries. The speaker then exhibited another form of lamp with which a succession of flashes could be obtained without recharging. He said this lamp would prove very useful in photographing dark interiors and similar subjects where one flash would not give sufficient exposure.

The President enquired whether the flash light had been used for portraiture in Russia.

Mr. Warnerke said it had already been used for that purpose. He considered that it would be an immense boon to the amateur, who had not often the means of properly lighting portraits and groups. He thought amateurs ought to derive great pleasure from taking portraits of their friends, as in the future such photographs would prove to be of far greater interest as reminiscences than any landscape photograph.

Mr. J. D. England had said that it was better to leave the ordinary light burning in order to avoid startling the sitter by the flash, but a little judgment on the part of the operator would avoid that. He had seen a theatrical group of about one hundred persons taken successfully on a 12 by 10 plate, and the lighting was quite natural. Such an exposure could not have been made by daylight. Flash light preparations containing chlorate of potash were very objectionable and dangerous. When his firm were exhibiting at the late exhibition at St. Petersburgh, a serious accident happened to one of his assistants, who, when operating with the powder, incautiously left the lid of the jar containing the mixture open, and the result was a serious explosion.

In conclusion, Mr. Warnerke said he was pleased to know that a new Society had been formed, and he wished them all success.

The President said it would probably be conceded that flash light photography was a most important subject, and one which deserved the attention of both amateurs and professionals, and he was very gratified to see such a large attendance of members. He could say without exaggeration that the present was the most important meeting upon the subject which he had yet attended.

Mr. J. A. Hodges then exhibited a new form of lamp just introduced by Sands and Hunter, the design and workmanship of which were much admired.

A vote of thanks to Mr. J. D. England and Mr. Warnerke terminated the proceedings.

On Friday, 22nd inst., Mr. T. Stafford Hazeon will read a paper on the "Autotype Process;" visitors are invited.

Society of Amateur Photographers of New York.

Regular Monthly Lantern Slide Exhibition.—The committee on papers and publications send us the following report:—The exhibition took place on Friday evening, January 25th, at the rooms of the Society, 122, West 30th Street, and was largely attended, there being as usual a great many ladies. The first half of the exhibition included about sixty slides contributed to the American Interchange by the Philadelphia Amateur Photographers' Club, and represented the work of twelve different members. There were some beautiful English road scenes by Mr. Alfred Clements, very pretty views of waterfalls by Mr. F. S. Cunningham and Mr. Charles Truscott, excellent views in Florida by Mr. H. L. Roberts, "Southdown Sheep" by Mr. Edmund Stirling (a very effective animal study), while "Winter on the Brandywine" by Mr. William H. Walmsly was a very striking and pleasing snow landscape. The work of this Club is much superior to that formerly exhibited. A brief intermission followed, then about fifty slides made by members of our own Society were shown. They represented various subjects, mostly of views near and in New York, and the work of Messrs. L. P. Atkinson, Major George Shorkley, A. L. Simpson, J. H. Stebbins, C. C. Ronmage, jnr., C. S. McKune, H. T. Duffield, J. Wells Champney, William M. Murray, H. J. Newton, John T. Bussing, Dr. John T. Nagle, C. J. Hine, Miss Catherine W. Barnes, and Rev. A. H. Hall, of Meriden, Conn. His pictures were mostly studies of children, and were quite novel in their way. The pictures of the other members were up to the usual standard, and were pleasing and interesting. The lantern was operated by Messrs. Beach, Simpson, and Cobb; Mr. H. T. Duffield announced the subjects. The seating of the audience was attended to by Mr. A. L. Simpson, who performed his duties with his usual politeness and good nature.

President Canfield, owing to a painful accident, was obliged to be absent. In his stead, Mr. Beach announced that a special meeting commemorative of the birth of photography would be held on the evening of January 31, at which several of the oldest photographers in the city would be present. On February 12, "Improvements in Photogravure Processes" are to be explained by Mr. Ernest Edwards, accompanied by a practical demonstration; and on February 20, a special lantern slide exhibition representing the work of Mr. Richard H. Lawrence, called "A Trip with a Detective Camera through France and Norway," is to be given.

The lantern slide committee has under contemplation the collection of a special set of slides illustrating "Interesting and Picturesque New York," and asks the aid of members in furnishing slides.

PATENT OFFICE LIBRARY

Talk in the Studio.

ROYAL INSTITUTION OF GREAT BRITAIN.—The following is the syllabus of a course of eight lectures on "Experimental Optics" to be delivered by Lord Rayleigh on the following days at 3 o'clock:—February 23rd, March 2nd, 9th, 16th, 23rd, 30th, April 6th, and 13th, the subjects of the course being Surface Colours; Fluorescence; Wave Theory; Newton's Rings; Interference; Shadows; Diffraction Gratings; Resolving Power of Instruments; Polarisation; Double Refraction; Colours of Crystalline Plates; Nature of Common Light; Rotary Polarisation; Invisible Radiation.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—The usual weekly meeting was held on the 7th inst., Mr. E. P. Everett in the chair. C. H. Cooke asked the members' opinion as to whether a transparency, for the purposes of enlargement, would be best made on a slow bromide plate, or by the carbou process. Mr. W. E. Debenham said carbon transparencies were excellent for enlarging purposes. If it was a question of fineness of grain, he should give preference to collodio-bromide. Mr. J. B. B. Wellington had found it very easy to get good carbon transparencies. Mr. A. Cowan asked what rule would be taken in enlarging two companion pictures, one being a lady with a high chignon, and the other, a gentleman with a bald head and long beard? Mr. F. A. Bridge would take, as his guide, a line drawn across the eyes of each face. A question was raised as to the best means of obtaining uniform illumination over the whole of a plate without a condenser, daylight not being available. Mr. W. E. Debenham recommended using two sheets of ground glass with several gas jets behind. Mr. H. S. Starnes said Dr. Maden had suggested cementing two glass clock faces together and filling with water as a cheap form of large condenser. Mr. J. Traill Taylor said, in order to have perfect illumination, the focus of the condenser should be long. He suggested instead of the condenser referred to by Mr. Starnes, to give preference to a glass nicely bent and silvered, and used as a reflector. A piece of glass could be easily bent by the followiug method. Cement the sheet of glass to be bent on to the top of a deep iron ring. A vacuum is formed underneath it by heat, which will cause the glass to curve inwardly, and would answer very well. Mr. Haddon read from the *Freeman's Journal* particulars of the recent fatal accident from an explosion of hydrogen gas, by which it appears that the bottle that burst really contained a mixture of hydrogen and oxygen gas which became ignited. This appeared to be proved by the body showing signs of having been burnt. Mr. Haddon said a mixture of the two gases would not explode when the pressure was very high, as the outrush of the gases would prevent the flame from entering the bottle. This would only be the case while the pressure was kept up. Directly it got weaker the flame would fire back. Mr. J. Traill Taylor had made several experimeuts with the mixed gases with a view to prevent the flame travelling back. The gas would explode even when passed through a tube filled with very fine shot. Mr. A. Haddon stated that with the gases in proportion the flame travelled at the rate of 1,800 feet per second. One of the most powerful explosives known was fulminate of silver. He related an instance of an experimenter; on pouring some into his hand it exploded and drove the bones of the hand through the boards of the table.

PHOTOGRAPHIC CLUB.—The meeting on February 20th will be a lantern night, with a discussion on "Lantern Matters," instead of on the 27th, which will be devoted to an exhibition of photographs and the reading of a paper by Mr. W. Cobb.

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," should now be sent to Mr. Spiller, who is alone responsible for all which appears under that heading.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

H. D. (Tunbridge).—Your impression is quite correct—the tilting up of the lantern is as bad as tilting the camera; it always produces distortion, and sometimes a want of definition, for the top and bottom of the picture on the screen cannot be brought equally well into focus. It may, however, have been a necessity on the occasion mentioned to get the image clear of the heads of the people, and in consequence of too low a staging being employed. Of course the lantern, if kept truly level, would require to be mounted as high as the centre of the screen; portable apparatus does not always provide for this necessary height, and therefore, if the lantern must be tilted up a little, the bottom of the screen ought to be thrown back to compensate. In this way good definition without distortion might have been secured.

T. L. M. C.—"Descriptive Astronomy," published by W. and R. Chambers, London and Edinburgh.

INSURANCE.—You have started a very important question, for since the introduction of dry plates the fire-risk must have been considerably reduced, and the rates charged ought to be modified in proportion. This subject was discussed in the NEWS two years ago (see Vol. XXXI. pp. 41 and 60), and again on the 20th of July last, but it does not yet appear that any relief has been granted. The London and County, North British and Mercantile, and the Phœnix Insurance Offices, have had the question before them, but we are unable at the moment to give a decisive report. The matter shall have our further attention; meanwhile there is no help for it but to go on paying the "extra risk" premium until your representations are successful in getting it reduced. In this effort we will try to aid you, if only you give us the name of the office.

ALEX. M. MORRISON.—Begin by grinding a double convex and a meniscus lens, the curves of which will have to depend upon the refractive index of the glass. Read up the papers of Sir D. Salomons and Mr. T. R. Dallmeyer, of last year, and the latest account of "Photographic Lenses," by Mr. Conrad Beck, in the *Journal of the Society of Arts*, for the 1st instant.

ELEPHANT.—The best mountant for your purpose is made by soaking glue in cold water until quite soft. Then pour off the excess of water and liquefy the soddened glue at a gentle heat. When quite melted, add methylated spirit very gradually with constant stirring until the bulk is about doubled. Strain if necessary through muslin, and keep it in pomade bottles. When required for use, the spirit glue may be liquefied by standing the bottle containing it in warm water; it is then applied with a bristle brush to the back of the prints, which must be dry, and laid down immediately on the marked leaf of your album. It is a good plan to work backwards; that is to say, begin by mounting the last print of your book, and in this way avoid bending a newly-mounted page.

SODA.—1. Your proceeding to copy old book illustrations for lantern exhibition is perfectly justifiable, but you cannot treat recent publications in this way without first asking leave of the author or publisher. In most cases this would be freely given, as in the instance mentioned. 2. When it is said that one part by weight of any chemical salt is soluble in 10·5 parts of water, you are to understand that 1 lb. of the substance will dissolve in 10½ lbs. of water, making, of course, in all, 11½ lbs. of the resulting solution—not that the *total weight* of such solution will be only 10½ lbs. 3. The Winstanley barometer should be fitted up at very small cost. We cannot quote exact price; much will depend upon whether you are able to make the glass bulb and chain for yourself. You must not let it get frozen.

COQUET.—For removing the colouring matter taken up by your silver prints by contact with red blotting paper, we should advise you to try a solution of sulphite of soda, which readily discharges vegetable colours without acting upon the photograph. The prints must afterwards be washed again to get rid of the excess of sulphite.

WM. THOMSON.—To prepare a negative for retouching, you may either coat it with a varnish composed of five grains of gum dammar dissolved in 1 ounce of turpentine; or use Fritz Luckardt's retouching varnish made with sandarac and spirit. The proportions are given at page 206 of the YEAR-BOOK. Or, lastly, you may dull the surface of your ordinary varnish coating, and give it "tooth," by rubbing with the finger dipped in tripoli.

A. B. C. (Hyde).—1. Gelatino-chloride plates are best for transparencies. 2. Edwards and Co.'s isochromatic plates, which will work without a yellow screen. 3. Yes, 10 inches focus would be ample for a half-plate camera. 4. That you mention is highly approved. 5. We will enquire about it.

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SPREAD OF HYDROKINONE DEVELOPMENT.

THE paper read by Mr. J. W. Swan before the Photographic Society of Great Britain at its last meeting affords a yet further proof of the interest which the use of hydrokinone as a developing agent is now exciting, and of the increasing use made of this addition to the store of our photographic reagents. Our readers will have been prepared to expect these results, and present indications point to a continuance in the advance in public favour accorded to the substance under discussion. One of the most notable of the evidences of this growth in favour is the fact that two at least of the great manufacturing dry plate firms now send out with their productions formulæ for the use of hydrokinone, and appear to give preference to this developer over those which have hitherto been customarily employed.

Mr. Swan's paper should prove serviceable in more ways than one to the photographer who is about to try hydrokinone as a developer. In the first place he will be told not to expect too much, or rather not to expect advance in a direction where, however much it may be desirable, there is nothing to be actually gained. We refer to the power which the author of the paper calls energy—not, perhaps, the best or most characteristic term that could be applied to the special quality to which he refers it—that of bringing out a visible image with the least possible amount of exposure. In this particular quality Mr. Swan finds no difference between hydrokinone and pyrogallol with ammonia, when both developers are pushed to the utmost of their power. We remember in this connection to have heard a more general and sweeping statement recently made in a paper read before another Society, in which the author gave it as his view that all developers possessed the same power, when pushed to the full extent of their work, of bringing out an image impressed with the smallest quantity of light. Be this as it may—and such an assertion must at present be looked upon rather as an hypothethis than as an authoritative statement of fact—we may accept Mr. Swan's statement of equality in this respect between the two developing agents particularly mentioned, hydrokinone and alkaline pyro, as one which is in accordance with the experience of most practical workers who have used them both fairly.

Whilst, however, we must not look to hydrokinone to give us actually greater sensitiveness to weak radiations of light, there are, according to Mr. Swan, certain qualities which are characteristic of it, and these qualities will in some cases bestow upon the negative a selective power to distinguish more clearly between the places where light has not acted, and those which have received a weak impression. He claims for hydrokinone in a high degree, which he truly says is a great advantage, that it refuses to recognise fog-producing tendencies, and only pays respect to the disturbance set up by light. The effect of this selective action will practically be to produce an image which in the negative developed with hydrokinone will indicate weak radiations; whilst in the pyro developed one the faint impressions will be lost, owing to the unexposed portions of the plate being filled up with a deposit which will nearly equal in printing density the deposit representing the weakest impressions of light. The difference to which we have referred was strongly illustrated by a pair of negatives shown by Mr. Swan, one of which, the pyro-developed one, exhibited a strong copper fog, whilst the other, developed with hydrokinone to the same extent, possessed perfectly clear shadows.

The advantage of clear shadows is one that will not easily be overlooked, although writers have at times been found to declare their preference for shadows that are somewhat veiled or misty. There has probably been some misunderstanding or cross-purposes when the argument has been taken up for and against clear shadows. The sort of clear shadow that proceeds from an insensitiveness to weak radiations of light will of course tend to harshness; but that the deepest shadow in nature should be represented by a clearness in the negative compared with the weakest registration of light of which the plate is capable, hardly admits of a doubt.

The particular formula given by Mr. Swan in his paper contains caustic potash as the alkali. It will be remembered that we have recently referred to the advantages conferred upon the hydrokinone developer by the use of alkali in the caustic state. Whether or not the balance of advantage is on the side of using caustic alkali alone, or in conjunction with a carbonate, is a point that will require considerable experience to determine, even if it prove that there is any decided advantage in the one or the other method of proceeding. It may, perhaps, turn out that it will depend upon circumstances which plan is best to adopt, and that under some conditions, or for some purposes, it is more advantageous to use only the caustic alkali, and in others to employ the mixture of caustic and carbonated alkali. It is noticeable, however, that the use of caustic alkali bestows certain advantages, rapidity of action being one of these, and according to several writers and experimentalists greater brightness at the same time. As to whether caustic potash, to which Mr. Swan gives such decided preference over caustic soda, is so much superior, there appears to be a considerable difference of opinion. Here, again, is room for practical experience to determine.

For the purpose of making transparencies, hydrokinone development is very generally recommended. It should, therefore, be particularly suitable for making reproduced negatives. In this field, as in others, we shall doubtless have many workers practising, and some of them recording their experience for the benefit of others. The result of these experiences cannot fail to be of service to the cause of photographic progress.

SUTER'S RAPID APLANATIC LENS.

SINCE the introduction, some twenty years since, by Steinheil, of lenses of a doublet form, having so large an aperture and so little spherical aberration that they were styled aplanatic, it has been very generally recognised amoug opticians that lenses constructed more or less closely upon that model are those which will take the place of others of earlier construction. Steinheil's model has ever since been most extensively followed ; there is, indeed, scarcely a photographic optician who has not adopted Steinheil's principles, without, however, for the most part, using the word aplanatic in the description of the instrument.

With the new optical glass that has more recently been introduced, it has become possible to make a fresh advance in the direction of aplanatism, in virtue of which lenses may be constructed having larger apertures, competing with the Petzval or portrait lens in rapidity, whilst preserving the cemented surfaces and general resemblance to the Steinheil model. Iu fact, lenses of this character are the only ones that seem at all likely to supersede the Petzval for the rapid work for which the latter were originally constructed.

Amongst the latest addition to the stock of photographic objectives we have pleasure in noticing an instrument by Suter, of Basle, a maker whose lenses take rank with the very first of the old and well-knowu opticians. The lens submitted to us has been put to the practical test of the camera, and come out very satisfactorily from the ordeal. The leading feature of the lens is the perfect manner in which spherical aberration has been corrected, whilst enlarging the aperture so as to render the instrumeut serviceable for rapid exposures approximating to those obtainable with the old portrait lenses. The definition we fiud excellent when used with full aperture, and at the same time the marginal definition is good, a result obtained by reducing astigmatism to a minimum. It is, indeed, a lens we value, and to the using of which, during the coming season, we look forward with some pleasure.

As accessory points, we may mention that the lens is supplied with diaphragms calculated and marked on the U.S. system, the system, now so well known, adopted by the Photographic Society of Great Britain, in virtue of which the relative exposures are at once indicated by the numbers engraved upon them, and is fitted in a neat, serviceable case of unvarnished leather, affording a very desirable protection, whilst adding but very slightly to the bulk of the instrument. Mr. J. R. Gotz, of 19, Buckingham Street, Strand, is the London agent for Suter's lenses, and we anticipate a considerable demand for this latest addition to their number.

ORTHOCHROMATIC PHOTOGRAPHY.

BY CAPT. ABNEY, C.B., R.E., F.R.S.*

As far as I can make out, the principal objection to the theory I have given is one which at first sight is plausible, but is not a valid one ; the objection is, that as it takes *time* to bleach the dyes, the exposure would have to be very prolonged before any oxidizing takes place.

My reply to this is, that the amount of dye oxidized need only be infinitesimal to produce an infinitesimal reduction of the silver salt. When a plate is exposed in the camera, the amount of silver haloid reduced is perfectly inappreciable except by means of development. It matters not whether the nucleus on which development takes place is produced by light acting on the silver salt, or whether the nucleus is formed by the action of light on another body in contact with the silver salt which reduces it.

The question comes to this. At what period of exposure of a dye does the alteration in it commence ? The answer is, that the effect is immediate when our units of time are considered. In one second of time billions of impacts of the ether waves are made on it, so it is not difficult to imagine that the time when the waves have not swung apart the atoms comprising at all events one of the molecules which form the compound to such an extent as to cause a separation must be measured by millionths of a second at most.

In reference to the chemical action of light ou dyes, I would recall some experiments, published iu the PHOTOGRAPHIC NEWS and elsewhere, made several years ago by Dr. Minchin. He coated metallic silver and platinum plates with dyes, and made them the plates of a cell, and connected a galvanometer with them. He fouud that when light fell on the dyed plate a current was caused to flow in a certain direction, proving that a chemical action took place in the dye, and not a heating effect. Becquerel many years ago proved that a current was produced when it fell on chloride of silver, with which one plate of a similar cell was coated. In other words, electrical action was shown by the chemical decomposition of the compound in contact with one of the plates. Some three years ago I made various experiments ou this matter. I have not had time to collect all the results of my experiments in an orderly shape, so have deferred giving them till a more conveuient time. I may say, however, that all my experiments point to the action of light on sensitive substances on a dye being always largely chemical. For instance, on the surface of a silver plate silver chloride was produced. An exposure of this to white light as one of the pairs of plates iu a cell filled with an electrolytic liquid produced a deflection of the galvanometer needle—the same light after passing through yellow glass none. The plate was removed and coated with a film containing eosine. White light produced a deflection, and through yellow glass there was also a deflection. Eosine alone on the plate, when exposed to the yellow light, gave a deflection of the galvanometer needle. This showed that a chemical action took place in the green rays where the eosine absorbed, no matter whether the chloride was there or not.

I have touched upon the theory in this place but briefly, and shall, throughout these papers, revert to it from time to time in order to meet certain objections which have been made to it, but which it will be more convenient to attend to as the practical part of the subject is under treatment.

As I said before, the spectrum work cannot be dismissed, as we shall learn much from it, and it will be my next object to show how the spectrum work leuds itself to supporting the theory propounded.

In a paper quite recently read before the Photographic Society I have shown how the sensitiveness of any plate to the spectrum can be quantitatively measured. To make this series of papers complete it may be well to indicate the manner in which this is done :—

To do this it is necessary to have a kuown scale of density on the plate, on which the photograph of a continuous spectrum is takeu, and also to have a means of referring the photograph of the spectrum to the spectrum itself. When this is done the measurement can take place.

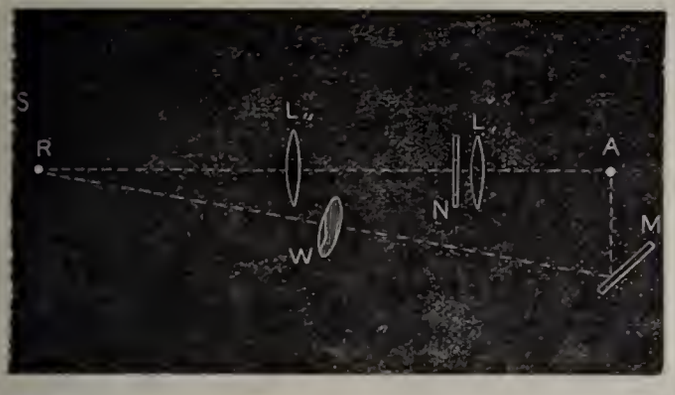
The mode of measuring the photographs I gave in a paper read before the Photographic Society in June, 1887, and was as follows :—

"The light, whatever it may be, is placed at A, a lens, $L_{,}$, at distance of its equivalent focus, in this case 9 inches. The negative, N, is placed in front of this, and auother lens, $L_{,,}$, throws the image on the screen, S, in front of which is a rod, R, whose shadow is cast by the light coming through L .

"This is the ordinary optical lantern form of apparatus. At one side, at a convenient distance, I place a mirror, M, with the angle so adjusted in azimuth that it reflects the light from A over the patch illuminated by the lens $L_{,,,}$ This naturally throws another shadow of the rod along-

* Continued from page 708, vol. xxxii.

side the first shadow. The screen, S, may be transparent or opaque, whichever is deemed best. Where the shadows of the rod fall, I cut out a square mask to enable me to view the two shades without distraction to my eyes by glare from adjacent parts. It will be seen that as the



light and the reflected beam are stationary, the method of varying distance cannot be adopted to vary the intensity of the light. To obtain the necessary variation I employ revolving sectors. These sectors are connected with a small electro-motor working with 4 Groves' cells. The aperture of the sectors can be increased or diminished during motion by a simple arrangement. This is an admirable plan of graduating light, and answers for all purposes of the sort. It will now be apparent that should the light vary, the results will not be vitiated in the least, since the original light is made to act as the comparison light as well."

The following is a print from a spectrum negative taken on a bromo-iodide gelatine plate, and will show the manner of proceeding. The top band is the photographed continuous spectrum, from which the sensitiveness of the plate to the various colours is to be measured. The second band is the spectrum of lithium and sodium. The third row of squares is the scale of density. The continuous spectrum in this case was taken by means of gaslight, the sodium and lithium spectrum with the arc light, and the scale made by exposing successive portions of the plate to the light of a paraffin lamp at a distance of ten feet, for varying times, progressing from ten seconds.

The negative is placed in the holder, and the image of the portion to be measured brought on the white screen.

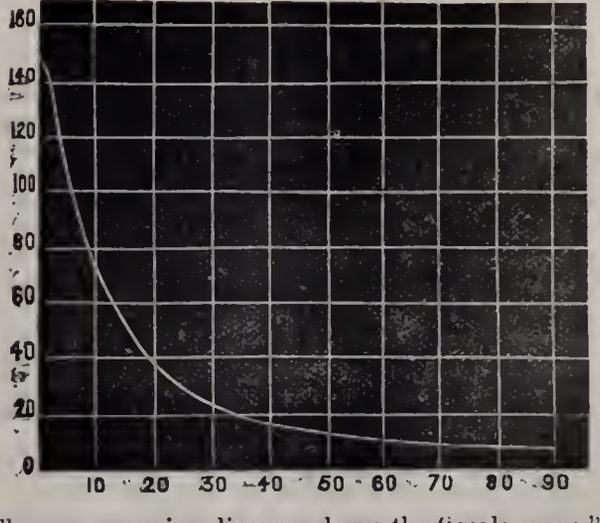


By equalizing the shadows of the rod cast by the light and passing through the negative, and the other through the motor, the intensity of any part of the negative can be measured; always measuring as a reference the bare plate. The square patches are measured with a thicker rod, whilst the spectrum is measured at fixed points in its length by means of the shadow cast by a marking needle about $\frac{1}{8}$ inch in diameter.

The angular aperture of the sectors required to be used in front of the reflected light in order to make the two shadows of the rod equal when the light through the negative is that coming through the bare glass, is used as the standard, and all other densities are referred to it. Thus, supposing the light coming through the bare glass requires an angular aperture of 70°, and that coming through the deposit on a certain part of the negative to be 10°, the density of deposit is $\frac{6}{7}$ of total opacity. To obtain the value of the density of deposit a curve is made from the scale, putting the number of seconds exposure along a straight line, and placing perpendiculars of a height equal to angular apertures of the sectors required, or the density of deposit with these times of exposure. From that curve the value in seconds of exposure is obtained for any density measured in the spectrum, and that is equivalent to the intensity of photographic action. The curve of sensitiveness of the spectrum is then derived from these.

An example is given in detail of the bromo-iodide plate already referred to. The opening of the sectors required to balance the light transmitted through the squares was—

Bare glass	151°
10 seconds' exposure	75°
20 ,, ,, ...	39°
30 ,, ,, ...	24°
40 ,, ,, ...	17½°
50 ,, ,, ...	15°
60 ,, ,, ...	12°
70 ,, ,, ...	10°
80 ,, ,, ...	8½°
90 ,, ,, ...	7°



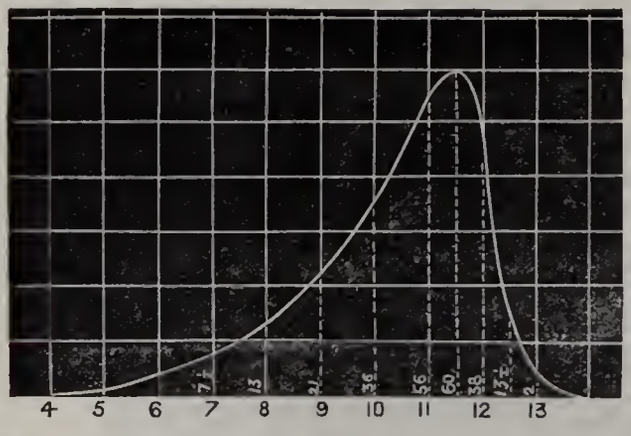
The accompanying diagram shows the "scale curve."

The following are the readings and the scale value of the density of the spectrum :—

No. of division of scale.	Angular aperture of sector.	Density curve.	Sensitiveness from scale.
4	147	4	½
5	141	10	1
6	91	60	4
7	51	100	7½
8	28½	122½	13
9	18	133	21
10	9½	141	36
11	5½	145½	56
11½	5	146	60
12	9	142	38
12½	27	624	13½
13	126	25	1¼

and from this the diagram accompanying has been constructed.

It will be now apparent how all the curves of sensitive-



ness have been arrived at, and the method of construction will not be repeated.

Further from the second spectrum (the sodium and lithium spectrum) the position of the following Fraunhofer hues have been ascertained to correspond with the divisions of the scale into which the measured gas spectrum was divided.

D=14·4 E=13·1 F=12·1 G=9 H=6·7

D is in the orange ; E in the green ; F is the commencement of the light blue, which extends towards 11 ; G is in the violet blue ; and H the limit of the violet. This gives us a reference for the effectiveness of the different colours, and will be entered into more fully subsequently.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

BY W. M. ASHMAN.

EIGHTEENTH ARTICLE.

BEFORE passing to the subject of fixing, a few words must be written concerning hydroquinone. Although considerable progress has been made in the use of this developing agent, it is inadvisable with our present knowledge of the properties of the commercial product to recommend its general adoption so freely as some advocates have already done. The early samples obtained of this substance being not only very dear, but variable in quality, and the first formulæ published by experimentalists proving so widely different from each other, the results even hardly satisfactory, led many to abandon its further employment. In contrast with pyrogallol, whereas that re-agent is known as to its purity, by the feathery lightness and whiteness of its crystals, and the greatness of its bulk, hydroquinon will not occupy one tenth of such bulk, and its colour in the best obtainable samples is lemon yellow. Dr. Byks' preparations answered this description. The present cost being less than double that of pyrogallol, and as nearly half the weight of hydroquinon effects the purpose, it becomes more economical. The majority of the formulæ hitherto published provide for the separation of the developer into two solutions ; this, of course, is of great assistance where subjects and exposure vary considerably, but there is much to be said in favour of one solution, always ready, especially in the case of regular and frequent use. The writer is enabled, by favour of Mr. G. Lockyer, to quote such a formula which will be found to keep well, and the proportions are as follows :—

Hot distilled water	1 pint
Potassium carbonate (crystals) ...	300 grains
Sodium sulphite	400 „
Hydroquinon	100 „

Mix in the order given, dissolving each thoroughly before the addition of the next.

Sufficient of this solution, which is specially suited to instantaneous and under-exposed pictures, is poured over the plate at one sweep in the ordinary way, that is, lying film upwards in a developing dish, and the image will be seen to appear shortly afterwards, and will strengthen up by the continuation of the action until sufficient density is gained. The colour of the image after the removal of the superfluous silver bromide is of a bluish tinge. This developer may be diluted with water, and can be used again and again if fortified from the stock bottle. A small quantity of potassium bromide solution may be added, but this is not essential, as in the case of pyrogallol. The solution does not readily darken after use, neither are the gelatine films stained or the fingers.

Fixing.—Whatever be the agent used to develop that which we call a negative image, when the work has been effected, further action is stayed by washing under a stream of water in the dark room, and placing the plate in a dish containing a saturated solution of common alum.

This last precaution, even when the gelatine shows no tendency to frill, is useful, as it renders the surface much less liable to injury afterwards, and permits of the use of a damp clean wash leather to remove the surface water, and quicken the drying after the negative is really finished. Five minutes in the alum bath is quite sufficient to harden the film, and remove any little staining produced by the pyrogallol developer ; then another washing is necessary to prepare the plate for the next process. This consists of the removal of those molecules of silver bromide which have not been reduced by the action of the developer, and still remain in the gelatine as a yellow powder. There are several solvents of this and of other silver haloids, but the most convenient is sodium thiosulphate ($Na_2S_2O_3$) technically known as hypo. The chief point is to ensure a solution of this sodic salt being sufficiently concentrated to do the work perfectly in a reasonably short period, and provide an excess which shall dissolve the product of the chemical decomposition which takes place. This may be explained briefly thus. Sodium thiosulphate dissolves silver bromide, forming the double salt of silver and sodium thiosulphate. This is very unstable, and only soluble in an excess of the sodium thiosulphate, so the process of fixing should be prolonged several minutes after all visible traces of the yellow silver bromide have disappeared. This bath should be strengthened from time to time with fresh crystals of hypo, and occasionally—say once a week, where a moderate amount of work is carried on every day—a new bath prepared. A little common salt added tends to prevent blistering where alum is not employed before fixing. A fixing bath may be made up by dissolving

Sodium thiosulphate (crystal) ...	1 pound
Hot water	6 pints

Cool before use. 60° F. is the most suitable temperature. Into a vessel containing this solution the developed, alumed,

nd slightly washed negative is placed, and a few minutes fterwards it will be noticed that the yellow semi-opaque ubstance pervading the plate will disappear, leaving a ark image with patches here and there of clear, or nearly lear glass. Presuming this to take place in about five inutes, according to the freshness of the solution and he composition of the emulsion with which the plate is oated, after another five minutes' soaking the negative nay be considered thoroughly fixed, and will require lenty of washing in order to eliminate every trace of the ixing agent. Before washing, advantage may sometimes e taken of the decolourising properties of the more com- non mineral and vegetable acids when used in a dilute orm in conjunction with a saturated solution of ordinary lum. The brown stain which pervades negatives de- cloped with some formulæ containing pyrogallol may be lischarged in this manner, and is termed "clearing."

Two ounces of ordinary alum and one ounce of hydro- hloric acid in a pint of water is effective.

Again, negatives which appear too dense in the high- ights for effective printing, upon emergence from the fix- ng bath, may be reduced, to some extent, by exposure to he air before washing is proceeded with. It is only necessary to put the wet negative after a slight rinse in water, film side towards light and air, for a period ranging from a few minutes to an hour; but this will not be neces- sary when development has been stopped at the right stage, as pointed out in previous chapters. Of the various methods which have been suggested for washing, that is unquestionably the best in which the plate, after a pre- liminary washing under the tap, is placed in almost a horizontal position, film side downwards, in water which is frequently changed. Many contrivances, more or less bulky, are supplied commercially for this purpose; but the plan set forth by the writer in "Hints for Summer Work," already referred to, will be found as simple and effective as any.

Fig. 21 shows a folding rack, which can be held in any vessel that will hold it, and is very portable, while anyone could easily construct it from the sketch. When a nega-

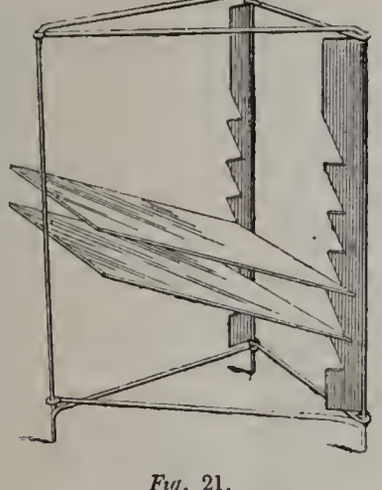


Fig. 21.

tive has been insufficiently washed there is a tendency to the production of red spots and stains during printing, or afterwards, when ordinary sensitised albumen paper is used, and these stains are extremely difficult to remove. Varnishing is, in some measure, a safeguard against this annoyance, but not absolutely so, therefore beginners should, as far as possible, prevent the possibility of such an occurrence by well washing every negative intended for printing.

When the fixing solution and its products have been satisfactorily removed by some process of washing, the negative can be placed in a grooved rack to dry spon- taneously, or the process may be hastened by removing the surface water by means of a clean, moist wash leather, or soft linen cloth, and the film soaked in methylated alcohol which extracts most of the water remaining in the gela- tine, thereby assisting the process of drying very consider- ably. It is very important that the negative should be absolutely dry before printing is attempted, or even var- nishing; passing the hand lightly over the surface will always prove the presence of any moisture, as a slight sticki- ness may be felt, and the drying therefore must be pro- longed. After this the plate may be thoroughly warmed to advantage, whether it be intended to varnish or not.

Intensification.—Few, indeed, are the photographers who invariably produce negatives so perfect in printing qualities as to leave nothing to be desired. Stopping the process of development too quickly, or giving an excessive exposure, or both combined, tends to produce flatness in prints taken from such plates; the exact reverse of the hardness and excessive density referred to previously, and upon which part of the subject more will be said in the next chapter. Negatives calculated to print without vigour may be greatly improved by intensification—a process capable of conferring additional strength to the deposit of silver forming the developed image, without in- terfering in a great measure with the shadows or clearer portions. When a negative has been much over-exposed, and no steps have been taken to restrain the action of the developer, and the shadows appear to be appreciably blocked with reduced silver, some skill in the use of an intensifier is necessary to transform such a hopeless looking negative into one capable of yielding prints of any ex- cellence. This comes from practice, and when once the process of intensification can be managed with certainty, the chief difficulty has been surmounted.

In the present chapter simple intensification of weak nega- tives will be considered, leaving the more difficult processes employed by experts to be acquired afterwards by study. Some of these will be found treated by the writer on p. 306 of the Photographic News for 1886. For ordinary work the chemical method is usually employed, which consists of bleaching the image with a solution of corrosive sublimate (mercuric chloride), either alone or in conjunc- tion with a soluble bromide, iodide, or chloride. It is based upon the properties of metallic silver and mercuric chloride to react upon each other and thus effect a chemi- cal change. The mercuric chloride, when in contact with the finely divided reduced silver forming the image, loses some of its chlorine, which latter combines with the metal silver, thus forming silver chloride. The mercuric salt thus becomes mercur*ous* chloride, and is easily reducible to the form of black oxide when acted upon by dilute ammonia, lime water, and some other agents. In this way we are able to increase the opacity slightly or to a much greater extent, according to the requirements of the negative. In the first case, it is often sufficient to apply the mercury solution very much diluted until a grey tone on the surface has been secured, when, after a good washing in ordinary water, there will be a slight addition to the density. But, if we desire to have a considerable degree of intensification, we must continue the action of the mercury until the entire film is bleached through to the back. For this purpose a more concentrated solution may be used with advantage. Mercuric chloride, com- monly called bi-chloride of mercury ($HgCl_2$) the salt we are now dealing with, is a most dangerous and acute poison, three to five grains being sufficient to destroy adult life in twenty-four hours; therefore it should be handled with more than ordinary care. It is soluble in cold water, but more so in hot, also in ether and alcohol. In the pre- sence of nitric or hydrochloric acids, or one of the haloid salts, such as sal ammoniac or common salt, cold water dis- solves it much more freely, and hence one or other of these additions are useful in photographic work. Ever since its introduction into the laboratories of photo- graphers, it has been used either in the form of an acid solution, or associated with another salt like those referred to. Of late, however, some writers lay stress on the use- fulness of a soluble bromide. In either case the saturating

point is considerably higher than with water alone, hot or cold, and there is also a certain restraining action conferred, which tends to preserve the clearness of the gelatine—that is, to ensure brighter shadows rather than veiling or cloudiness. The behaviour of the negative during the process of mercury intensification is a certain test of the thorough elimination of the fixing agent, for if any of that remains in the film, the result will not only be veils and clouds, but patches of brown stain after the application of the ammonia, very destructive to the printing properties of the negative.

Having thus bleached the film all through, and well washed it in several changes of water, as well as in a running stream, we can apply a strong solution of ammonia—say one ounce of liq. ammon. fort. to half a pint of water—until the whitened negative is turned throughout into a black one. The following formula from the PHOTOGRAPHIC NEWS ALMANAC, page 198, for 1889, will answer our purpose, and it can be weakened by the addition of water when only a slight increase of density is required. The opacity may also be modified by substituting another agent as below for the ammonia, as recommended by Scolik :—

Mercuric chloride	1 part
Potassium bromide	1 „
Cold water	50 parts

After bleaching the negative and well washing, it can be treated either with a solution of ammonia as above, or weaker, according to depth of deposit required ; or it can be immersed in a solution consisting of one part of saturated solution of sodium sulphite to one part of water until the greyness has completely vanished from the under side of the film. This last mixture is not stable ; even when well corked there is liability of its undergoing a chemical change into that of sodium sulphate. It will, however, keep all right for a week or two, and negatives treated with it do not require more than a few minutes' washing after bleaching, before being blackened ; whereas the ammonia method necessitates a careful washing between the two processes, in order to avoid the reduction of mercury in the clearer parts of the negative. In either case, the negative requires copious washing after the darkening action has taken place, when it may be dried and varnished. The student having mastered intensification by the above simple means, he may with more safety try other methods, such as the mercurial process followed by ammonium sulphide, silver cyanide, hypo, or that of uranium nitrate and red prussiate of potash. He may also venture upon removing the varnish from a weak printing negative by means of methylated alcohol to which a small quantity of strong liquid ammonia has been added, and improve its printing properties by means of intensification as above shown.

THE DETECTIVE CAMERA: A SUMMARY OF EXPERIENCES AND OPINIONS.

BY HARRY T. DUFFIELD.*

AMONG photographers, especially the amateur, the camera which has been generally—unfortunately—named "The Detective," has become a great favourite ; and it occurred to the writer that a paper summarizing the experiences and opinions of experts with this instrument would be of interest. Forms of questions were prepared, and sent to the secretaries of a number of photographic societies in this country. It was the intention of the writer to send these forms to all of our own members, but time prevented him from so doing.

The first questions asked were, the name of the answerer, the society of which he is a member, and the make of the camera. Of the thirty-eight, home-made or made from designs are used by twelve owners. One says his is "leather covered shoe blacking box." The lenses are the make of Ross, Dallmeyer, Beck, "Euryscope," Watson, Suter, Beck, Shew, Gray, Bausch, Lamb, Gregg, Gundlach, Fracais, "Optimus" Morrison, Darlot, Laverne, Wales and unknown. Then came :—

What size of detective camera do you prefer ? Eleven answered, 3¼ by 4¼ ; twenty-two, 4 by 5 ; two, 4¼ by 5½ ; one 4¼ by 6½ ; one, 4¾ by 6½ ; two, 5 by 7. Those preferring the quarter size, generally say that they do so because the dry plate it holds is the right size for making lantern slides by contact, and enlargements can be nicely made from it.

Is it necessary that the camera should be so constructed that observers' attention will not be called to it ? The majority answer "No ;" but it is preferable if it were made unobtrusive ; that it is almost impossible to so construct it that people will not "catch on it ;" that nothing, however, that tends to affect the simplicity of the mechauism of the camera should be sacrificed in making it inconspicuous. A number think the detective cameras of to-day sufficiently unobtrusive for all ordinary purposes, especially street work.

Which is the best way to hold the camera while making an exposure so that it will be steady ?—Under one of the arms (the right generally) pressed closely to the side, the hand of that arm keeping it steady, while the other hand operates the release of the shutter. Hon. Alvey A. Adee, Assistant-Secretary of State, Washington (D.C.) Camera Club, says: "I rest my larger boxes on my left fore-arm, not touching the body ; the right hand works a bulb, and does not touch the body." Harry D. Williar, Amateur Photographic Society of Baltimore (Md.) : "I have a push button on the right hand side, upper corner front, of my camera ; I take a firm hold with the left hand, palm on the bottom, and steady with the thumb on the side, and then with nearly the same positiou of the right hand on the right side of the camera, and thumb pressing on the push button, or handy to it, I take a firm hold with the right, and I never have a blurred negative. At one time I pressed it against my side and found at times blurred negatives." L. M. Petitdidier, Cincinnati (O.) Camera Club : "Under the right arm, with the right hand reaching under the box and one or two fingers controlling exposure by pressing a buttou at will. If the camera be so held, any motion communicated to it by the body will be a slow one, and for ordinary exposure there will be no movement noticeable. I never had auy case of shaking in the detective camera." W. T. Wintringham, Brooklyn (N.Y.) Academy of Photography: "Resting against the right hip." William A. Bullock, Photographic Society of Philadelphia : "Under the arm, resting upon the hip. Hold your breath when pulling the trigger. Do not rest the camera upon the stomach, and bend over it, as though you had an ache in that locality ; it is not graceful, and always attracts attention." J. V. Black, Society of Amateur Photographers of New York: "I find no difficulty in holding mine perfectly steady under my right arm, pressiug the spring with my thumb of the left hand, when the shutter is set at a medium speed; but for the slowest speed of the shutter I usually hold the camera directly in front of my body, with the back against it." D. E. McComb, Washington (D. C.) Camera Club: "Pressed tightly against the breast."

Should not the camera have a swingback ?—For detective work it is not necessary ; for view work, quite essential, is the general opiuion. W. M. Butler, St. Louis (Mo.) Camera Club: "No ; because this requires a small stop, and thus prevents instantaneous work." Albert H. Pitkin, Camera Club of Hartford (Conn) : "Would prefer a rising front." Charles Simpson, The Society of Amateur Photographers of New York : "Decidedly yes ; and I see no reason why manufacturers have overlooked this very important feature." Major George Shorkley, U.S.A., Society of Amateur Photographers of New York: "Yes, two of them." Edgar Richards, President of Washington (D.C.) Camera Club: "Certainly, if architectural effects are to be reproduced ; for landscapes, not necessary." George Marshall Allen, Society of Amateur Photographers of New York: "If it would work automatically." Walter Clark : "It is best to keep the detective as simple as possible." The following question was asked : "If a camera with a swingback is used without a tripod, is it not liable to give greater distortion than a camera without one ?"

Do you think it necessary to have a finder ? Should there not be two ? Should there not be hoods over the finders ?—Four consider it needless ; seven, that it is an advantage to have a finder, but not absolutely necessary ; twenty-eight that it is indispensable ; nine, that one is sufficient ; twenty-nine, that two are desirable. Hoods are also considered desirable. Charles Simpson : "I have two finders on my camera ; a camera without any would be of no value to me ; when you want to

* Abstract of a communication to the Society of Amateur Photographers of New York.

ake a picture either way (vertical or horizontal), you must have finder for each position to be sure of your field." W. M. Butler: "A finder is quite needless; if three round head crews be placed on the outside of the camera, thus :

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he angle between the dotted lines corresponding to the angle of view of the lens, all the purposes of the finder will be fulfilled without any of the annoyances of the usual form." A. A. Adee: "A finder is very necessary; one is sufficient, as it can be viewed as easily from the side as above; a cover hinged and standing upright serves as a hood." Harry D. Williar, Amateur Photographic Society of Baltimore (Md.): "I think a finder absolutely necessary, but do not see the advantage of two; but I do think that it should have a hood, as at times I find it almost impossible to get along without one, and, in fact, have concluded to put one on my box on a hinge; for, outside of its usefulness, it is a means of hiding the purposes of the box, and makes it a little more mysterious, or rather less conspicuous to the uninitiated. I make a hood with my hands to answer the purpose until I can get the chance to make a good one on hinges." Isaac T. Norris, Amateur Photographic Society of Baltimore (Md.); "I think two finders so essential that I shall have an extra one put in; the hood I do not feel so necessary, as I make a hood of my hand." L. M. Petitdidier: "Have tried without and with finder; and emphatically pronounce in favour of finder; do not consider a hood necessary; good only to keep off dust." Edgar Richards, President of the Washington (D. C.) Camera Club: "Finders essential, and to embrace the same angle of view as the lens cuts on the plate; certainly two; hood to screen off the light an improvement." Robert Baker, Society of Amateur Photographers of New York: "Very important to have two finders; if well sunken in the box there is no needs of hoods." Frederick Bruce, Society of Amateur Photographers of New York: "Only use one finder, as the other cannot be made exact; consider hoods necessary." E. Terry, Society of Amateur Photographers of New York: "Two finders necessary, and also sights." Walter Clark: "Not essential; the large finder or full plate on which to focus, I consider a powerful aid to intelligent composition and the study of nature."

Should not the detective be made solely for detective work, and not also be arranged for view work?—Nine answer, for detective work only; twenty-nine, for both. Robert E. M. Bain, St. Louis (Mo.) Camera Club: "I believe that it should be arranged for detective work only." Archibald I. Carson, Photographic Section Cincinnati Society of Natural History: "If 'detective' be used in the strict sense of the term, it should not be so arranged; otherwise yes." Isaac T. Norris: "If only for detective work, many of its appliances may be abandoned; while if used for view work also, too many cannot be added. Major George Shorkley: "For detective, not tripod use, but should have a time shutter." Sydney Bishop, Society of Amateur Photographers of New York: "For the average amateur, both ways." W. T. Wintringham, Brooklyn (N.Y.) Academy of Photography. "Immaterial, provided the arrangements for time pictures are not complicated." William A. Bullock: "There is no need of a tripod attachment to the camera; all that it is capable of doing can be accomplished holding it in the hands." Walter Clark: The vest camera and others of that class are the only true detective cameras; the province of the so-called detective I consider to be the production of satisfactory pictures of moving objects or random bits of interest to tourist or pleasure-seeker, or notes for the artist, architect, or engineer, to be gathered right and left with minimum of effort." William M. Murray, Society of Amateur Photographers of New York: "If the camera is as large as 4 by 5 it adds to its value to have it arranged for view work; I have used mine with a tripod for time pictures, and have made my best work with that arrangement." Miss Catherine Weed Barnes, Society of Amateur Photographers of New York: "I should not have bought a detective unless it might be used for view work."

(*To be continued.*)

PHOTOGRAPHIC CHEMICALS AND THEIR IMPURITIES.

AMONG the many chemicals used in photography, the alkaline salts are the most important and often contain the greatest quantity of impurities. A number of these impurities are incidental to the processes by which the salts are manufactured, and not being easily eliminated in the course of purification, may cause very serious trouble when used for photographic purposes. Taking sodium carbonate as the first, and, perhaps, most useful alkaline salt in the process of development, let us stop a moment to consider the several processes by which it is made, and the impurities it is likely to contain.

There are three processes from which the sodium carbonate of the American market may be obtained. The first of these is the old Leblanch process; the second, the Solvay or ammonia-soda process; and third, the cryolite process of the Pennsylvania Salt Company.

It is probable that most of the soda crystals are made from products produced by the Leblanch soda process, as practised in England. Without going into details, this process consists in first converting sodium chloride (common salt) into sodium sulphate by the aid of sulphuric acid; then by roasting this sodium sulphate with coal and limestone, the sulphate is converted into sodium carbonate ("crude soda ash," as it is called); this last product after crystallizing gives us the soda crystals of commerce. The sources of the impurities in this method of manufacture are numerous. The common salt used for the purpose is reasonably pure; at least the impurities are generally only lime and magnesium salts, which do no harm as far as photography is concerned. But as soon as the sulphuric acid is added, we begin to introduce a number of impurities. This acid as made in England often contains arsenic and nitrous compounds, which, when brought into contact with the sodium chloride, forms compounds with it that are by no means easily eliminated from the subsequent products. When we remember the exceedingly minute quantities of material that effect the photographic image, we are constrained to believe that the traces of arsenic often found in soda crystals may have some important effect upon photographic results. Yet the quantity of arsenic is exceedingly small in even the crude soda crystals, and possibly its presence is unimportant; nevertheless it is very active in its reactions, and may have an influence far exceeding our expectations. But this is not the most important impurity in soda crystals. The most serious trouble comes from the impurities introduced during the conversion of the sodium sulphate into carbonate by roasting with coal and limestone. Having made this roasting, the crude semi-fused mass is treated with water, which dissolves the sodium carbonate formed, and gives the liquors from which the sodium carbonate crystals are ultimately obtained. An examination of these liquors reveals the fact that, in addition to the sodium carbonate which they contain, there is also present sulphite, hyposulphite, sulphide, and cyanide of sodium. It is obvious that unless the sodium carbonate is crystallized several times, traces of all these compounds find their way into the crystals. Their effect upon the photographic work done with such crystals is the more dangerous, according to their amount.

It is too true that there is much crude soda crystals in use that contain considerable quantities of sodium sulphate. This impurity is harmless, but is an index of imperfect purification, and such crystals should not be used for photographic purposes. If one impurity is present in large amount, it is reasonable to suppose that others of more importance, and not as easily eliminated, are also present.

Fortunately we are not confined to the use of soda crystals, and there are two products in the American market that are admirably fitted for photographic use. Only they must be used with judgment. These products are the sodium carbonate made from cryolite, and a like product made from common salt by the ammonia process.

The first of this is perhaps the purest commercial sodium carbonate made, its only impurities being traces of alumina and lime. In using it, remember that it is dry sodium carbonate without any water of crystallization; consequently only about thirty-seven per cent. of the weight given for the crystals should be used.

The sodium carbonate made by the ammonia process is perfectly free from the dangerous impurities incidental to the Leblanch process; but it contains two products that result from its method of manufacture. One of these is ammonia salts, and the other is an excess of carbonic acid. Dry sodium carbonate made by the ammonia process often gives a faint odor of ammonia, due to the volatilization of the ammonic carbonate which it contains. The presence of the excess of carbonic acid in this last variety of sodium carbonate is due to the imperfect heating of the sodium

bicarbonate, which is one of the steps in the process of manufacture. There is no particular harmful influence exerted by this excess of carbonic acid, but it makes it very difficult to determine the true strength of the material. It is almost impossible to know how much real sodium carbonate there is in such a product, the sodium bicarbonate being of little use as a developing agent. —*Anthony's Photographic Bulletin.*

Notes.

"Taking Photographs for Pleasure" is the title of a capital paper contributed by Mr. F. C. Beach, of New York, to the February issue of "Association Notes"; this being the organ of the New York Young Men's Christian Association, a vigorous and healthy organisation, if we may judge by their monthly paper—twenty-four pages, the size of the PHOTOGRAPHIC NEWS. The year's estimates amount to no less than £8,000, and the Society has just bought premises for the German branch at a cost nearly £5,000 ($24,000).

In the course of the article Mr. Beach suggests that those in charge of Young Men's Christian Associations should establish convenient facilities for the practice of amateur photography in their buildings, and also a selection of slides of exhibitions; a recommendation which will be understood when we point out the New York Association seems rather to strive towards drawing its catechumens into attractive places which may serve as a fence against the corruptions of the world, than at sending them out militant in the world, with a view of mending things.

We have several times noted the absurd fashion in which the English Custom House officials interpret the Merchandise Marks Act in relation to photographic goods; and insisting on white embroidered handkerchiefs, which "looked as if they might have been manufactured" in England, being stamped in black "manufactured in Switzerland," and thereby rendered quite unsaleable, is about as unreasonable as the constant letting through of French lenses bearing English names. A climax of absurdity has, however, been reached in the case of a consignment of Mr. Bellamy's now celebrated work, "Looking Backward," which was forwarded from Boston to Mr. Reeves, the well-known bookseller of Fleet Street. Although the book fairly bristled with evidence of its American origin, the price on the front page of the paper cover being stated as 50 cents, the annual subscription to Ticknor's paper series being there given as 12 dols., and the advertisements at the end referring almost exclusively to the United States, the Custom House authorities actually detained the consignment because "United States" did not follow the word Boston, and Mr. Reeves could not get possession till he had stamped "U.S.A." on the cover in large letters. The theory was that the purchaser might suppose they were printed at Boston in Lincolnshire. If the Americans reciprocate, all London literature that does not bear the words "London, England," will be stopped at entry into America, as there is a London (several, we think) in the United States. *Invention* says: "The Merchandise Marks Act was aimed rather at worthless imitations of English goods of well-known repute which were made abroad, and flooded into this market to the great detriment of the home manufacturer, who had been building up his reputation for years."

The Madrid correspondent of a French newspaper informs its readers that the King of Spain, young as he is, is probably the most photographed monarch of Europe. His fond mother, it would seem, having appointed a Court photographer, is determined that his post shall not be a sinecure, and accordingly the baby-king is taken well nigh every day of his royal life. It is even said that a premium is offered to the aforesaid photographic functionary if he can only manage to invent some novel pose or position for the juvenile monarch, who, let us hasten to add, is happily ignorant, as a rule, of the fact that he is being so frequently focussed. He must have been painfully aware, however, that something unusual was going on on his last birthday, when he was actually dressed up, poor little mite! in a Liliputian military uniform, and taken with a row of orders on his chest. A copy of this photograph, it seems, was subsequently sent to every general in the Spanish army, with the words, "From the King you serve so faithfully," on the back. This is only one of the many acts which have proved the Queen Regent to be a woman of exceptional cleverness and tact!

Professor Archibald's interesting lecture on the Phonograph last Saturday afternoon was illustrated with a series of illustrative photographs, amongst which was a capital likeness of Mr. Edison, taken at the moment when he was lecturing, with rapt attention, to his new phonograph as it "reeled off" the very first phonographic message which had been folded up in letter form and "mailed" across the Atlantic. The photograph of so important and interesting a scientific event might well become of historical value, the Lecturer suggested, and he, in effect, re-echoed the opinion expressed by us in these columns but lately, when we urged the necessity of at once adopting official and systematic means of securing adequate photographic representations of all contemporary events likely to be of historical value. Once let there be a store of such photographic records on hand, and who shall say that the historical painters—now conspicuous only by their absence—will not, in due course, come forward and avail themselves of what we may call the photographic raw material? And if the expense of official photographers is an outlay the Chancellor of the Exchequer is unable at present to countenance, surely there is no reason why amateur operators should not step into the breach and temporarily, at any rate, devote their skill and dry plates to the service of their country.

All that is really needed for them is that official sanction and patronage which are absolutely requisite. Granted this, we do not see why a Volunteer Corps of Photographic Amateurs should not at once be formed, each member of

which would be ready to go on photographic duty with his camera in turn. It would be for the officer of the corps to arrange the routine of duty, and to decide where the photographic fixed points, so to speak, should be.

Of course a Volunteer Photographer would always be on duty behind the Speaker's chair during the sitting of Parliament (think what a fine fresco for the Irish House of Commons the "Suspension of the Thirty-two Parnellite Members" would have made), and it would be advisable for the Minister in attendance on her Majesty, whether at Balmoral or Biarritz, to have a skilled amateur at his disposal, ready to take negatives of special investitures, historical Privy Councils, and the like. Another photographic "fixed point" should be the Treaty Room at the Foreign Office; and if a sentry-box could be provided for his use near the Achilles Statue an intelligent amateur would find many opportunities of distinguishing himself, in a photographic sense, if he kept his eye and his lenses on the "Drive" and the "Row," during the season.

At present the London County Council is in a somewhat inchoate condition: but, doubtless, in due course, it will claim to have scenes on its floor worthy of pictorial perpetuation. As to the Lord Mayor and Corporation, ancient as is the municipality they represent, we fear it would be scarcely safe to trust them with an official photographer, especially as most of the public functions in which they figure are incidents to be buried in oblivion rather than handed down to posterity. But we think that the Lord Chancellor—or, rather, the Lord Chief Justice—might, with advantage, have an official photographer attached to his Court for general use in the new Palace of Justice; for tableaux of historic interest frequently develop themselves in the Law Courts. But it is not for us to settle all these details. It is for the Volunteer Corps to themselves arrange how, and when, and where their voluntary work shall be done. We shall be quite content if our remarks have the effect of leading to the formation of some such novel volunteer corps as we have suggested.

When artists make mistakes as to identity the consequences are rather disastrous. To put one man's words into another man's mouth is bad enough, but it is a thousand times worse when the wrong face is seriously offered to a critical public. In a recent divorce case it was the misfortune of a witness to get mixed up with the respondent, and he accordingly appeared in a certain illustrated paper as the deceiving husband. The paper of course apologised, but the mischief was done. This reminds us of a mistake not of an artist, but of a painter, who, having to arrange the portraits in a weekly paper of the two rival candidates for parliamentary honours, changed the names, and the result was the handsome Conservative gentleman appeared as the ugly Radical, and *vice versa*.

Photographs are gradually being utilised by promoters of public companies to assist in floating their ventures. In the prospectus of a company adverised recently, setting forth the advantages of a new explosive, we read that photographs of the result of the trial (*i.e.*, of the explosive) can be seen at the offices. This is all very well and quite legitimate, but the sharp City men are not contented with being legitimate. Thus, a gold mining company a few days ago issued with its prospectus the copy of a photograph representing hydraulic machinery at work in a gold bearing district. Unfortunately the photograph was the property of another company which had had it taken on its own property. Company No. 2 appears to have been ignorant of the laws of copyright, and had coolly copied the photograph without permission. Hence, a very pretty quarrel is likely to arise.

In reference to public companies, we may say that the innocent investors would be rather surprised if they knew who were really the "wire pullers" in many of the schemes which are advertised week after week. The object of the "promoter" is to be unknown, and his name never appears in any of the documents which the public can examine before investing their money. The reason of this is obvious. Promoters sometimes make "mistakes;" companies go wrong, and there are occasionally ugly revelations. If certain men were known to be at the back of a new undertaking, not a farthing would be subscribed. Hence, if it were enacted that with the prospectus of a new company the photograph of the promoter should also be issued, the financial atmosphere of the City of London would be greatly purified.

The *Standard* has lately been discussing, with much sense, on the subject of portraits. It declares, on the authority of painters themselves, that the grand characteristic of the age is a mania for portraits. Photography, we learn, has engendered this mental disease. At one time, sitting for a portrait was a solemn function to be undertaken only once or twice in this life, and by persons alone of acknowledged responsibility in Church and State. This exclusiveness, however, vanished with the advent of photography, and when every servant maid has an assortment of miniatures, carte-de-visite, vignette, cabinet, and the rest, gentlefolk must draw a distinction. Mere self-respect demands a picture in oils. Hence the artist owes much more than he cares to acknowledge to photography.

But the argument might have been pushed much further. There is not only a mania for portraits in oils, but also for portraits in newspapers. The periodicals known as trade journals go in extensively for portraits of heads of firms, and when one sees these harmless but excessively uninteresting individuals the question arises, do the readers of the papers care much for such pictures? We fancy they do not, and that the secret of the appearance of a vast number of these portraits is that they form an admirable advertisement of the firm in question.

A paper of the "Bit" class recommends amateur photography as "a new way of making money." The way is very simple. Illustrated papers, we are told, "gladly welcome a photograph illustrating any matter which is attracting

public attention, and what is more to the point, pay for it too." Therefore, all the amateur has to do is to take photographs of this kind and send them to the illustrated papers. Again, the said papers have given as much as £50 for the portrait of a criminal. Consequently the amateur must set to work photographing persons who are likely to become celebrated in this direction. Another plan is to photograph some public ceremony in your native town, and sell the copies at half-a-crown a-piece; and a fourth method is to go on board one of the steamers at the next Jubilee Naval Review and photograph the ironclads!

When the "London Correspondent" is hard up for readable matter he often falls back, among other things, upon forgotten photographic gossip. The correspondent of the *Sheffield Daily Telegraph* has resuscitated what may be termed a photographic "chestnut." A photographer is called in to photograph the body of a young lady who had just died under peculiar and distressing circumstances. The photographer takes a couple of negatives, and discovers, to his horror, that they are unlike, the inference being that the body must have moved. A doctor, of course, is summoned, and then it is ascertained that the supposed deceased was in a trance. The drawback to this pretty story is that it has been told before. It is a solitary example of success depending upon the moving of the sitter.

Patent Intelligence.

Applications for Letters Patent.

1,475. JAMES WILLIAM JONES, 8, Catherine Street, New Chesterton, Cambridgeshire, for "Instantaneous Shutter for Photographic Lenses."—Jan. 28th, 1889.

1,504. EDMUND EDWARDS, 35, Southampton Buildings, Chancery Lane, London, for "Improvements in Spirit Lamps for the Rapid and Perfect Combustion of Magnesium Powder without Perceptible Smoke for Photographic Purposes." (*John William Charles Coven Schirm*, Germany.)—Jan. 28th, 1889.

1,513. WILLIAM JAMES LANCASTER, 6, Livery Street, Birmingham, for "Improvements in Photographic Camera Shutters." Jan. 29th, 1889.

1,570. WILLIAM CHARLES HUGHES, Brewster House, Mortimer Road, De Beauvoir Town, N., for "Improvements in Magic Lanterns, and in Apparatus for use therewith."—Jan. 29, 1889.

1,591. ROBERT EDWARD MATHER BAIN, 55 and 56, Chancery Lane, Middlesex, for "Improved Apparatus for Operating the Shutters of Photographic Cameras."—Jan. 29th, 1889.

1,631. WILLIAM JAMES Lancaster, 6, Livery Street, Birmingham, for "Improvements in Photographic Cameras."—Jan. 30, 1889.

1,645. EDWARD THORNTON, 3, New Lorne Street, Moss Side, Manchester, for "Photographic Apparatus."—Jan. 30, 1889.

1,736. ARTHUR SAMUEL NEWMAN and FRANK LINDSAY-SIMPSON, 11, Albemarle Street, Clerkenwell Road, E.C., for "Improvements in Iris Diaphragms."—Jan. 31, 1889.

1,776. WILLIAM JAMES SCOTT, and CHARLES PROCTOR, 7, Cherry Street, Birmingham, for "Improvements in Photographic Shutters.—Feb. 1, 1889.

1,926. HENRY HERBERT, 119, Hartfield Road, Wimbledon, S.W., for "Improvements in or Relating to Tail-boards of Photographic Cameras, and Means of Attaching Body of Camera to same."—Feb. 4, 1889.

2,184. JOHN CLARKE BARNES, 16½, Dymoke Street, Birmingham, for "Improvements in Photographic Camera Pinions."—Feb. 7, 1889.

Specifications Published.

2975. HARRY HEAPE, of 8, Kingsmead Road, Oxton, in the County of Chester, Gentleman, for "New or Improved Arrangements or Devices or Articles of Furniture for Exhibiting and Holding Photographs, Cards, Pictures, and the like."—Dated February 24th, 1888.

Full details next week.

4248. FRANCIS NOWLAN, of 17, Soho Square, London, County of Middlesex, for "An Improved Form of Camera for Obtaining Photographs of Moving and other Objects."—Dated March 20th, 1888.

Full details next week.

4874. ERNEST SIDNEY WILLIAMS, Manufacturing Chemist, 41 Jones's Road, Drumcondra, Dublin, Ireland, for "A Method for Producing Photographic Emulsions not Requiring a Base or Support as Photographic Films."—Dated 31st March, 1888.

Full details next week.

18,026. WILLIAM CHANNING GIBBS, of No. 303, California Street, Marine Adjuster, and GEORGE WILLIAM DORNIN, of No. 215, Sansome Street, Insurance Clerk, each of the city and county of San Francisco, and State of California, one of the United States of America, for "Certain Improvements in Photographic Cameras."—Dated December 11th, 1888.

The claims are:—

1. In a photographic camera, a plate which, when closed, forms one end of the camera-frame, and so hinged thereto as to adapt it to be dropped down to expose the camera end, and turned under to form a bed or support for the camera-frame, substantially as described.

2. A photographic camera, having a body frame with a hinged back plate adapted to be dropped down to expose the camera back, and turned under to form a bed or support for the body-frame, substantially as described.

3. A photographic camera, having a body-frame with a hinged back plate adapted to be dropped down to expose the camera back, and turned under to form a support for the body-frame, and a proper fastening for holding the plate steady under the body-frame, and a fastening under said plate for the tripod, substantially as described.

4. In a photographic camera, an open-ended body-frame, a plate forming one of its ends and hinged thereto, adapting it to be turned down to expose the camera-end and form a focussing platform for its adjustment, and a second plate forming the other end of the body-frame and hinged thereto, adapting it to be dropped down to expose that end of the camera, and turned under the body-frame to form a bed or support therefor, and for the other end-plate, substantially as described.

5. In a photographic camera, an open-ended body-frame, a plate forming one of its ends and hinged thereto, adapting it to be turned down to expose the camera end and forming a focussing platform for its adjustment, a second plate forming the other end of the body-frame and hinged thereto, adapting it to be dropped down to expose that end of the camera, and turned under the body-frame to form a bed or support therefor, and for the other end-plate, an automatic catch-connection between the two plates to hold them firmly together, and a fastening for holding the second plate solid under the body-frame, substantially as described.

6. In a photographic camera, the adjustable support for the finder, consisting of the plate secured to the finder, and having opposing shoulders by which its movement is limited, and the arm pivoted to the front board of the camera and to the finder-plate, and having a pin for coming in contact with the shoulders of said finder-plate, substantially as described.

7. In a photographic camera, the focussing or adjusting mechanism, consisting of the carriage-frame on which the camera-front is mounted and adapted to slide, the fixed tracks on which the carriage-frame moves, the notches in the tracks, and latches on the carriage-frame for holding said frame to the position to which it is adjusted, and the pinion-shaft on the camera-front, and racks on the carriage frame for adjusting the camera-front on said carriage-frame, substantially as described.

PATENT OFFICE LIBRARY

Correspondence.

WEIGHTS AND MEASURES.

SIR,—Owing to the great inconvenieuce of readily ascertaining the proportioual quantities contained in the numerous formuke with which photographers have to deal, the Photographic Club has taken the matter in haud and formed a committee, to devise, if possible, some scheme of weights and measures that will commend itself to photographers generally, and supersede the intricate jumble at present existiug; and also to take means to secure the adoption of such scheme wheu a definite course has beeu decided upon.

E. DUNMORE, of the Photographic Club, *Hon Sec.*

AZALINE AND ORTHOCHROMATIC PHOTOGRAPHY.

SIR,—I have given you to a short article published in your issue of February 8th, for correcting some errors announced in the Photographic Society of Great Britain about my azaliue. I stated that Mr. Spiller's assertion that azaline is a mixture of quinolin red and cyanine is right.

I am not less surprised that Mr. Spiller now withdraws this statement in your issue of the 15th February, and declares : "Having since procured some of the azaline tincture from Mr. Gotz, and carefully examined the same, 1 can find nothing but erythrosine or eosine." This assertion is already very strange, for there is a very marked difference betweeu eosine and erythrosine, easy to find out by any of my pupils.

I have only to answer that I am not the man to mystify the photographic world by a wrong thing. I think I have the same good reputation as Mr. Spiller has.

Ever I trust Mr. Gotz that he will not sell another product than I have sent to him as azaline—that is to say, a mixture of quinolin red and cyanine. It may happen that in the older solutions, when the solvent is acid, that the cyanine decomposes ; but the truth I can give with my word of honour is, that iu the azaline prepared by me there is not a trace of eosine or erythrosine. If Mr. Spiller asserts to have found this, I declare his so-called "careful examination" is wrong.

Ever I declare it wrong if he asserts Mr. Attout Tailfer was the first and true iuventor of eosine for orthochromatic purposes.

The first who has discovered the value of eosine for the so-called orthochromatic photography was Colouel Waterhouse of Calcutta, in 1875, and the first who made practical application of it have been Ducros du Hauron Brothers, 1878. Mr. Attout Tailfer has done nothing but applying the same dye on gelatine plates which was used before him on *collodion* plates. That is about the same thing as if anybody invents an instrument, and another one imitates it in brass, and calls that a new invention.

Mr. Spiller says further, Dr. Vogel comes in afterwards (after Mr. Attout Tailfer) with what appears to be the same thing under another name. I protest against such imputation. I have no necessity to borrow inventions from others, and now recommend Mr. Spiller to read and employ for correcting his bad aualysis, Dr. O. Witt's paper, *Versuche einer qualitative Analyse der im Handel Vorkommende Farbstoffe*, which he will find in the hands of Mr. Gotz ; further, my "Practical Spectrum Analysis," second edition, published by Mr. Oppenheim, Berlin, 1888.

Berlin, February 18, 1889. Dr. H. VOGEL,

SIR,—In your last issue Mr. John Spiller makes a direct statement that "Attout-Tailfer was the first and true inventor" of the use of eosines for orthochromatic purposes ; an assertion which I think should not be allowed to pass unchallenged.

The language employed by Mr. Spiller is so authoritative, and has such a technical legal ring in it, that it sounds rather like that of a judicial decision than that of a scientific expert, eveu if taking part as an advocate, however zealous, upon a point which, at the least, is open to controversy. As a matter of fact, however, it is in evidence which is almost universally known by those interested in orthochromatic photography, that the use of eosine "for orthochromatic purposes," as Mr. Spiller puts it, was published, and many experiments with it recorded, years previous to the date of Tailfer's patent. Mr. Spiller's claim ou behalf of Tailfer's patent would appear to be as much at variance with the fact as the manner of stating it is authoritative. W. E. DEBENHAM.

London, Feb. 20th.

Proceedings of Societies.

SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.

Commemorative of the Birth of Photography.

THE committee on papers and publications send us the following report :—

On the evening of January 31, 1889, the Society held a special meeting commemorative of the birth of photography, at its rooms, 122, West 36th Street, which was very interesting. It was intended to commemorate the termination of the first fifty years since Daguerre first gave to the public the secret of his wonderful invention, and was attended by several of the oldest and leadiug photographers in this city.

Shortly after eight o'clock President CANFIELD iutroduced Prof. L. H. Laudy, of the Columbia College School of Mines, who explained fully all the details connected with taking a Daguerreotype, exhibiting the apparatus as used by himself not very long ago. He related how some of the valuable specimens which he exhibited were obtained, and had several frames hung upon the wall illustrating various styles and shapes of the Daguerreotype. The cheapest he said used to be sold, frame, case, and all, at 12½ cents each. There were also three pictures of Daguerre and a copy of Fox Talbot's "Pencil of Nature" published in 1884, with specimen photographs, framed and hung upon the wall. The last Daguerreotypes were made by Pearsall of Brooklyn, in 1878.

At the conclusion of his remarks, Mr. BEACH threw on the screen, in the Society's lantern, a few slides which Mr. Laudy had made, showing the illustration and title page in the first book published by Daguerre. It bore the date of 1839, and had an engraving of Daguerre on the cover.

Mr. ABRAM BOGARDUS, the veteran photographer, followed, talking of the trials and tribulations of the photographer in the first days of photography. He said many amusing things gathered from his forty-one years under the skylight. He showed a Daguerreotype of Daguerre himself, made by a Mr. Mead in Paris about 1846, which appeared to be an excellent likeness. His remarks needed to be listened to, to be fully appreciated. He advised all young photographers to try one brand of plates and one kind of developer, aud stick to them till he thoroughly mastered the art, instead of branching out on new things.

The amateur photographer of other days was the topic which Mr. H. J. NEWTON spoke upon. The first society for the advancement of photography was composed of three persons, and was started by Mr. H. T. Anthony about 1861 ; Mr. Newton was a member, and was afterwards treasurer. Amateurs, in the old days, had to prepare their own chemicals, collodion, silver bath, &c., which meant a great deal of work, and they sometimes produced fog, and considerable of it, instead of picture. Now, it was only necessary to buy a camera, &c., make the exposure, and have somebody else to do the developing and printing. He thought it was not quite right. If amateurs had more work to do they would accomplish more, and make valuable discoveries.

Mr. ALEXANDER BECKERS, a grey-haired, aged photographer, one who was noted for the fine quality of Daguerreotypes he used to make, read a paper on his experience in the history of the Daguerreotype, which was quite entertaining and instructive. He told of how he had to pay five dollars a pound for imported hyposulphite of soda, and said that the first place for manufacturing photographic chemicals was located where the Young Men's Christian Association building now stands—corner of 23rd Street and Fourth Avenue. His first out-door views were of Highbridge before the scaffolding was taken down. There he

discovered that the Daguerreotype plate increased in sensitiveness during the time between preparation and exposure. He also said that this year celebrated the end of the first century since Daguerre was born, which was in 1789, making the meeting all the more valuable as a commemorative event.

At the conclusion of his remarks Mr. J. B. GARDINER was intending to speak, but, owing to the lateness of the hour, said the meeting would be continued at the section of the Institute, February 20th.

On motion of Mr. Beach, a vote of thanks was unanimously accorded to all of the speakers, and on another motion of Mr. Duffield, a congratulatory letter, speaking of this meeting and the interest shown, was directed to be sent to the Photographic Society of France by the secretary. The meeting will long be remembered as of one of peculiar historic interest, since so much was said and shown regarding the birth of photography.

The PRESIDENT: The first paper of the evening in discussing "The Detective Camera and How to Use It," is to be read by Mr. H. T. Duffield. Mr. Duffield has been to a great deal of trouble to collect the material for his very interesting paper, and I am sure you will all be very much pleased with it.

Mr. DUFFIELD then read his paper.

The PRESIDENT: There have been brought, in response to invitation, a number of detective cameras which are in the library, and it would be rather too much of a tax upon your time just now to exhibit or explain them. They can be seen in the library after the other papers have been read.

Mr. GRISDALE has a paper upon "An Easy and Effective Way to Make Lantern Slide Mats."

Dr. PIFFARD: Mr. President, it seems to me that in considering the subject of the "focus of a lens," two points must be taken into consideration, and one of them is the size of the image. You take a detective camera, a 4 by 5 camera, with the ordiuary lens that accompanies it, and take a shot across the street, and you have the image of a man about half an inch high, hardly more than that. With a longer focus lens you will get it considerably larger. Another point to be taken into consideration is, if you are going to photograph objects in motion, the further away you are from the object the less the motiou will be perceptible; consequently the long focus lens will serve you where a short focus lens will not. It has been my experience that you often get into crowded corners where you have to use a short focus lens; my camera is adapted to two sizes of lenses. I use a 6¼ and an 8½ inch. In some pictures I took last winter by flash-light in the slums, I could not have done anything with an 8½ inch lens, but with a 6¼ inch lens my pictures were quite satisfactory. With ordinary work out of doors, I prefer altogether a lens of over 8-inch focus, and in many of the cameras you cau use both lengths of lenses without very much difficulty; but there are cameras of some constructions in which you cannot. The kind of lens seems to me to go without saying. As to the "finder," I have a finder on my camera—may be there are two. I never use them except for long range work. I don't need them, and for short range work I have never found a "fiuder" that registered with the plate. Mine doesn't in any of the detective cameras, and I have had four. As to the angle of view, the thirty degrees that has been mentioned is pretty small, I think; if you can secure a lens with sixty degrees, aud use an "F 8," you will have got about the maximum that you can use. The larger the angle the less the focal opening must be to give you a good, clear picture.

Mr. ATKINSON: Mr. York, who has taken more street views for us than any other mau, told me that he always used a lens of 2½ inches equivalent focus. But you cannot take a high building unless your focus is very short. Then, as regards the camera, it is almost impossible to make a "detective camera" that will be fit for a wide-angle leus. Now the other question about the name of the "detective camera." It is an odious name—the "dctective camera" is—to me. We all know what a detective is. It is one who worms himself into your confidence to betray it. It is a hateful name to me, a very hateful name. The inventor of the detective camera lives in Brooklyn. His idea was that it should be called the artist camera; that was the original idea. And allow me to say right here, that Mr. Beach, I think, has made a little mistake in his article in *Harper's*, in giving the credit to Mr. Bolas, the editor of the PHOTOGRAPHIC NEWS, as being the inventor of the detective camera. No doubt Mr. Bolas invented a camera which he used to set on to take a picture. Then there was a prejudice against it, that it was not a detective camera in any way, and he made it about the size of a shoe box. Then he had to put it on the ground, and there was no "finder" to it. But the detective camera which is now known as the "detective camera," the credit of its invention belongs to this side of the water. It was invented here, and when Mr. York was over here about four years ago he obtained two samples of detective cameras in order, so he said, to show them on the other side what a "detective camera" was.

Mr. GRISDALE: Mr. President, I have not prepared any paper to be read this evening, and I only get up to say that what I have to show here this evening does not require any elaborate preparation. The main object was to let the members know that the Society has been in possession of a lot of brass mats here cut in the different forms shown on this sample card. They are for the use of the members of the Society. And the only other wrinkle that is new is the use of a printing frame in connection with the mat. The great difficulty was a constant slipping of the mat, and the difficulty of placing the card back in its original position and getting a true form cut. In this way you take a form, and ordinary quarter printing frame, and cut your brass mat or form 3½ by 4¼. The object of that is that it prevents any "play." It is much better to cut the paper 3½ by 4¼ than 3¼ by 4, because by so doing it allows you a margin to use, whether you bring your mats a little bit to the right or to the left when you mat a slide. If you take a mat of that form (indicating), and that is a proper reduction of a 5 by 7 or a 5 by 8, and you want to make that cross-wise of the plate, all that is necessary is to place your paper cross-wise in your printing frame, so (illustrating). I am sorry that the cutter we have has become injured, so that I cannot show you; but the point is to put in the brass mat and place the sheet of paper in behind it, then take the glass plate and put it in at the back, behind the paper that secures the paper between the glass plate aud brass form. You then place your back of the printing frame in. Now (illustrating) you have that in, so that there is no difficulty in cutting out the mat. You can cut a dozen sheets of paper like that, and will get thirty mats for five cents. Now you have some idea of how the stock-dealer must suffer by selling mats at one dollar per hundred.

The PRESIDENT: What do you use to cut out the paper mat?

Mr. GRISDALE: The Robinson trimmer where the corners are round, or ovals, or other forms you can use it; and where the corners are square I use an ordinary pen-knife. You can't get into the corner here (indicating) with a cutter. It won't reach it. That is all I have to say in regard to the matter; it was principally to call the attention of the members to the fact that we have those mats if you should want them at any time.

The PRESIDENT: The interest in the matter of lantern slides is growing in the Society, as our exhibitions bear witness, and doubtless there are a great many members that will take advantage of these mats. Mr. A. Peebles Smith has a paper, I think, on the "Developer for Instantaneous Exposure."

Mr. SMITH: Mr. President, I have no paper prepared to-night, but before speaking of development or developers, I will mention something relative to plates. Rapid plates of extreme sensitiveness that will possess any quality at all, are only made in the winter time. From now on to the first of March you will get a plate which will be unequalled in any make, and now is the time to lay in your stock for next summer. There are two kinds of plates: one a chemically quick emulsion, made by mixing everythiug cold, and a boiled emulsion. Boiled emulsions cannot be made in the summer time without decomposing the gelatine. Taking a plate of a sensitometer 25, and using F 8, as Dr. Piffard states, which I believe is the proper aperture to use at all times, one ought to guage the plate by the light they have to use. Sometimes, in extreme hot weather, a Carbutt B plate I have used for instantaneous pictures. By using stop F 8 you get atmosphere in your picture, and aside from this your picture has more artistic feeling in it. The main object, or the thing you take, will be in focus, and the background, as it appears to the eye, in diffused focus, which is more correct. A good many people say that by usiug a small stop we get everything on the different planes in focus, so that the foreground, the middle distance, and extreme distance will be sharp. But the flatness is something terrible. Now, in the matter of the development of these plates; if you take a slow plate, using any developer you please, it is easy. This plate which you are using, we will suppose, contains a good deal of silver; you get an impression on that silver, you have got silver back of it, you reduce it with your developer, and you get a good vigorous image. With a rapid plate (a good many of them) there is not silver enough in them. This is done in getting the speed in the plate, and in order to get speed

they leave a portion of the silver out, and you have to make it up in the development. A plate of the sensitometer of 25, any average person can develop; but when you get up to 27 degrees Warnerke, or beyond, or up to 50 degrees, or what Cramer calls his "greased lightning plates" of 70 degrees sensitometer, then it is not so much fun. You make instantaneous exposures, and you want instantaneous development, but you do not get it. You go into your dark room, sit down or stand up, just as is the more convenient, and put on your developer. Your formula says so much of this and so much of that, some say weak and some strong. You put it on and it comes out weak and thin, and unsatisfactory. You look at it and proceed to fix it. It is thin, and you cannot see any detail, and say: That is undertimed; that lens is not good. You go and get another lens, and you try it, but with no better success. Then, after a while, perhaps, the plate gets into the hands of somebody who has had considerable experience, and he looks at it and says, "It has a lack of detail in it." And the books say, if there is a lack of detail, the plate is undertimed; but it is just the opposite in extremely rapid plates. Taking Cramer's sensitometer numbers of a winter-made plate, of sensitometer 35, you will find that there is silver enough in the plate to be developed, and you get full time, providing you use an aperture of $\frac{f}{}$, regulating the speed of the shutter to get the correct time. The developer should not be put on weak, although a good many formulas read that way. To develop instantaneous exposures instantaneously, the developer should be put on strong, soaking first in pyro, if you use pyro, but if you use hydroquinone you had better use it in two solutions, soaking first in the hydroquinone, and using the method of separate solutions for the development. If you take a plate of a sensitometer of 50, which we will say is about as fast as the average person can develop in the average light that is used to develop in, the developer should be put on the plate extremely strong. The development should be concluded in about five minutes. At the point where most people would stop development is just the point where they should proceed. After the plate begins to kind of fog over, don't pay any attention to it, but pour that developer off and throw it away. It has spent itself. Whatever pyro and hydroquinone there may have been, it has had a tanning effect on the film, and it prevents any alkali you may add from penetrating into the plate and doing its work. You take the plate out of the developer and throw the developer away, and rinse the plate off with water and place it in a pan, while you prepare some fresh alkali solution, and flow the plate until you see the plate gain density, and carry it along until it begins to gray over well, then put it into your hypo bath, containing a little alum. The alum will prevent its being stained, and also acts as a kind of reducer, cleaning out the shadows, and you have a clear dense negative on an extremely rapid plate. Now, in my practice, I use a developer which is pyro. I make it in three solutions. It is mixed by hydrometer. The sulphite solution tests 60 degrees by hydrometer, being in one solution in a glass stopper bottle. The alkali solution is carbonate of soda and water, and the test is twenty degrees. The pyro is mixed with distilled water; but it makes no difference whether you use distilled water or not, it is immaterial; acidify with oxalic acid, and pour in twelve ounces of water, and into that one ounce of pyro. You will find that the pyro will keep dissolved in the water, either in the light or away from it.

Now in using this developer, you take a sufficient quantity of the sulphite solution and cover your plate, and to that you add from two to three drams of pyro solution, and from two to three drams of carbonate solution, and no water whatever. You will find this is a very powerful developer, and especially adapted for the Cramer plates. If you use it on a Carbutt plate it should be diluted, and one-half and less pyro used. A convenient method of using it is to first soak the plate in pyro and sulphite solution alone for a minute, then place it in the alkali and watch the effect. If it is over-exposed, apply the bromide of potassium and check it at once. Do not be afraid of it, but put it on in good quantities. Then take and soak the plate in pyro and sulphite solution for a minute, and to this gradually add the original developer drop by drop; by this method a good negative will be secured from an over-exposed plate. As to the correct timing of rapid plates, it is more the amount of light which strikes the plate at the moment than any subsequent light which comes after. Now, a number have used a good many rapid plates in taking flash-light pictures, for instance, they would expose on an interior and would make one flash, and then another, and then another, and another, and then they would go to work and develop it, and the plate would come up and fog all over, having the appearance of being undertimed, and they would wonder what the matter was. The reason of this is, the first light affects the plate, and every succeeding shot after that has to go through the silver which has been reduced by the light, and the successive flashes after the first do not hurt the plate at all. It is the first light you get on the plate that does the work, and this is one of the secrets of success in instantaneous work with detective cameras by using lenses of large apterture, and getting plenty of light to do the work the first time. If you step down, you will get very little light on the plate, and you will get extreme flatness, which is not wanted. In developing instantaneous exposures with hydroquinone a weak developer is preferable. A very good plan is to start the plate in weak pyro until you get the details, and then finish the plate by a separate solution development in hydroquinone developer, which will give you good density, softness and delicacy, where, with hydroquinone alone on an instantaneous exposed plate, you are apt to get extreme hardness or rockiness.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE ordinary meeting of the above was held in the Society's new room at the Grand Hotel, Colmore Row, on Thursday, the 14th inst., Mr. W. J. HARRISON, F.G.S., in the chair.

Mr. W. F. May, Mr. T. H. Kendrick, and Mr. G. E. Wilson were elected members.

Mr. THOS. HORTON then delivered his paper on "Daguerreotype," giving full particulars of this now extinct practice of photography, and exhibited the apparatus used in the process with a number of Daguerreotypes.

In the discussion which followed, in answer to a question what kind of lens was used in Daguerreotype,

Mr. J. EDMONDS said an ordinary single lens was used, but allowance had to be made for focussing. Early lenses were limited in variety, but good views were taken about that time on Calotype paper with a non-achromatic meniscus lens. He remembered excellent portrait lenses by Voigtlander, in which the chemical and actinic foci did not coincide, and which required the dark slide and the focussing screen of the camera to be set at a different distance from the lens in order that the plate might be in the true chemical focus. Mr. Edmonds referred to his recollections of photography when Mr. Whitlock practised Daguerreotype under "Beard's patent," and exhibited photos of Birmingham celebrities at his shop in that part of New Street which is now Stephenson Place; also of Mr. Jas. Johnstone, a skilful photographer, who practised Daguerreotype at that early date.

Mr. J. COTTERILL: Members had spoken as though the difference between the chemical and visual foci was a novelty now-a-days, but at the present time he found it still prevalent in many cases in modern lenses. Out of six portrait and landscape lenses in his possession, only one is perfectly coincident in chemical and visual focus.

Mr. G. M. ILIFF had, some time ago, an old camera with single lens of early make, which, after focussing on the glass, required the back to be moved to obtain the correct focussing for plate.

Mr. W. J. HARRISON: The lenses used by Daguerre and others in the early days of photography were uncorrected in the respect that the chemical and visual foci were not coincident. This was pointed out by Towson of Liverpool about 1840, and was remedied by the genius of the Viennese professor, Petzval. The speaker exhibited a large picture of Daguerre—a fine print, by Nadar of Paris, on Eastman paper; being a copy of a Daguerreotype taken about 1840.

Mr. E. C. MIDDLETON had seen one camera with one opening for focussing screen, and another for the dark slide.

Mr. WALTER GRIFFITHS then read a paperette on his experience with Kristaline, as applied to photography.

A short discussion followed, and

The CHAIRMAN announced that at the next meeting, on the 24th, a paper will be read on "Photo-micrography," by Mr. J. F. Hall-Edwards.

IPSWICH PHOTOGRAPHIC SOCIETY.

THE monthly meeting of this Society was held on Tuesday evening, February 12th. There was a large attendance of members. The President (Mr. J. DIXON PIPER) was in the chair.

The evening was devoted to a demonstration of enlarging on bromide paper by Mr. A. L. Churchman, who used one of Lancaster's enlarging lanterns. Mr. Churchman, after calling attention to the advantage of portability in a small camera, practically demonstrated the ease with which the small pictures could be enlarged, by making several 10 by 8 bromide prints from quarter-plate negatives.

Mr. Fiske, Woodbridge, and Mr. H. P. Evans, Ipswich, were elected members of the Society.

Mr. J. C. WIGGIN exhibited a number of old waxed paper negatives of large size, and one of Ashford's "Tripod Stauds."

The HON. SECRETARY said he had received a copy of the PHOTOGRAPHIC NEWS ALMANAC from the Publishers for the use of the Society.

NORTH SURREY PHOTOGRAPHIC SOCIETY.

A MEETING of the above Society was held at the West Norwood Club on Tuesday evening, February 12th; the chair was occupied by Mr. W. H. WALKER.

Messrs. W. Rice and H. S. Bellsmith were elected members of the Society, and Mr. W. Gale was elected an honorary member.

Mr. BELLSMITH, in demonstrating the stripping films and transferrotype of the Eastman Company, made the announcement that in these new films the Company had entirely overcome the earlier difficulties which had been encountered by those gentlemen who had adopted their use—viz., damp spots and difficulty in stripping.

The next meeting of the Society will be on February 26th, when Mr. WOLFF will occupy the chair.

BRIGHTON PHOTOGRAPHIC SOCIETY.

A MEETING of this newly formed Society was held at 36, Vernon Terrace, on the 14th inst, and was numerously attended. Mr. D. E. Caust was voted to the chair.

The minutes of the last meeting having been confirmed, the officers for the current year were then elected, viz. :—

President—Mr. W. H. Rean.

Vice-President—Mr. W. Jago.

Treasurer—Mr. J. P. Slingsby Roberts.

Secretary—Mr. A. H. C. Corder.

Committee—Messrs. Foxall, Caust, Perren, Wilks, Walls, Burt, Sharp, Hardcastle, Bedford, and Devereux.

A discussion as to the rooms to be used by the Society ensued, and eventually the matter was referred to the committee to report upon at the next meeting.

At the next meeting, on February 24th, the President will deliver his opening address. During the winter months the meetings will be held on the second and fourth Tuesdays at 8.15. p.m. All applications for membership to be sent to the Hon. Sec., Mr. A. H. C. Corder, 42, Montpelier Road, Brighton.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

A REGULAR meeting of the above Society was held in the Mayor's Parlour, Old Town Hall, on Wednesday, Feb 12, Mr. S. S. PARTRIDGE, V.P., in the chair, in the absence through indisposition of the President, Mr. Geo. Bankart, from whom a letter was read explaining his inability to be present.

The minutes of the last meeting, held January 17, were read and confirmed, and one member proposed for ballot at the next meeting. The members then proceeded with the competition for lantern slides arranged for this evening, forty-eight slides being projected on the screen with the aid of the oxy-hydrogen lantern kindly provided and admirably superintended by Mr. F. Pierrepoint, a member of the Society.

The whole of the slides were of exceptional merit, leaving little to be desired, and presenting some difficulty in awarding the prizes. The slides for competition were sent in by Mr. W. F. Tucker, Mr. S. S. Partridge, Squire Wilson, Mr. W. Taylor, Mr. Porritt, Mr. Weatherhead, and Mr. J. C. Cook. In the final voting, Mr. W. F. Tucker was awarded the silver medal of the Society for six slides which did him ample justice, the perfection of which was all that could be desired; and the brouze medal was awarded to Mr. W. Taylor for six slides, in which artistic composition was equally prominent with skilful manipulation.

A vote of thanks was proposed and carried with acclamation to W. F. Pierrepoint for the loan of his lantern, the excellent manner in which the slides were presented materially assisting the members in their decision.

It was announced that Mr. J. T. Cook, a member of the Society, had kindly consented to deliver a lecture in connection with the Society, on Thursday, March 28, in the Lecture Room, Temperance Hall, entitled "Through Australia and New Zealand," illustrated with lantern slides, Mr. Pierrepoint kindly consenting to work his lantern on the occasion.

The meeting was then adjourned until March 13, on which date the print competition for the Society's silver and bronze medals will take place.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on the 14th inst., Mr. C. H. COOK in the chair.

Mr. F. W. HART showed a photograph he had taken of some houses at night, using a flash-light; the houses were 60 feet distant. He also exhibited some 12 by 10 prints of groups taken at night with the flash-light. Mr. Hart received instructions at half-past nine o'clock in the evening to attend a meeting to photograph about 200 members assembled; this he accomplished in about half-an-hour in groups of from forty to sixty in each group.

Mr. A. HADDON, referring to some remarks he had made at a recent meeting, on the subject of the illumination of the plate when the lens was only partly uncovered, said he noticed that a writer in the current issue of the *British Journal of Photography*, signing himself "Free Lance," had thought fit to criticise the correctness of these remarks. Mr. Haddon said he should be pleased, at any time, to meet "Free Lance" and test the question with him, on condition that the results arrived at should be made public. He (Mr. Haddon) thought it very unfair that critics sheltering themselves behind a *nom de plume* should take only a portion of a speaker's statement for criticism. He thought it would rather tend to discourage members of societies from giving the results of any experiments they had made, and, consequently, would do harm.

Mr. J. B. B. WELLINGTON exhibited his new detective camera. Unlike other cameras of its class, it opened at the bottom, and the dark slides were changed also at the bottom. It was very compact and convenient to carry. The shutter was in front of the plate.

This was the ordinary lantern night. Slides were exhibited by Messrs. S. G. B. Wollaston, J. Joel, C. H. Hastings, F. A. Bridge, H. Starnes, and J. B. B. Wellington. A very interesting series illustrating a visit to Holland was shown by Mr. F. E. Freshwater, from negatives taken by Mr. H. Fincham.

CAMERA CLUB.

ON Thursday evening, Feb. 14th, lantern slides were shown at the Camera Club, a large and varied collection having been brought together. The subjects exhibited were as follows :—Tintern Abbey series and microscopic slides, Mr F. Evans; hand-camera work, Mr. Beck and Mr. Shipton; landscape, Mr. B. G. Wilkinson, junr.; scenery at home and in Canada, Lieut. Gladstone; views around Richmond, Mr. J. H. Williams; slides on transferotype and on gelatino-albumen plates, Mr. H. M. Elder; also work by Messrs. Ferrero, Laurie, Barclay, Mackell, Major Nott, and the Hon. A. W. Erskine. Some transparencies from negatives by Mr. Gambier Bolton were lent by Messrs Fry and Co., and at the request of members present the American slides received in the 1888-9 exchange were again shown. During the evening Mr. Roberts drew attention to the new form of Beard and Oakley's regulator, which was in use at the lantern, and Mr. Ferrero exhibited a new dark-room lamp introduced by Messrs Marion and Co. The subject on Thursday, February 28th, will be "Notes on Photographic Lenses," when a paper will be read by Rev. T. Perkins, M.A.

NOTTS AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE members of the above Association held their usual fortnightly meeting on Monday evening, the 18th inst., at their rooms, Cavendish Chambers, Market Street, Mr. HENRY BLANDY, President, in the chair.

Minutes of previous meetings read and confirmed.

The following gentlemen were elected members :—The Rev. A. C. Beckton, Messrs. P. Peach and J. G. Westby.

The PRESIDENT then called upon Mr. T. W. Cave, M.R.C.V.S., F.R.M.S., and Mr. W. H. Pratt, F.R.M.S., for their lecture on "Micro-Photography."

Mr. CAVE said: Before introduciug the subject of photo-micrography, it is my wish to point out to you that the paper is the joint work of Mr. Pratt and myself. The paper is merely a plain description of our apparatus, and the way in which we are accustomed to work. The apparatus has been designed by ourselves, and is the outcome of practical experience during three or four years' work in this subject. As to the method in which we work, there are probably other methods much superior to ours, but in our paper this evening we have endeavoured to give you the results of our own experiences, pointing out the difficulties and failures, and exhibiting on the screen a few lantern slides which we believe to be fairly good examples of successful photo-micrography. At the same time, we must ask you to remember that we are only beginners in the art, and have succeeded in climbing only the first few rungs of the ladder. We have had many failures, but we hope that our failures will point the way to greater success in the future, and that some day we may have a more elaborate paper to bring before you than at present. The lecturer then proceeded to give a full description of the apparatus used (a facsimile being thrown on the screen), pointing out and explaining the working of the different parts. Passing from that, he fully explained the best light to use; they themselves using a Welsbach incandescent burner, which is a kind of Bunsen burner, over which is a kind of network, or "mantle" as it is called, of delicate texture, which readily becomes white-hot and gives out a steady brilliant light. This light is almost equal to the oxy-hydrogen or electric light. The arrangement of the light so as to get the best possible illumination was then fully explained. Passing on, the lecturer came to the real work, the arrangement of the object and the exposure of the plate. This part of the working of micro-photography was most exhaustively explained, taking *seriatim* the objectives used, arrangement for focussing and how to overcome the difficulties, exposures of the plates, developing, printing, making transparencies, &c., every detail likely to be of interest to beginners and more advanced workers of this fascinating art. Slides were then thrown upon the screen including:—Proboscis of blowfly, portion of ditto, fore leg of water beetles, gizzard of cricket, tongue of cricket, antennæ of cockchafer, section of human lung, small intestines of monkey, zoophite, parasite of spoonbill, dog flea, palate of whelk, coal section, section of palm stone, section of tongue of frog, &c., &c.

In conclusion, let me express the hope that we have succeeded in interesting you in a branch of the great art of photography—a branch which is valuable to the cause of science, and valuable as a most fascinating study which can be carried on when other branches of the art must be laid aside owing to the want of sufficient light. A most hearty vote of thanks was accorded to the lecturer, and also to Mr. G. A. Bull for his kindness in putting the slides through his lantern.

DERBY PHOTOGRAPHIC SOCIETY.

THE members of this Society held their usual monthly meeting in their new rooms, Derwent Buildings, 3, Derwent Street, on Tuesday, Feb. 12th, Mr. R. Keen presiding. The minutes of the previous meeting having been read and confirmed, the chairman called upon Mr. T. A. Scotton for his paper and demonstration on "Lantern Slide Making," which he did, developing the plates with various developers, including the new one with hydroquinone. He also gave a demonstration on making transferotypes on opal. The lantern demonstration was supplemented by an exhibition of lantern slides by Mr E. J. Lovejoy (Hon. Sec.). A cordial vote of thanks was given to Mr. Scotton for his interesting paper, &c. The members of this Society have now taken rooms of their own, and intend, as soon as possible, to fit up a dark room, and they have a fairly good library.

AMATEUR PHOTOGRAPHIC SOCIETY OF MADRAS.

THE first annual meeting of the above Society was held on Tuesday evening, 15th January, at the Masonic Hall, Mount Road, Mr. F. B. HANNA, M.A., M.I.C.E., President, in the chair; H. E. Lord Connemara being present, with Viscount Marsham.

The members present first unanimously elected His Excellency a member of the Society, and Lord Connemara very kindly consented to allow his name to be placed on the list as one of the patrons of the Society, H. E. Sir Charles Arbuthnot, the Commander-in-Chief of the Madras Army, already occupying that position from the commencement.

The report of the committee was read, showing that the Society was in a very flourishing condition, both numerically and financially. The treasurer's accounts were also read, and these showed a balance of Rs. 677 in hand.

The next business was the election of the committee for the coming year Mr. F. B. Hanna was elected president, being proposed by Lord Connemara, and seconded by Mr. Sandarum Sastri. Mr. J. C. Hannyngton, C.S., and Mr. C. Mitchie Smith were re-elected vice-presidents, the proposition being made by His Excellency, and seconded by Mr. T. M. Horsfall. Lord Connemara then proposed that the following gentlemen be elected on the committee, and this being seconded by the Zemindar of Challypally, was carried:—Colonel A. Curtois, Mr. T. M. Horsfall, Dr. G. Oppert, Mr. W. G. Pavey, Mr. C. Sundarum Sastri, and Captain R. H. C. Tufnell. Mr. Hanna proposed, and Mr. Horsfall seconded, that Mr. Dunsterville be re-elected secretary and treasurer, which was carried.

The PRESIDENT then spoke as follows: It is always a pleasure to a chairman at an annual meeting to be able to say that the year, the proceedings of which he was about to review, had been a successful one. He thought there could be no doubt that this had been the case with their Society. Their members were recruited from a limited portion of the community, yet, in the first year of the Society, fifty-one members had joined; one of these had died, and one resigned, so that at the end of the year the number of members was forty-nine. Meetings had been regularly held on the last Tuesday in each month, and at these meetings a number of pictures, the subject of which was in each case fixed at the previous meeting, had been exhibited. This method ensured new pictures, and was specially intended to encourage the less experienced members of the Society, who would, he hoped, avail themselves fully of the opportunity thus afforded of showing their work and of hearing the opinions expressed by more experienced photographers. Mention had been made in the report of the exhibitions of lantern slides that had been given at his house; as this had been so much appreciated, he hoped to have the pleasure of giving similar exhibitions during the current year. The pictures sent in for the recent competition were very good, but he regretted there were so few competitors: he hoped, however, that on the next occasion more members would send in pictures. He trusted that the members of the Society were fully satisfied with the work of the committee during the past year. By far the greatest part of the credit was due to Mr. Dunsterville, their honorary secretary, on whom devolved all the hard work; but Mr. Dunsterville was one of those happily constituted men who were never so happy as when they are working hard: this, combined with a great love of order and regularity, enabled him to get through a wonderful amount of work, and accounted for the flourishing condition, financially and otherwise, of the societies in which he took a special interest.

H. E. Lord CONNEMARA then congratulated the Society on having such a successful beginning, and expressed a hope that the coming year would show even better results. He further said that he would like to see a photographic exhibition held in Madras, and trusted the committee would see their way to carry out the idea.

No further business remaining to be done, Mr. T. M. Horsfall proposed a vote of thanks to the Chairman, Mr. F. B. Hanna; this was seconded by Lord Connemara, and carried unanimously.

His Excellency then proposed a vote of thanks to Mr. Dunsterville for his services as Secretary and Treasurer, which was seconded by Mr. Horsfall and carried unanimously.

Talk in the Studio.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN. — Technical meeting, Tuesday, February 26th, at 8 p.m., 5A, Pall Mall East, when the negatives developed by hydroquinone, shown by J. W. Swan, M.A., F.C.S., during the reading of his paper at the annual meeting, will be exhibited.

THE COMPRESSED GAS EXPLOSION.—Mr. J. H. Steward, of 406, Strand, sends us the following notes on the precautions taken by Brin's Oxygen Company, Limited, to prevent accidents with steel cylinders:—"The cylinders supplied are made of soft steel, and of such a thickness in proportion to their diameter as to have

a very large margin of safety when tested, so as not to approach the elastic limit of the metal. Cylinders in which oxygen is compressed to 1,800 lbs. per square inch are all tested to 3,000 lbs. both with air and water. Every cylinder brought into the Works is tested, whether supplied by the Company or not—strange cylinders being frequently tested to destruction, and in no single case has any accident ever occurred, either at the testing, or when the cylinders have been in circulation, from over-compression. Considerable precautions are taken to prevent the admixture of hydrogen with oxygen, all the hydrogen cylinders issued being painted *red*, and the oxygen painted *black*. Every cylinder brought into the Works—whether it is a hydrogen or oxygen cylinder—has the valve opened, so that the contents are liberated. Only the most experienced men are employed as the compressors, and separate pumps are kept for oxygen and hydrogen."

THE GAEDICKE DARK-ROOM LAMP.—We now give a cut of the lamp as supplied by Messrs. Marion, constructed for use with gas, and noticed by us last week. The chimney is of light



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orange glass, and is a desirable cover to the bare flame, but it does not much diminish the light. It will be noticed that one excellent feature of this lamp is that the combustion is in no way impeded, and there are no fumes of carbon monoxide.

THE JOINT AMERICAN PHOTOGRAPHIC EXHIBITION.—Third Annual Joint Exhibition of the Society of Amateur Photographers of New York, the Photographic Society of Philadelphia, the Boston Camera Club, open to all photographers, foreign or American, will be held under the auspices of the Photographic Society of Philadelphia, April 8th to 20th, 1889, at the Galleries of the Pennsylvania Academy of the Fine Arts, Broad and Cherry Streets, Philadelphia, Penna., U.S.A. All pictures, except those from foreign exhibitors, must be framed (with or without glass, at the option of the exhibitor). Pictures from foreign exhibitors should be sent by mail, unmounted. They will be mounted for exhibition by the Committee of Arrangements, free of charge, or will be framed if the proper amount to cover the cost is remitted with entry. Entries of all exhibits must be made in duplicate, on blanks issued by the Committee of Arrangements, giving, for catalogue purposes, &c., information on the following points:—Number and size of frames, amount of wall space required, total number of pictures, subject or title of each, lens and plate used for negative, if for sale, price, name, address, and society of exhibitor. No charge for wall space to foreign exhibitors. Pictures from foreign exhibitors should be sent by mail and unmounted, addressed to Mr. John G. Bullock, Chairman of Committee of Arrangements, 528, Arch Street, Philadelphia, Pennsylvania, U.S.A. March 25th, 1889, is the last day upon which pictures will be received for exhibition. Foreign exhibits should be sent to arrive as much before that date as possible, to allow ample time for mounting, &c.

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," should now be sent to Mr. Spiller, who is alone responsible for all which appears under that heading.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

J. G. N.—Dr. Eder's original formula for gelatino-chloride emulsion was given in the YEAR-BOOK, 1882. Mr. A. Cowan gave an account of his experiments on the same, particularly with reference to the production of transparencies and lantern slides, at the March meeting of the Parent Society in the following year (see report in the NEWS, April 6, 1883). Then, later, Dr. Barker went over much the same ground, giving a formula for the chloride emulsion in the YEAR-BOOK, 1884, which was intended to be used as a printing-out process. Assuming that Mr. Cowan's will meet your wants, the proportions were—

Silver nitrate	950 grains
Sodium chloride	480 ,,
Gelatine	960 ,,
Distilled water	30 ounces

The silver is dissolved in 10 ounces of the water, gelatine soaked and salted, then mixed and worked at 120° Fahr.; developed either with ferrous citro-oxalate, or, as Mr. J. W. Swan has recently shown, with hydrokinone.

J. D. (Durban).—The difficulty you mention with the Aristotype paper is sometimes encountered, and it is generally met by over-toning the prints, so as to allow for the reduction of force or tone by the action of the fixing salts. To overcome the stickiness of the prints, you should try and wash them in a vertical position, with glass plates between.

J. FARMER.—You appear to be trying to use gelatino-bromide opal plates by the printing-out process. They will require development with ferrous oxalate, and then a very much shorter exposure is required.

W. M. (Clapham).—1. For coating the inside of cameras and enlarging apparatus, use a dead-black paint composed of a weak shellac spirit varnish charged with lamp-black well rubbed together; or you may use a thin glue (or size) with lamp-black. The first is to be preferred; and without oil of any kind, for obvious reasons. 2. Messrs. Marion and Co. keep them in stock. 3. Use Messrs. Law and Sons' cherry fabric or a black sort of bookbinder's cloth which they supply for this particular purpose of binding the edges of plate-boxes and light-tight apparatus. Their address is Windsor Court, Monkwell Street, E.C.

TEIGNBRIDGE.—Reverting to your enquiry last month, Carbutt's flexible celluloid films are now procurable; see advertisement on page vi. of our issue of February 8th.

W. L. (Barnet).—Mr. J. W. Swan read a paper on the "Hydrokinone Developer" at the last meeting of the Photographic Society, which is to be discussed on March 12th. Endeavour to be present, for you will then get the latest information. Specimens will be on view at the next Technical Meeting, 26th inst.

J. M. T.—The best works to which we can refer you are Burton's "Modern Photography," and Captain Abney's "Instruction in Photography." Both may be obtained at the NEWS Office.

FRILLING.—One would hardly expect to be troubled at this season with uplifted films. Did you use warm water for washing your negatives? The best cure is a citric acid and alum bath, used immediately after development.

A. M. M.—See "Report on the Cartographic Applications of Photography," by Lieut. J. Waterhouse, R.A., Calcutta, 1870. Also *Journal of the Photographic Society*, Vol. VIII. p. 410, Vol. XIII. pp. 58, 108, 184, 189, and Vol. XIV. p. 134. Other references next week.

AFFILIATED SOCIETIES.—Your idea has been anticipated. See the President's speech at the last meeting of the Photographic Society; also Mr. H. M. Smith's proposal in last week's NEWS, p. 108.

W. S. G. (Aberdeen) would be glad to exchange lantern transparencies with any of our correspondents. We cannot take upon ourselves the duty of conducting the interchange, but will forward full name and address to any who desire to communicate direct.

AN ADMIRER.—Portraits of the late Mr. W. F. Donkin (two poses) were taken not long ago by Mr. Barraud, 263, Oxford Street, W. The larger head is an admirable likeness; that we have is mounted as a carte vignette. Mr. Goodman, of Oxford, also took the late secretary's portrait.

INSURANCE.—We have now procured the asked-for information. Please send your address.

C. RUSSELL.—The report of Professor Meldola's lecture on "The Life and Work of Colonel Russell" is not yet published; it will appear in an early number of the *Essex Naturalist*, and covers the history of the tannin process.

S. V. W.—Answered by post.

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LATEST DEVELOPMENTS OF HYDROKINONE.

THE discussion at the technical meeting of the Photographic Society of Great Britain which took place last Tuesday evening, was forcibly illustrative of two points. The first point is the general and growing interest that is taken in the use of hydrokinone as a developing agent; and the second is the utility and advantage of meetings of the character of the one in question, at which discussion takes a freer form, and is more general amongst the members present than it commonly is at the more formal ordinary meetings. Both kinds of meetings have their place and their use, but the advantage of the more conversational gatherings lies very much in bringing out scraps of information, and opinon from members who under other circumstances merely come to listen.

As to the immediate subject of the last meeting, the negatives shown by Mr. Swan illustrating his paper on hydrokinone development, the discussion, as might be anticipated, took a somewhat wide range, and touched upon hydrokinone development generally, without being confined to the particular negatives that we have mentioned. Indications are not wanting, indeed, that many more evenings may be, and probably will be, profitably employed in the discussion of the details of manipulation connected with the developing agent at present occupying such a large share of public attention amongst photographers. One of the new points brought out on this occasion was the very high quality of negative that may be produced by the use of meta-bisulphite of potash with the hydrokinone solution, without the addition of any sulphite of soda. This result is not, indeed, one which in itself would be regarded as surprising, but that it has been asserted by several skilled experimentalists that metabisulphite of potash must not be taken as dispensing with the necessity for the use of sulphite of soda with hydrokinone, but the sulphite must be used, whether metabisulphite be employed or not. Some negatives were shown by Mr. Montifiore, developed without sulphite of soda, which appeared to be of great excellence; so much so, that an opinion was freely expressed that it would be difficult to find negatives exhibiting higher qualities, photographically speaking, than those referred to. For the particular formula employed by Mr. Montefiore we refer our readers to the report of the meeting, which will be found on another page. Doubtless many will be disposed to make a trial of it, and some, probably, to make such variations as their observations may suggest to be worth trying, or as in some cases the nature of the subject or a particular make of plate may require.

A point worth noting in connection with hydrokinone development is the increasing preference shown for potash in place of soda, both when using the caustic and the carbonated alkalis. The preference is not confined to English experimentalists. In a recent article in the *Photographische Correspondez*, Dr. Eder observes that potash (carbonate) with hydrokinone acts with notably greater power than does soda when the lighting and time of development are the same. Here we may remark that it would be desirable to know whether if the development were continued with both alkalis until there was no further action, there would still be a noticeable difference in their respective power of development. It might prove that potash is only more rapid in its action than soda, and not absolutely possessed of greater energy. On the other hand, however, Dr. Eder tells us that potash gave not only greater sensitiveness, but, with a relatively shorter exposure, yielded a more powerful and well modelled negative.

The sensitiveness shown by the plates, according to Dr. Eder's experiments, varies considerably, according to the alkali used; the result of these experiments being decidedly in favour of potash rather than soda. Compared with iron oxalate development, too, there is a remarkable difference in favour of hydrokinone and potash. With one make of plates, the difference was equal to using plates of double sensitiveness when using the latter developer compared with the same plates developed with iron, an advantage which must be highly appreciated.

With regard to the clearness of the shadows, the range of half tone, and the density of the highest lights, there does not appear to be, in the experience of some of those whose views have been in evidence, any developer which combines all these characteristics to the same extent, simultaneously, as hydrokinone. With some plates—notably, plates not of a very rapid kind—it is not difficult to simultaneously obtain these qualities when using other developers; it is with films of a more rapid kind that difficulties come in, when, in addition to the characteristics that we have referred to, it is desired to get as much out of the plate in the way of sensitiveness as it is capable of yielding. Any process or method which enables us to obtain greater sensitiveness while maintaining a certain quality, or which gives us a higher quality whilst utilising the maximum sensitiveness of a film, must be recognised as a distinct advance in photography, and, according to the experience of many of the ablest workers, such an advance is now gained by the use of hydrokinone.

There is yet another way in which, though indirectly, the introduction of hydrokinone development may prove of advantage. Although pyrogallic development has been in use for so many years, and on such an extensive scale, it is not probable that the full extent of its power as a developing agent has been arrived at. Hydrokinone development languished for a long time, and has comparatively recently been brought into so much notice by the unceasing number of experiments that have been made in order to discover the conditions under which

it may be employed to the most advantage. The result of so much laborious experiment having proved so satisfactory, it is very probable that fresh methods of working pyrogallic may be tried and investigated, and that thus, arising primarily from the improvement in hydrokinone development, an advance may be made in the pyrogallic method. Any and every improvement, even if small in itself, is an advance, and as such to be welcomed.

TESTING COMPRESSED GAS.

In spite of all precautions against the accidental mixing of oxygen and combustible gas in the iron bottles now so much used, those who use the gas will always be liable to uneasiness from a knowledge that a mistake may have been made. Hence a cheap, convenient, and portable arrangement by which a small quantity of the gas may be drawn off and tested, will be a welcome addition to the appliances of the lanternist. Such an apparatus we now receive for notice from Mr. H. Steward, of 406, Strand.

It consists of a miniature gas holder standing six inches high over all, weighing with its fittings just ten ounces, and it holds about five cubic feet of gas. The following cut shows the arrangement, which is essentially



an inverted syphon of tin plate, the short limb being closed and provided with a stopcock and jet, as shown, also with a safety valve or breaking surface consisting of a thin membranous cap of india-rubber held in position by an elastic ring.

The stopcock shown on the west side of the drawing is intended as an inlet for the gas, and the pipe connected with it runs under the longer and open limb of the inverted syphon, and mouths into the shorter limb. To use the apparatus, the safety cap is taken off and water is poured into the open limb until the level of the opening from which the safety cap has been removed is reached. The india-rubber cap is then put on, and all is ready for filling the holder with gas. One end of a rubber tube is slipped over the connection of the iron bottle, and a slow stream of gas is turned on, the open end of this rubber tube being next slipped over the shank of the inlet stopcock shown at the west side of the sketch, and is allowed to flow in until the bubbles begin to rise, when the inlet stopcock and supply cock are each turned off. The pressure of the water is sufficient to drive the gas out of the outlet stopcock when opened, and if a light is applied directly the tap is turned on, it will be at once seen by the way it behaves if it is hydrogen or oxygen, and if mixed gas, it will explode either at the nozzle or inside the test tank, according to the combustible nature of the mixed gases inside. At worst it can only blow out the thin india-rubber cap, and the small quantity of water contained in the vessel. A cork may be used instead of a rubber cap.

THE CAMERA CLUB CONFERENCE.

The 1889 Conference will be held in the Theatre of the Society of Arts (by kind permission of the council), on Tuesday and Wednesday, March 26th and 27th, under the presidency of Captain W. de W. Abney, C.B., R.E., F R.S.

Programme.

Monday, March 25th, 8 p.m.: Smoking concert at the Camera Club Rooms, 21, Bedford Street, W.C.

Tuesday, March 26th: Conference and exhibition of apparatus at the Society of Arts, 18, John Street, Adelphi, to be opened by the President at 2 p.m. Papers to be read from 2 p.m. to 5.30 p.m. in the Theatre:—Mr. Conrad Beck, "Depth of Focus"; Mr. J. Brett, A.R.A., "The Relation of Photography to the Pictorial Art": Mr. P. H. Emerson, B.A., M.B., "Science and Art"; Mr. Lyonel Clark, "A Comparison of Developers"; Captain W. de W. Abney, C.B, R.E, F.R.S., "The Law of Error and Photography"; Mr. T. R. Dallmeyer, "Shutters"; Mr. G. Lindsay Johnson, M.A., M.B., "A Shutter Speed Measurer." At 8 p.m., exhibition of lantern slides in the Theatre; slides from Paris, Vienna, American and English societies.

Wednesday, March 27th: 10 a.m.—Apparatus on view at the Society of Arts, and exhibition of photographs by members at the Club Rooms, 21, Bedford Street. 2 p.m.—Renewal of Conference in the Theatre, Society of Arts. Papers to be read from 2 p.m. to 5.30 p.m.:—Mr. C. H. Bothamley, "Chemical Changes from a Modern Point of View"; Mr. A. A. Common, F.R.S., "Irradiation in Astronomical Photography"; Mr. A. Dawson, "The Field of Photogravure"; Mr. W. T. Wilkinson, "Dry Plates for Photo Litho and for Collotype"; Mr. A. Pringle, "Photo Micrography"; Captain A. M. Mantell, R.E., "Photography applied to Military Purposes." 7.30 p.m.—Annual Club dinner for members and friends at the Holborn Restaurant.

All photographers are cordially invited to the Conference and exhibitions. The meetings, except the smoking concert, will be open to ladies. G. Davison, E. G. Spiers } *Hon. Secs.*

Camera Club, 21, Bedford Street, Covent Garden, London, W.

NOTES ON THE GROSVENOR GALLERY.

BY WIDE ANGLE.

The features of the Grosvenor Gallery are Morland's and Constable's pictures. There is plenty of interesting work by contemporaries, but with this one is more or less familiar in some cases, while in others the best does not appear at the Grosvenor. Romney's portraits, for instance, do not compare at all with his examples at Burlington House. His version of Lady Hamilton as "Miranda" is poor and affected beside the picture glowing with vitality in the rival gallery. And so with his picture of Mrs. Jordan. A charming painter of heads, his power deserted him when he came to deal with the full or three-quarter length figure. There is much to be admired in the picture of Mrs. Jordan, but it has not the force and character of the same painter's "Miss Mellon" in Burlington House.

Morland's pictures must come as a surprise to the present generation. The popular notion of Morland's pictures is, that there must be a pig in every one. The pig is as much associated with Morland as a white horse with Wouvermans, but with far less reason. Of twelve pictures in the gallery, there is only one to be found with a pig in it. All Morland's work is characterised by a simplicity of treatment and a purity of feeling which are remarkable when one remembers his dissipated life. Half of his pictures were painted in the King's Bench Prison, while his "exploiters"—says Mr. Armstrong, the compiler of the interesting catalogue notes—who paid him four guineas a day and his drink, stood over him watch in hand as he worked.

It is certainly a curious contradiction that a man who lived essentially a town life, and who loved nothing better than to be the leader of a drunken bout, should, whenever he put brush to canvas, plunge into Arcadian scenes of peace and happiness. It is hard to think that, having acquired a mastery of certain subjects, he turned them out as superior pot-boilers. One would rather believe that he loved his art, and that it reflected the best side of his character. Anyway, it is clear that had he chosen to leave his rural scenes he could have acquired fame in other directions. Witness his "Surprise" (No. 53), a picture of a girl lying on a couch, which is remarkable for its originality of treatment, pose, and freshness and vigour of colouring.

The Constables are very numerous, the bulk consisting of sketches in various stages. Of the finished works the famous "Lock" stands out beyond all others. Indeed, it is the picture of the gallery. Much has been written of this picture, but not a word too much in its praise. It has all the faithfulness of the true pre-Raffaellite without his painful labour. There is not an atom of the brush in it, whether you take the dock leaves and grass in the foreground, the timbers of the gates, or the sky. It is simple nature transferred to canvas, and you do not trouble to inquire how the painter has produced his effect. The reputation of many a painter of the early part of this century is preserved only because the possessors of their productions do not exhibit them publicly. This is not the case with Constable. His pictures are unaffected by time and fashion, and could be hung to-day in the Royal Academy, without anybody knowing that they had been painted the best part of a century ago.

In landscapes, after Constable, come John Crome, R. P. Bonington, R. Wilson, and P. Nasmyth. Crome, though not to be placed near Constable, has a touch of the same truthful quality, and it is curious to note that he anticipated the use which many artists now make of the camera. In his early days, when he painted signs one half of the week to enable him to paint landscapes the other half, he made, says Allan Coningham, "a camera-obscura which brought mechanical help to his studies, and impressed a love of accuracy in his mind which may be traced through all his productions." Crome is generally identified with woodland scenery, but two sea pieces (Nos. 82 and 97) show him to be equally at home in the painting of marine subjects. Bonington, Wilson, and Nasmyth are artists whose names command respect, but do not rouse enthusiasm. There is nothing in the gallery of one of the three to need comment.

In English portraiture, wherever Sir Joshua appears, he towers above everybody else. His portrait of Admiral Keppel at once arrests attention, and there is nothing in the gallery at all to be compared to it. The dignity, the individuality, and the repose of this picture are simply marvellous. Keppel, who was a friend of Reynolds, appears to have been a favourite sitter, for it was with a portrait of the Admiral, at that time Commodore, that Sir Joshua made his first success as a portraitist.

The portraits by Opie are very interesting, and to those who only know this painter by his turgid historical studies, will be very refreshing. They are marked by much decision and vigour. His celebrated portrait of Dr. Johnson everyone will, of course, recollect; a similar portrait without the wig is not so well known, and the aspect of the rough but kindly lexicographer devoid of his accustomed head-gear is exceedingly curious. For the rest, Gainsborough is represented, but not by any picture of surpassing merit; while the work of Beechey, Cotman, J. B. Pyne, Smirke, and Peters will be looked at with interest as examples of a school which exists now only in name. The portraits of Sir Henry Raeburn, the "Scottish Velasquez," should, by the way, not be passed over. No. 74, a portrait of a lady with the face lighted from both sides, is particularly worthy of study.

FIFTY YEARS' PHOTOGRAPHY.

BY W. LANG, JUNR.*

By general consent it is agreed that the science, whose aims and purposes we, as an Association, seek to further and advance, has at last reached its period of jubilee. At this stage in the history of photography it may not be without interest to take a retrospective look, and see from what comparatively small beginnings the science and art of photography has arisen. Many of the earlier facts and triumphs have been lost sight of in the perfected processes of our own time, and are, indeed, unknown to the ordinary worker of the present day. In the paper which it is my privilege to bring before you this evening, it would be perfectly impossible, having regard for the time at my disposal, to lay before you the complete record of what has been done during the fifty years' existence of photography. I can only refer to the more important points, and it will be my endeavour to do so in a way that may not be deemed wearisome by those who may be present this evening.

We have it on the authority of the Poet-Laureate that—

"Science moves but slowly, slowly creeping on from point to point,"

and perhaps a good confirmation of this may be found in the fact that the camera-obscura existed for nearly three hundred years before a method was found whereby the pictures obtained in the darkened chamber could be rendered permanent. The name that has been associated with the camera is, as most of you are aware, that of John Baptista Porta, a Neapolitan philosopher who flourished in the sixteenth century. Eder, in his "Handbook of Photography," is inclined to attribute the discovery of the camera to a Benedictine monk—one Pauutius; but, be this as it may, certain it is that Porta, in his "Magia Naturalis" (natural magic), describes the method of obtaining images in a darkened chamber. In the first edition of this work, reference is made only to a simple aperture, while in the later editions the use of lenses to improve the appearance of the image is recommended. A word or two regarding Porta may not be out of place. First of all we will throw upon the screen his portrait, taken from the frontispiece of one of his works, "De Humana Physiognominia," published at Sorrento, 1586. I was fortunate enough to secure a copy of this very rare first edition at the sale of Lord Crawford's library.

Porta seems to have been born at Naples about the year 1550. At a very early age he appears to have shown great delight in studying the works of the old philosophers, and it is recorded that when he was ten or eleven years of age he was able to compose in Latin. Brought up under the care of an uncle who fostered the natural tendencies of young Porta, we find that he travelled through France, Italy, and Spain, his principal object being to consult the various libraries scattered throughout these countries, and make himself acquainted with the contents of the old manuscripts collected together in the different storehouses of learning. Porta, on account of a Society which he founded and named *De Secreti*, found himself in discord with the Pope of that day, Paul III., and he had to betake himself to Rome in order to justify the action, and this presumably he would have no difficulty in doing, as the Society was only intended as a means for encouraging the natural sciences, the members for which were only eligible who had done something in the way of discovery, either in the art of medicine or in natural philosophy. Porta, along with his brother Vincent, established a museum of natural curiosities, which was visited from to time by the men of science from other countries. Porta never married. He died at Naples in the year 1615. His writings were varied. We have already referred to his "Natural Magic"; it was originally published in four books, but subsequent editions contain twenty books. Several of these contain as frontispiece a portrait of Porta standing in front of a concave mirror, with a sword in his hand performing the experiment known as the mysterious dagger. We will throw on the screen the picture in question which is taken from a copy of "Magia Naturalis," published in Amsterdam in the year 1664. The original work I have brought with me and it can be seen by the members at the conclusion of the paper. I have also a copy of an early edition published by Plantin, of Antwerp, in the year 1585, which contains only the four books. I may mention an English translation has been published bearing date 1669. I regret that so far I have not been able to procure a copy of this translation. I may, however, give a few quotations from the seventeenth book of this translation, which bears more especially on Porta's experiments with his

* A communication to the Glasgow Photographic Association.

darkened chamber, and the employment of a lens. After describing the way "to see all things in the dark that are outwardly done in the sun with the colours of them," he adds, "Now will I declare what I ever concealed until now, and thought to conceal continually. If you put a small lenticular crystal glass to the hole, you shall presently see all things clearer—the countenances of men walking, the colours, garments, and all things as if you stood by; you shall see them with so much pleasure that those that see it can never enough admire it." He further recommends: "But if you will see all things greater and clearer, over and against it set the glass, not that which dissipates by dispersing, but that which congregates by uniting both by coming to it and going from it, till you know the true quantity of the image by a due appropinquation of the centre; and so shall the beholder see more fitly birds flying, the cloudy skies, or clear and blue, mountains that are afar off, and in a small circle of paper, that is put over the hole, you shall see, as it were, an epitome of the whole world, and you will much rejoice to see it." The quaint descriptions of a concave and a convex lens are well worth noting—that which dissipates by dispersing, and that which congregates by uniting. Porta further suggests the use of a darkened chamber as an aid to drawing. He says:—

"If you cannot draw a picture of a man or anything else, draw it by this means, if you can but only make the colours. This is an art worth learning. Let the sun beat upon the window and then about the hole; let there be pictures of men that it may light upon them, but not upon the whole. Put a white paper against the hole, and you shall so long pit the men by the light, bringing them near, or setting them further, until the sun cast a perfect representation upon the table against it; one that is skilled in painting must lay on colours where they are on the table, and in the superficies it will be seen as an image in a glass."

The camera-obscura was at one time a much more popular affair than it is now. It formed often one of the features of country residences. The diagram thrown on the screen will give a good idea of the form in which the camera-obscura was erected.

Before we pass on, however, I may refer to the general writings of Porta, and the titles of his various works. These are:—A treatise on cipher writing, entitled "De Furtivis Literarum Notis"; one on plants, "Phytognomonica"; another on the relations supposed to exist between men and animals, "De Humana Physiognomonia." It might be interesting to show the mode in which this work has been illustrated. A transparency from one of the cuts will therefore now be shown. It represents the head of Socrates alongside a stag's head, the point of similitude as in the flat noses. Porta has a work bearing on agriculture, cultivation of trees, &c, and its title is, "Villæ"; another, relating to optics, "De Refractions Optics parti libri III." He wrote, concerning hydraulic engines. "Pneumaticorum libri tres"; another work, "De Cœlesti Physiognomonia, treats of the heavenly bodies. "Ars Reminiisceudi" is a compendium of all the methods made use of by the agents to aid and strengthen the memory. A book regarding distillation, "De Distillatione, which gives one a good idea of the state of chemistry, or rather alchemy, in the sixteenth century. A treatise on fortifications, "De Munitione"; and the last of his scientific works, "De Æris Transmutationibus," which may be reckoned the first work bearing on meteorology. Porta towards the end of his life took to writing plays, and four comedies and two tragedies emanated from his pen. Enough has been said regarding our philosopher to show how varied must have been his talents, and although much that is inaccurate and even childish is to be found in his writings, we have yet to remember that he lived in an age of superstition, when alchemy and astrology were regarded as sciences. The only other two works which I possess of Porta's are two editions of his cypher-writing, the first edition published at Naples, 1563, and a later one published at Monthelliard, a town in France, in 1593. These, with those previously mentioned, can be seen by any interested at the conclusion of my paper. In anatomy Porta's name still lives, for anatomists still speak of the Vena Porta.

It is difficult to say to whom we should attribute the camera-obscura in its portable form. Robert Hooke, famous English mathematician, describes such an apparatus in 1679, and Mario Antonio Cellio, 1687, recommends this form of the camera for assisting artists. In the transparency now shown you have a reproduction of the illustration which is found in Hooke's *Philosophical Experements*, where this device of his is described. This work was published in 1726, and the original copy I have with me.

Photography may be said to be the offspring of the two sciences—optics and chemistry. We have just been considering the parentage on the optical side, and perhaps on the chemical we might have to go still further back in the annals of history were it desirable to be minute; but one thing is certain, that at all events in Porta's time the darkening of silver chloride by the action of light had been observed by the alchemists. The name by which this substance was then known was that of horn-silver—*luna cornea*; and the alchemist, Fabricius, in his work "De Rebus Metallicis," printed in 1568, gives a lengthened account of its various properties. It was reserved, however, to the famous Swedish chemist, Scheele, to give, in 1777, a philosophical explanation of this darkening action of light, and he showed that the action took place more rapidly in the violet coloured rays than in any other. Coming now to the beginning of the present century we find that Ritter established the fact that the rays beyond the visible spectrum had even a greater action than the visible. The names associated with investigations of a similar nature at this period may be just simply given—Sennchier, Seeheck, Dr. Woollaston, Sir William Herechel, and many others.

In France, a Professor Charles was in the habit of showing to his class about this time a mode by which portraits of a kind could be obtained by the darkening action referred to. The picture now shown will indicate his manner of proceeding, Strong sunlight was allowed to penetrate through a considerable aperture in a darkened chamber, and where the light fell the sitter was so placed that the profile of his head cast a shadow on the paper behind him; a sort of silhouette was thus obtained, but as no mode of rendering it permanent was forthcoming it was valueless.

Thomas Wedgwood, fourth son of the Wedgwood of porcelain fame, as also Sir Humphrey Davy, occupied themselves with the attempt to secure light-drawn pictures. Beyond establishing the fact that the chloride was more susceptible than the nitrate of silver, and that white leather as a basis for the image gave better results than white paper, the problem of fixing remained still unsolved. These two investigators did not attempt camera pictures, they contented themselves with what we would now call printing by contact. This was in 1802. We now come to the year 1814, and the man who was destined to secure the first permanent picture appears on the scene—Joseph Nicephore Niepce. He, too, seems to have started in the first instance experimenting with the salts of silver. Discarding these, he studied the action of light on resinous and bituminous bodies. He devised a process, to which he gave the name of heliography, which was based on the fact that a substance known as bitumen of Judæa, after exposure to light, was no longer soluble in the menstrua which originally dissolved it. Application of the process now known as the bitumen process remains to the present day, being made use of in certain photo-engraving processes. Niepce employed pewter plates covered with the sensitive bitumen. Comparatively sensitive in the case of contact printing, the material was by no means sensitive enough for camera work, hours being required to effect the necessary change in the camera. Pictures are, however, extant secured by this means, and some little time ago I had the honour of bringing one before our Association. A few facts connected with Niepce's career may not be without interest. He was born at Chalons-sur-Saône, March 7th, 1765. Educated for the Church, he, however, ultimately became a soldier, and saw actual service. Retiring from the army on the score of ill-health, he settled down as Chalons. His leisure time would seem to have been devoted entirely to experimenting, and we may take it that it was about the year 1813 he commenced those experiments which ultimately ended in his heliographic method. A good deal is learned regarding Niepce's work from a French book, "La Vérité sur l'Invention de la Photographie," a biographical notice by Victor Fouqué, published in the year 1867. The book in question is rarely to be met with now, but I have a copy, which can be seen further on. Nicephore Niepce had a brother, Claude, and the book is largely made up of the correspondence which took place between the two brothers. Claude seems to have had also an inventive turn of mind, and he came over to England regarding a machine of his, the "pyrelophore"—a method of propelling vessels by means of hot air. This was about the year 1811. Nicephore visited his brother at Kew in 1827, and he then wished to bring his process before the Royal Society. On account of his not divulging the method his memoir was not received by the Society. At the opening meeting of last session we had that identical memoir before our Society, as also a reproduction of an engraving and the camera picture already referred to. Niepce would seem to

have worked hard all his life at the attempt to secure light-drawn pictures, but success did not crown his efforts. He died at the age of sixty-eight, his death occurring on July 5th, 1833.

Four years previously Niepce had entered into partnership with Daguerre, and we will throw upon the screen a portion of the facsimile of the now world-famous co-partnery, that portion containing the signatures of the respective contributories. Fouqué's work has the complete deed reproduced, but we have thought it sufficient for our purpose to show the particular portion referred to. Daguerre, although a Frenchman, may be said to have added a word to our English vocabulary. Although many may not exactly comprehend what a Dagnerreotype really is, few there are who have not heard the term. A few details regarding Daguerre, and how he became associated with Niepce, may be here given. This photographic pioneer rejoiced in a perfect plethora of names—Louis Jacques Mandé Daguerre. His portrait, taken from a Daguerreotype by Mayall, in 1846, is now presented to you. Daguerre was born at a village near Paris, named Cormeilles, on November 18th, 1787. He seems to have been left at an early age to his own resources, but appears to have developed a considerable talent as a scene painter. He was employed as scenic artist at several of the theatres in Paris. Daguerre originated those scenic effects known as dioramic. A diagram illustrative of Daguerre's pictures and his mode of showing them is here reproduced. The pictures were painted on both sides of the canvas, and shown first by reflected and afterwards by transmitted light. A description of the mode of producing such pictures is to be found in a translation of Daguerre's treatise on Daguerreotype, published in London in 1839.

I have with me this evening the translation referred to. Daguerre's Diorama was one of the sights of Paris. It was opened in the year 1822, and continued till the year 1839, when it was destroyed by fire; this occurred on the 3rd of March in the year specified. The subjects he had in this manner portrayed on canvas were many and varied—"Roslin Abbey in a Fog," changing afterwards to a snowstorm; "The Deluge"; "A View of Paris from Montmartre; Napoleon's Tomb, St. Helena; Princes Street, Edinburgh," and "A Fire," &c. "The Temple of Solomon" was his last production.

In his sketches from nature Daguerre is said to have largely made use of the camera-obscura; and to fix the ephemeral images of the instrument seems to have been the one idea of the illustrious Frenchman. So engrossed with what he deemed possible did Daguerre become, that the story is told of his wife consulting some of the scientific men of the day regarding the sanity of her husband, and receiving the reply that the thing Daguerre sought after was not by any means impossible. We rather think that Madame Daguerre would not derive much comfort from an answer such as this. It may be here mentioned that Isidore Niepce, the son of Nicephore, took his father's place in the Niepce-Daguerre copartnery, which was to last for ten years, starting from 1829.

(To be continued.)

DAGUERREOTYPE.

BY T. W. THOMAS HORTON.*

It is instructive to trace the progress of a discovery from the first indication of the truth to the period of its full development, and of its application to purposes of ornament or utility.

The progress of discovery is ordinarily a slow process, and it often happens that a great fact is allowed to lie dormant for years or for ages which, when eventually revived, is found to render a fine interpretation of some of Nature's harmonious phenomena and to minister to the wants or the pleasures of existence. Photography is peculiarly illustrative of this position. As in this year of grace, 1889, we celebrate the jubilee of our art-science, it has seemed to me to be a suitable occasion to trace briefly the steps by which we have advanced to our present knowledge.

The progress has been slow and laborious, but it has been steady. And while we rejoice in the perfection of our apparatus, in our instantaneous plates and rapid lenses, in our ability to depict every phase of nature and art, from the bullet in its rapid flight to the mapping of stars which must ever remain unseen by the human eye, we ought never to forget the men who laid the foundation of all this. In asking your special attention to-night to the elegant process devised fifty years ago by the great Frenchman, Daguerre, I shall also briefly mention the work of other men who aided in the birth of photography, the infant of fifty years ago, the giant of to-day.

The philosophers of antiquity appear to have had their attention excited by many of the more striking effects of light, yet we have no account of their having observed any of its chemical influences, although its action on coloured bodies—deepening their colour in some cases and discharging it in others—must have been of everyday occurrence. The only facts which they have recorded are that some precious stones, particularly the amethyst and the opal, lost their sparkle by prolonged exposure to the rays of the sun. It has been stated, but on doubtful authority, that the jugglers of India were for many ages in possession of a secret process by which they were enabled in a brief space to copy the profile of any individual by the action of light. However this may have been, it does not appear that they know anything of such a process in the present day. The alchemists, amidst the multiplicity of their manipulatory processes in their vain search for the philosopher's stone and the *elixir vitæ*, stumbled upon a peculiar combination of silver with chlorine, an element unknown to them, which they called horn silver, as, by fusion, the white powder they obtained by precipitation was converted into a hornlike substance. They observed that this horn silver was blackened by light, and as they taught that silver only differed from gold in being mercury interpenetrated by the sulphurous principle of the sun's rays, they concluded that this change was the commencement of the process by which their dreams were to be realised. Failing, however, to produce gold from horn silver, the fact of its blackening was simply recorded, and no further investigations were made into this remarkable phenomenon. The illustrious Scheele, in his admirable *Traité de l'Air du Feu*, gave us the first philosophical examination of this peculiar change in the salts of silver, and showed the dissimilar powers of the different rays of light in effecting this change. In 1801, Ritter proved the existence of rays a considerable distance beyond the blue end of the visible spectrum, which had the property of speedily blackening chloride of silver. These researches excited the attention of the scientific world. M. Berard Seebeck, Berthollet, and others, directed their attention to the peculiar condition of the different rays in relation to their luminous and chemical influences; while Sir William Herschel and Sir Henry Englefield investigated the calorific powers of the coloured rays, and were followed in these investigations by Seebeck and Wunsch. Dr. Wollaston pursued and published an interesting series of experiments on the decomposition effected by light on gum guaiacum. He found that paper washed with a solution of this gum in spirits of wine had its yellow colour rapidly changed to green by the violet rays, while the red rays had the property of restoring the yellow hue. Sir Humphrey Davy observed that the pure coloured oxide of lead became, when moistened, red by exposure to the red ray, and black when exposed to the violet ray; that hydrogen and chlorine entered into combination more rapidly in the violet than in the red rays; and that the green oxide of mercury, although not changed by the most refrangible rays, speedily became red in the least refrangible. The revival of gold and silver from their oxides by the action of the sun's light also occupied the attention of Count Rumford, who communicated two papers on this subject to the Royal Society. These and some curious observations by Morichini, Configliachi, M. Bérard, and Mrs. Somerville, on the power of the violet rays to induce magnetism in steel needles, are the principal points of discovery in this branch of science previously to the announcement of the Daguerreotype.

A statement has been made by the French to the effect that M. Charles was in possession, about the year 1790, of a process by which portraits could be obtained by the agency of sunlight producing a dark impression upon a prepared surface. This is, however, exceedingly doubtful; and even the Abbé Moigno, in his "Repertoire," states that M. Charles never disclosed any fact connected with his hypothetical discovery, and that he left no evidence behind him of ever being in possession of such a secret process.

In June, 1802, Mr. Thomas Wedgwood, a son of the celebrated porcelain manufacturer, published, in the Journals of the Royal Institution, "An Account of a Method of Copying Paintings upon Glass, and of Making Profiles, by the Agency of Light, upon Nitrate of Silver, with Observations by H. Davy. This was certainly the first published account of any attempt to produce images by the decomposing powers of light. Mr. Wedgwood made use of white paper or white leather, moistened with a solution of nitrate of silver. He found that white paper or

* A Communication to the Birmingham Photographic Society.

white leather, moistened with a solution of nitrate of silver, underwent no change when kept in a dark place, but on being exposed to the daylight it speedily changes colour, and, after passing through different shades of grey and brown, becomes at length nearly black. When the shadow of any figure is thrown upon the prepared surface the part concealed by it remains white and the other parts speedily become dark. The images formed by means of the camera-obscura were found to be too faint to produce in any moderate time an effect upon the nitrate of silver. Davy made some important additions to Wedgwood's work. He found that the chloride was much more sensitive to light than the nitrate of silver. Both Wedgwood and Davy attempted to secure the pictures formed within a camera upon paper coated with these salts of silver, but without success. Davy, however, using the more concentrated light of the solar microscope, readily obtained images of small objects upon paper prepared with silver chloride. But there was a fatal objection to this method which not even Davy, with all his chemical knowledge, was able to surmount. When the copies obtained were exposed to daylight the same agency which had produced the picture proceeded to destroy it. Davy clearly recognised its capabilities, for he writes:—"Nothing but a method of preventing the unshaded parts of the delineations from being coloured by exposure to the day is wanting to render this process as useful as it is elegant." In this copying process, devised by Wedgwood and improved by Davy, we see the germ of the ordinary method by which our negative photographs on glass are made to yield a positive proof or impression upon sensitised paper.

The failure of two such eminent men as Wedgwood and Davy in their attempts to produce light-drawn pictures appears to have discouraged any further experiments of this kind at that time in England. In 1814, M. Niepce, of Chalons-on-the-Saône, turned his attention to the chemical agency of light, his object being to fix the images of the camera-obscura, and he appears to have discovered the peculiar property of light in altering the solubility of many resinous substances. In 1824, M. Daguerre began a series of experiments with the same object in view. The first substances used by him were, according to M. Arago, paper impregnated with a solution of the nitrate or chloride of silver, but his ill-success induced him to abandon them. It is not, however, clear whether any other substances or materials were used by M. Daguerre previously to 1826, when, through a Parisian optician, he became acquainted with M. Niepce. Letters addressed to Niepce received, however, but curt responses, and it was not till 1827, when Niepce passed through Paris on his way to England, that he entered into cordial relations with Daguerre. In December of 1827, M. Niepce was in England, and he communicated an account of his experiments to the Royal Society of London, together with several pictures on metal plates in the state of advanced etchings; the etching effected by acid subsequent to that part of the process in which light assisted in laying bare portions of the resin-covered plate. These early productions prove that the experimentalist of Chalons was acquainted with the method of making the shadows and lights of his pictures correspond with those of nature, and of rendering his copies impervious to the erasing effects of the solar rays. In a paper, dated December 5th, 1829, M. Niepce communicated to M. Daguerre the particulars of the process employed by him, and they entered into an agreement to pursue, for their mutual benefit, the researches which they had respectively begun. A correspondence between M. Niepce and M. Daguerre has been published which sufficiently proves that to the latter the sole merit of the discovery of the process which bears his name is due. In 1831-2, M. Niepce indeed regrets that, at the recommendation of M. Daguerre, he had lost so much time in experiments on iodine. "I repeat it, sir," he says; "I do not see that we can hope to derive any advantage from this process more than from any other method which depends upon the use of metallic oxide," &c. In another letter he speaks of a decoction of thlapsi (shepherd's purse), fumes of phosphorus, and particularly of sulphur, as acting on silver in the same way as iodine, and that caloric produced the same effect by oxidising the metal; "for from this cause proceeded in all these instances this extreme sensibility to light." We may perceive from these remarks that although M. Niepce may not have been fortunate enough to discover the exquisitely sensitive method of M. Daguerre, he must have submitted to experiment a great variety of substances in different states of combination. The philosopher of Chalons died in July, 1833, and a new agreement was entered into between his son, M. Isidore Niepce, and Daguerre.

(*To be continued.*)

RUSSIAN CORRESPONDENCE.

Stripping Films—Substitute for Negative Varnish—Magnesium Illuminants.

BY C. T. CHESTERMAN.

Stripping Films in Practice.—Colonel Vishniakoff, whose landscape studies have gained for him several prizes, and are much sought after by artists, gave a lecture in the large hall of the Imperial Russian Technical Society, on the "Traveller's Outfit of the Period," in which he gave explicit instructions for working Eastman's stripping films. Some of his remarks may be of use to readers of the News, as they were by a practical person, who had exposed, developed, and stripped upwards of 300 (whole-plate) 18 by 24 c.m., with the loss by frilling of only half a dozen out of the whole batch taken last summer in the Caucasus. The lecturer said that a McLellan camera was in his estimation the camera for travellers, as it combines great portability with rigidity; a great improvement, however, would be a less fragile material in lieu of the ground glass.* As regards portable tripods, he had found those with loose head-pieces a failure. The lenses recommended by the colonel were for instantaneous exposures, Dallmeyer's rapid rect., or Ross' port. symmet.; for ordinary lanscape work he had found Dallmeyer's new landscape lens a very useful adjunct; for interiors or confined situations, one of Ross' or Dallmeyer's wide angle type should be taken. Such a journey as the colonel made would have been next to impossible with glass plates, first on account of weight, and secondly the liability to breakage. In describing one of the passes through which he had journeyed, accompanied by his son and a guide, he compared the road to a narrow path paved with stones, cocoa-nut shaped, all placed end upwards, but not fixed in their places; in fact, it was part of the bed of a river which recedes during the summer months. Under such difficulties only paper films could be carried with safety. Take two roll-holders on a journey, said the lecturer, because if ten exposures were made in one day, a fresh roll could be commenced the next day, or the first one finish up if few subjects were to be taken, and be sure to take some developer with you, as it sometimes saves a deal of chagrin. This is not so much required for timing exposures as for ensuring oneself from time to time that nothing has happened to the camera, as the slightest crack in the woodwork or a pinhole in the camera would perhaps make one's labour fruitless. As to exposure, the colonel said he preferred to over-expose, as great latitude lay in the use of the developer. Great care, he said, was necessary in attaching the loose end of the film to the winding-up roller, otherwise it might wind slantingly, and that would cause a stoppage. It would be an improvement to the Eastman roller slide if the exposed film could be removed, wound upon the bottom roller, instead of having to unwind. The lecturer said that as he had so much experience with ferrous-oxalate developer for dry plates, he did not like to despise an old and tried friend for a new one. Several baths of different strengths were made up, and all the films were immersed in the weakest one first; if the action was slow, they were removed to a stronger one; if the picture flashed out at once, it was removed to a bath of clean water to be afterwards developed with a restrainer. Films are easier to manipulate than glass plates, only one must be sure to develop until there is a slight deposit on the deepest shadows, otherwise the negative will require intensification, which will bring a lot of trouble with it. For fixing, a very small quantity of hypo solution, 30 to 40 per cent., is needed; ten minutes' immersion is sufficient; wash slightly, as the injurious chemicals are all removed in the hot water bath. The colonel found stripping a very easy matter, notwithstanding some adverse remarks which had appeared in foreign journals. Patent plate, slightly larger than the films, were well cleaned and polished with French chalk, then

* Perhaps the improved celluloid plates, as used by Mr. Carbutt, covered with matt varnish.

coated with raw collodion; no india-rubber solution was used round the edges, it being found superfluous. In transferring the negative to the collodionized plate a piece of oiled silk or transparent oilcloth should be interposed between it and the squeegee; all the plates carrying the films are piled one upon the other with a few sheets of bibulous paper on the top, and weighted for a time ranging from fifteen to seventy-five minutes, but on no account longer, as they would become too dry. While stripping, have a kettle of boiling water at hand to assist in removing refractory films. As soon as the substratum is softened, stick the point of a needle into one corner of the paper and raise it gently; if it does not separate easily, try it at one of the other corners, but on no account using force, and be very careful not to damage the film with the needle, as frilling will be sure to set in. Colonel Vishniakoff does not retouch his negatives; he says: "Don't try to beautify nature." To strip the negative from the preliminary support the colonel gives the preference to sheets of gelatine, which should be bathed in a bath containing one-half the quantity of glycerine given in the printed directions. Finally, he warned workers not to overdry the strengthened films, otherwise they would strip of themselves. The finished film negatives are best preserved between sheets of waxed paper.

A Cheap Substitute for Negative Varnish.—Mr. P. A. Schestakoff, in a letter to the *Photographic Vestnik*, writes: Having been engaged at retouching upon bromo-gelatine films ever since their introduction, he has been at a loss to attain that perfection demanded by his employers, as the pencil failed to do its work owing to want of "tooth" in the varnish. Now all is changed; the pencil yields to his will, it being the easiest matter possible to render the most transparent shadows as dark as the densest high lights, thanks to a medium that makes all varnishes and mattoleins superflous—*i.e.*, common turpentine. Its only drawbacks are that it takes rather long to dry, unless accelerated by heat, and it slightly weakens the negative. Mr. Schestakoff uses chiefly 3H and 4H Faber's pencils, but a 2B can be used if the work has to be hurried. Nothing detrimental to its use has shown itself after a trial of two years; in fact, it is a superior protection against damp. Several members of the V section of the I. R. T. Society who had tried this simple and cheap medium, spoke of its efficacy at one of their meetings, and one of them proposed the addition of benzole to accelerate desiccation.

The *Photographic Vestnik* for January, in an article on "Magnesium Illuminants," describes, among others, two magnesium flash-light lamps, by Mr. Gratchoff, which can be employed for several consecutive exposures, nearly exactly the same quantity of powder being used each time. The first consists essentially of two parts—a pipe containing a supply of magnesium powder on a support, and the lamp. The pipe is closed with a lid at the top, and at the lower end is a tap in which the orifice in the plug is soldered up at one side, so that upon turning it half round the portion of powder caught in the hollow formed is emptied into the pipe. One end is connected with rubber piping to a pneumatic ball, the other is bent up through the middle of the lamp. The lamp is stuffed with asbestos fibre covered in with a wire netting secured in position by two rings. When the tube is charged with magnesium, it is propelled through the flame of ignited spirit with which the asbestos is saturated. The second is an adaptation of the ordinary chemical spirit lamp with central draught cone. The wick is held at the upper end by a metallic tube, and the orifice through which the spirit is introduced into the reservoir is furnished with a glass stopper. A small glass receptacle is adjusted in the cone; it consists of a tube to which the rubber tube is attached, the upper portion being widened to form a holder for the magnesium. This is plugged with a cork which has through its centre a piece of glass tubing of small diameter. Upon pressing the pneumatic ball, the magnesium is forced into the flame through the tube. The lower the end of the tube the smaller the quantity of powder consumed at each blow-through. Mr. Gratcheff succeeds very well by employing a battery of five lamps on one side, and two on the other of the subject, arranged in boxes. The magnesium reservoirs are fixed with their ends protruding through the back of the box, where they are connected with india-rubber tubing to one common canal emanating from the pneumatic ball the same as in Schirm's arrangement. In some instances, a blind of tracing cloth, or other translucent material, is hung in front of the boxes to soften the effect. N.B.—A very small quantity of powder should be used in each lamp for instantaneous effects.

Reviews.

A New Principle in Heliochromy. By Fred E. Ives. Foolscap quarto. Boards. Illustrated with prints from phototypic blocks. (*Philadelphia*, 1889, *printed by the Author*).

In this work, Mr. Ives gathers together his various papers bearing upon a subject which he has made greatly his own. Heliochromy is now a thing we may hope to see practically realized within a reasonable time—indeed, the path to be followed may be considered as already mapped out, the investigations of the pioneers in orthochromatic photography having prepared the way, among which we may refer to the discovery of the chlorophyl method by our present author, the invention of the use of eosine for orthochromatic purposes by Colonel Waterhouse, the numerous discoveries and patient investigations of Dr. Vogel; also the brilliant labours of Captain Abney.

A Dictionary of Photography, by E. J. Wall. Cloth, crown octavo, 240 pages, price not stated. (*London, Hazell, Watson, and Viney, Limited*, 52, *Long Acre.*)

A concise and useful handbook in dictionary form, and one likely to have a large sale with wide popularity. Due prominence is given to subjects of current interest, and we note on page 86 an excellent article on quinol (hydroquinone) development, followed by a concise account of the method of development with hydroxylamine introduced by Messrs. Egli and Spiller.

Notes.

At the last meeting of the Photographic Society Dr. Lindsay Johnson gave useful hints as to the slow development of over-exposed plates—plates exposed in Switzerland on subjects involving the most violent contrasts. He used, as one might expect, a developer very weak in pyro, but his main point is to keep the dish in constant motion during a long development. For this purpose he adapts one of the automatic print washers constructed on England's water-wheel principle, and made by Messrs. Lejeune and Perken, as a rocking base for the tray. He will show the arrangement at the conference of the Camera Club, and it is an open secret that he will also exhibit a remarkable series of lenses which he has devised, these lenses working surpassingly well at $\frac{f}{4}$. Dr. Lindsay Johnson is also engaged in constructing a novel instrument for testing the speed of shutters.

Mr. England's form of the flash-lamp shown at the same meeting, and referred to in our report, is simple and

cheap to a degree, and every photographer can arrange it for himself. Mr. England pointed out that it might be a valuable aid in the studio on dull days. We shall say more about Mr. England's lamp.

The contention of M. Eiffel, that he has as good a right to sell his design of the tower as he would have to sell the right to photograph a statue or a picture, opens up an interesting argument. The Eiffel Tower has already been utilised in a hundred different ways in fancy articles, and could the designer establish his claim to a copyright, the royalties he could exact would amount to a very handsome sum. But can he? If anybody copied his plans of the tower, he could certainly proceed against the offender for an infringement of copyright, and this being the case, why should he not have the power to proceed against anybody who copied or photographed the object itself?

There is some sort of recognition of this principle in the regulations appertaining to photography in connection with the French Exhibition, but with a distinction. A charge is made to photographers who wish to use the camera, but the main buildings are strictly prohibited from being photographed. But here the condition is attached to the permission to enter private grounds. If photographs of the buildings could be taken outside the grounds, we fancy that the photographers could not be interfered with. It will be recollected that similar regulations were in vogue at the "Healtheries" and "Fisheries" Exhibitions, which regulations were enforced with great stringency and even rudeness, as we noted at the time. Of course the authorities, having sold the right to photograph to certain firms, were bound to protect the interests of the latter, but this is not quite the same thing as M. Eiffel's claim.

We do not desire to push the matter to an absurdity, but we are inclined to think that if M. Eiffel makes good his case, that this will be the thin edge of the wedge. Photographers are becoming so numerous, and detective cameras so artful, that copyrights will have to be discovered where at the present moment none appear to exist. The question as to whether a man has a copyright in his own face will be one of the first to arise, and so far as this is concerned we would like to point out an initial difficulty. The painter of a picture is, of course, the owner of the copyright as the producer; but could a man on this ground claim to have a copyright in his nose and mouth and other features? Would not the copyright logically belong to the authors of his being, his parents? If our view be correct, and things advance in the way in which they appear to be doing, the legislature will have to interfere, and enact that at the time of registration of an infant the parents must in writing present him with the copyright of his own face!

Invention, speaking of ghost pictures, says: "One of the latest 'wrinkles' in photography is the ghost picture, in which a person's likeness is taken by an instantaneous exposure, with a result so shadowy that the background, subjected to a longer exposure, can be seen through the ghost." Our contemporary might well have said one of the "oldest wrinkles," as the above style of picture was not uncommon thirty years ago. After the short exposure the person to be "spiritualised" moves on one side, after which the lens is again uncovered. A single ghost among a group of people can be made thus; but, of course, those composing the main group must remain still over a period including both exposures—a thing easy enough with the rapid plates of to-day.

The new rooms of the Liverpool Amateur Photographic Association, at Crescent Chambers, Lord Street, are to be permanently open as a sort of club, an arrangement calculated to be of great benefit to the members.

One of the first duties of a "celebrity" is to go and get photographed so soon as public attention is drawn to his doings, and paragraphs about him begin to appear in the evening papers. Owing to a disregard of what was expected from him, Col. North, the much advertised "Nitrate King," caused artists a good deal of trouble. Portraits of this lucky individual have, during the last two months, appeared in four papers, and they differ so much that one wondered which was the real man. The difference which existed caused the artist of an illustrated financial paper to seek out the original, but as it was on the eve of the monied magnate's departure for Chili, the task was by no means easy. However, after waiting for three hours at the Colonel's favourite haunt, "The Woolpack," his patience was rewarded. He was not able to use a pencil, but his sketch, which was entirely a memory one, is declared to be the most characteristic one which has yet appeared. Whether Col. North himself was satisfied is not known, but it is significant that he has taken out to Chili several hundreds of photographs of himself, so that if any South American journal cares to give his portrait it can be done without difficulty.

An ingenious lecturer, in pointing out the close analogy existing between photography and phonography, went on to show how the photographic camera and the phonograph—or phonophone, as Professor Edison prefers to call it—could be made mutually helpful. "Thus," said he, "whilst with the former the flash of the lightning is portrayed, the latter can effectively bottle up, as it were, the roar of the thunder." His example was, to say the least, a somewhat far-fetched one, and he might have adduced a much more practical specimen of the way in which these late great inventions can be, so to speak, driven in double harness; for it is asserted as a fact that Mr. Edison himself, wishing to prove the versatility of his improved phonophone, actually induced one of his workmen at Menlo Park, who was troubled with bronchial inflammation, to deliberately cough into the receiver of the aforesaid apparatus. The phonogram on which the fit of coughing was recorded was then taken out of the machine, and mailed to a professional friend of the professor's in New York, to-

gether with a letter giving details of the case. The doctor, acting on Mr. Edison's instructions, inserted the phonographic strip he had received in a phonophone, set the apparatus at work, and was thus able to have the workman's cough repeated as often as he deemed it necessary.

In the end, it is said, he was distinctly able to assign to the cough a bronchial source, and on this assumption proceeded to prescribe for the relief of the patient at Menlo Park whom he had never seen. So far then, so good; but if doctors are in future to prescribe for distant patients in this way, it will surely be safer to supplement the phonographic information with photographic details. For instance, the cough sent from Menlo Park would have probably been much more easily diagnosed in New York had it been accompanied with a photograph of the patient's face, or better still, a well-defined view of his protruded tongue; and seeing how rapidly science is moving from triumph to triumph, it will probably be, ere long, within the power of any intelligent amateur photographer to obtain a photo-laryngoscopic carte of the interior of a diseased throat, which, coupled with a phonographic record of a few sentences in the hoarse voice of the sufferer, would, in all probability, enable an Englishman who had fallen ill at Nice to virtually consult his own medical man in Harley Street, W., or Saville Row. In some such way as this, in short, the camera and phonophone may be worked together to an extent which, at present, it would seem Utopian to anticipate.

The veteran strategist, Von Moltke, will, in another week or so, have completed a term of seventy years' service in the German Army, and a few of his most devoted friends and comrades intend to mark the occasion by presenting the Count with a photographic album, the contents of which have been in course of collection during the past month or two. The gift will probably be a unique one of its kind, for the volume will contain a series of views of the various places in Denmark, Bohemia, and France, at which victories have been won, thanks to the successful carrying out of Von Moltke's plans; and in the second instance, portraits of the officers who on the aforementioned fields of battle served side by side with, or or under the direct command of, the great German general. Then, as he turns the pages of the album, he will be able not only to fight in imagination his old battles over again, but also to recall the many brave comrades who have shared his hazards and his triumphs in the past.

We have alluded thus specially to Count Moltke's photographic souvenir because it seems to us that photography might often be used in a similar manner under circumstances more or less analogous. Thus, in the case of a veteran parliamentarian, the presentation album might contain views of the seats he had won, with portraits of the candidates he may have beaten, and the rival politician he may have demolished in debate; whilst an aged and popular church dignitary could not but find a chastened kind of pleasure in tracing by the aid of a series of faithful photographs of churches and cathedrals, and possibly public schools, his ecclesiastical progress. When the time comes for Mr. W. G. Grace to leave the cricket-field, his presentation album might appropriately contain views of the numerous "pitches" on which he has distinguished himself; with portraits of the famous bowlers he has "hit all over the field." Or, say, a popular actor refuses to "lag superfluous on the stage," what could be more interesting to him as a farewell present than an album filled with portraits of his favourite characters, and scenes from the plays he has loved the best. Whether it would be advisable to add the likenesses of all the dramatic critics who have sat in judgment upon his acting is a more doubtful point. It may be open to argument, too, whether a veteran author would enjoy turning over the pages of a volume containing realistic photographs of all his publishers and reviewers; whilst it is tolerably certain that in any such presentation to a retired promoter of companies, the photographs of the gold-fields, nitrate beds, and other foreign scenes associated with his financial ventures would have to be selected with the utmost discretion if the emotions caused by them is to be wholly pleasant; but, none the less, the precedent about to be set in Count Von Moltke's case is one which, were it only for the sake of photography, we would gladly see generally developed, especially in instances where the camera would supply the links, so to speak, between a honoured past and a most interesting and handsome "present."

It has before been remarked that the photographs of important personages exhibited in the windows of the Paris shops may be taken as a sort of political barometer. The French are nothing if not effusive, and what may be passing in their minds seems to require some outward demonstration. It is pretty certain, in the case of photographs, that shopkeepers would hesitate to exhibit those of people who are disliked, and the sudden appearance in the shop windows of the principal thoroughfares of former rulers of France has no doubt its meaning. The photographs are not selected in regard to any particular dynasty, since the photographs of the Bonapartes are cheek-by-joul with those of the Bourbons, the latter of course reproduced from paintings; and the inference is that the photographs represent the feeling of anti-republicanism with which General Boulanger is supposed to be identified. The odd circumstance that the photographs of Boulanger himself in infinite variety are plentifully mixed up with the representatives of royalty and despotism may be noted as significant.

The difficulty of printing from stellar photographs so that every star down to the faintest sun in the negative can be readily understood. To make the proposed stellar charts of use, it is evident some method of reproduction must be employed which shall be thoroughly reliable. According to a paper read by Mr. Isaac Roberts, the most perfect photographic prints which have yet been produced were not equal to those prepared from the negative by means of the pantograver recently devised by Mr. Hilger for use in

stellar photography. Mr. Roberts stated that, in November last, he took his negative of the 1270 polar stars to Col. Sir C. W. Wilson, director of the Ordnance Survey at Southampton, and explained to him the difficulties of the transference of the images of very faint stars from negatives on to paper, and Sir Charles Wilson undertook to try if the methods in use for printing maps of the Government Survey would give satisfactory results with stellar photographs. Two sheets of illustrations were accordingly prepared, and represented a state of perfection in instrumental, chemical, and manipulative skill that experience and ample resources could alone supply, and it was not probable that more could be done than was shown by these illustrations. Notwithstanding, when compared with copies engraved by the pantograver, it was evident that very large numbers of stars were missing from such prints, while many others were reduced so that they could not be with certainty identified with stars. There was also the drawback that if there should be any speck on the film of the negative resembling a star, it would of course be printed so that it could not be distinguished from a star. Mr. Roberts expressed himself in favour of the engraving process as distinguished from the photographic, for various reasons; and this opinion was concurred in generally by other members of the Society.

Patent Intelligence.

2975. Harry Heape, of 8, Kingsmead Road, Oxton, in the County of Chester, Gentleman, for "New or Improved Arrangements or Devices or Articles of Furniture for Exhibiting and Holding Photographs, Cards, Pictures, and the like." —Dated February 24th, 1888.

The patentee says:—

In place of having a simple album to contain photographs, &c., I form a revolving stand with two, three, or more slides, or even a cylinder.

Each side of the stand or small are of the cylinder is formed of a door or doors having a panel or panels containing the photographs or other articles to be exhibited both inside and out. These doors are formed in two or three layers, on one of which the photographs or other articles are attached, while the outer one (or ones) form a framework round the photographs, so that they can be seen, as it were, ensconced in a frame.

The two or three layers can be fastened together by ornamental screws or otherwise, or in the case of innermost doors they can be simply fastened by a spring catch or otherwise.

It will be obvious that there can be a large number of these doors one behind the other until nearly the centre of the stand is reached.

The case preferably revolves on a pivot on its stand, and this stand can be either a flat board for standing on the table, or tripod, or even a small chest of drawers, or box for containing articles, or it can be arranged as an open cupboard or whatnot, in which music and other things can be placed, the photograph case swivelling on a pivot on the top.

The doors of the photograph case can be of ornamental wood, plush-lined, or any other fancy material that may suggest itself to the designer.

In some cases electric or other lights can be fixed behind the photographs so that transparancies can be used; the article of furniture then becomes to some extent a lamp.

The way I prefer to arrange the doors is as follows:—If the article is a pyramidal shape, the lower half of the door turns on hinges on its lower edge and falls horizontally, being prevented from falling further by tapes or chains. The upper half can be formed in one or two doors opening sideways on hinges.

4248. Francis Nowlan, of 17, Soho Square, London, County of Middlesex, for "An Improved Form of Camera for Obtaining Photographs of Moving and other Objects."—Dated March 20th, 1888.

A photographic camera, the plate carrier of which is in the form of a drum capable of carrying a number of plates, which plates are held in position inside the said drum by a series of flat spokes and made to rotate on an axis, the face of the plate when in position being at right angles to the focal axis of the lens.

By turning a small knob on the outside, attached to the axis, the plates can be brought in rotation to face the lens, their true position being automatically registered by a spring, such as is in use on rotating lens stops.

A shutter is arranged inside the drum and actuated from the outside, which, when desired, covers the opening in the periphery of the drum in connection with the lens. The sides of the drum complete the exclusion of light; one side of said drum may be attached to the shutter and revolve with it, the other side being removable, to enable the plates, after exposure, to be taken out and fresh ones put in. The removable side has an opening in its centre to allow a continuation of the axis forming the knob to project through by turning, by which knob the plates inside are brought into position after every exposure, light being completely excluded by a slight shoulder surrounding opening for knob.

On the outside of the periphery of the drum is an opening corresponding in dimensions with photographic plates carried inside. To this opening is fitted a telescopic neck to carry the lens. The neck may be either round or square, by preference. Through said neck the rays of light passing through the lens reach the sensitive photographic plate inside the drum.

To insure that the object to be photographed shall be accurately projected on the sensitive plate, a finder or sight of a novel type is attached to the camera as near lens as possible, and may be fastened either to the neck holding the lens, or to the inside of the knapsack case which encloses the whole apparatus. The said finder consists of a small mirror, either flat or convex, the convex by preference, as it may be selected of such a curvature as will give reflections corresponding in size with image projected by the lens on the sensitive plate. The said mirror, thrown back to an angle of forty-five degrees, is placed immediately behind two cross wires and reflecting their intersecting point. Any object in front of the camera visible in mirror in conjunction with intersecting wires, and viewed from the proper angle in relation to reflecting surface of mirror, will be on the plate in camera should a photograph be taken, the intersecting point of wires representing the exact centre of the sensitive plate.

To enable the operator to view mirror from the proper angle, an eye-piece or rim of wire is placed in such relation to the mirror that when the operator's position is correct he can see the reflection of cross wires central with the solid eye-piece. The operator need not place his eye in close position, but may be removed from finder as far as his eyesight will allow him no screening of the surrounding light is necessary, it being simply a reflection in a mirror having the correct angles regulated by a combination of a solid eye-piece with reflection of cross wires. This arrangement allows the operator to obtain photographs of objects on either side of him without turning his head or body in the direction of the object to be photographed, and to follow such objects about, keeping them constantly in position till he finds the pose or action suitable.

Any existing instantaneous shutter may be used for exposing the plates in the ordinary manner.

The knapsack case enclosing all having openings to face the lens and view meter. A small spirit level will also be necessary. When focussing is necessary for change of lens or any special purpose, the drum containing sensitive plates can be drawn out. The telescopic neck being in two parts, one sliding inside the other, the forward portion carrying the lens being fixed to front part of knapsack case, the drum and remaining portion of neck drawing away along regulating grooves and out through opening at back of knapsack. When the drum is removed for focussing, a ground glass is suspended inside knapsack on the same plane which the sensitive plate will occupy when the drum is returned to position. The necessary focus obtained, the drum is replaced; a block secured in position while focussing registers the position of the drum in regulating grooves, and secures plates in focus.

The claims are—

1. In photographic cameras a multiple plate carrier or drum

carried within a second or surrounding drum, and adapted to hold a given number of plates, and to present them in order to the lens opening, substantially as described.

2. In photographic cameras a view meter or finder consisting essentially of a mirror and cross wires, or lines adapted to be reflected thereon, and secondary wires or lines acting as an eye-piece or point of view, the parts being so arranged that the portion of an object reflected on said mirror where the secondary wire appears to coincide with the reflection of the front cross wires will be also in line for transmission to the centre of the plate, substantially as set forth.

3. The general arrangement and construction of parts forming the improved multiple plate camera substantially as and for the purposes described.

4874. Ernest Sidney Williams, Manufacturing Chemist, 41, Jones's Road, Drumcondra, Dublin, Ireland, for "A Method for Producing Photographic Emulsions not Requiring a Base or Support as Photographic Films."—Dated 31st March, 1888.

The Patentee says :—

My invention of process consists in a chemical combination, wherein I ensure the presence or contact of a salt of chromium with gelatinous photographic emulsions (known as sensitive emulsions) which are spread on glasses, or other suitable smooth material, and as soon as set or cooled I react on such emulsions with sulphurous acid or any of its compounds, whereby the salts of chromium do not affect in any way injuriously on the compound sensitive silver salts contained in photographic emulsions, provided such emulsions are thoroughly freed from excess of sulphurous acid or its compounds.

Hitherto the attempts to produce photographic emulsions for exposure in the camera without a base or support to carry the sensitive film have met with no success to my knowledge. Every endeavour was centered to improve the supports for such emulsions as paper, collodion, and various other transparent tissues. My attempts were centered to render sensitive emulsions capable of being their own supports.

By my method this can be attained, and consists in the following operations: I (make or) prepare a gelatinous photographic emulsion by any of the well-known processes, but containing a rather large quantity of gelatine in its composition, add a certain quantity of a chromium salt—preferably the bichromate of potash or ammonia—while the emulsion is yet warm and in a fluid state, mix thoroughly, spread said emulsion in a dark room upon levelled glass plates or on any other suitable smooth support such as slate, ebonite, or varnished paper, &c., which have been previously well polished and dusted over with French chalk ; leave the emulsion to cool, and when set I immerse the glasses, or other supports containing the emulsion, into a bath of sulphurous acid or its compounds until the acid has performed its chemical reaction upon the bichromated gelatine emulsion ; I then wash it in several changes of water to remove all soluble compounds, and the sulphurous acid. Lastly, I dry them in suitable dark chambers, and when quite dry strip the photographic emulsion from the support.

Thus produced the emulsion can be made in long strips either to be cut up to the required sizes, or suitable for roller slides without any base for support, neither glass, paper, nor any other transparent hard or flexible material, and which can be worked just as well as if such bases or supports were used.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is :—

1. The method or process of chemical combination wherein I ensure the presence or contact of a salt of chromium with gelatinous photographic emulsions (known as sensitive emulsions) and react with sulphurous acid or its compounds, whereby the salts of chromium are rendered uninjurious on such emulsions by subsequent development of the image after exposure to light.

2. The novelty of such dried emulsions not having any base or support for the production of photographic negatives or positives, combined with the simplicity and cheapness of its manufacture.

3. That such dried photographic emulsions can be exposed in a camera from either side, and that the resulting picture or image will be contained in the emulsion itself, consequently can be printed from both sides without loss of sharpness of such prints.

4. The perfect insolubility of such dried emulsions, not having any soluble emulsion on its surface.

5. That any photographic emulsion consisting of compound salts of silver suspended in gelatine can thus be treated and be made thick or thin, light and unbreakable, yet pliable and firm.

Correspondence.

AZALINE AND ORTHOCHROMATIC PHOTOGRAPHY.

Dear Sir,—I note with surprise that Dr. Vogel reiterates his assertion that, at the meeting of the Photographic Society in December last, I stated that "azaline is a mixture of quinoline red and cyanine." If he will do me the favour to look at the official report in the *Society's Journal* he will find, as I have already explained, that I was merely quoting Mr. C. H. Bothamley's paper, where it is said that azaline "was understood to be" the aforesaid mixture. Dr. Vogel (last week) says he is "surprised that Mr. Spiller now withdraws this statement." *I never made it*, but only put the enquiry at the meeting for my own information.

In reply to my question, Captain Abney said that "it (azaline) is simply a mixture of eosine and cyanine." This view is confirmed by my subsequent experiments, except that in the particular sample analysed by me I discovered no trace of cyanine blue, but every indication of an eosine of the kind known to us as erythrosine. After twenty years' experience in a colour factory, I do not require to be instructed by Dr. Vogel's pupils in order to find out the difference between erythrosine and ordinary eosine, of which the former is simply a variety. I know my friend Dr. Otto Witt's handy little pamphlet very well, but in his work (1885) there is no mention of the "marked difference" between eosine and erythrosine, as asserted by Dr. Vogel.

As to the question of patent rights, also referred to by Mr. W. E. Debenham, it must be remembered that Colonel Waterhouse's experiments were made with wet collodion, and we are now talking about gelatino-bromide plates, to which process alone my remarks were intended to apply.

John Spiller.

London, February 25th.

Sir,—Allow me to correct some errors in the reproduction of my letter, February 22nd, of your News, p. 123. Please read line six from down : "and now *I* recommend *to* Mr. Spiller, &c." Further, line twelve from down : "if anybody invents an instrument *of iron*, and another one imitates it in brass." Further allow me to add that the azaline was analysed after Dr. Witt's method already in 1886 by Stolik and Dr. Mallmann, Vienna, and recognised as a mixture of *quinolin red* and *cyanine* (*v.* Photogr. Correspondence, 1886, p. 322). Even Professor A. W. Hofmann, the world-renowned chemist, highly estimated in England, published special researches on quinoline red in the *Berichte der deutschen chemischen Gesellschaft*, Volume 1887, p. 1, wherein he calls attention to the fact (page 8) that this body, delivered to him from the same manufactory that makes my azaline, is employed by me for making colour-sensitive plates. By this testimonial, Spillers' so-called "careful examination" is proved as a blunder.

Dr. H. W. Vogel.

Berlin, 24th February, 1889.

Proceedings of Societies.

Photographic Society of Great Britain.

At the monthly technical meeting of this Society, held at the Rooms, 4a, Pall Mall East, on Tuesday evening last, the 26th ult., the chair was occupied by Mr. Thomas Bolas, F.C.S.

The Chairman referred to the subject that had been arranged for consideration—namely, the negatives shown by Mr. Swan at the preceding ordinary meeting, illustrating his paper on "Hydrokinone Development," and invited remarks from the members present as to their experience with hydrokinone as a developer.

Mr. A. Cowan said that it appeared, up to the present, that hydrokinone was as good as pyro, and in some respects, notably for the obtaining of clear shadows, it seemed to be better.

The Chairman enquired whether, on the whole, he thought there was less trouble in developing, when using hydrokinone, than with pyro?

Mr. Cowan did not think there was.

Mr. L. Montefiore found that there was greater certainty with hydrokinone than with pyro; there was very little difference in the ultimate result, but with hydrokinone almost every negative that he had taken was fairly printable. However much over-exposed within certain limits a negative might have been, with hydrokinone development they came out well, even in the same solution that was suitable for properly exposed plates.

Mr. Nowlan had used hydrokinone for five years, using washing soda as the alkali, and never had a bad negative.

Mr. Chapman Jones found that there was a great difference in the amenability of different makes of plates to hydrokinone development. Some commercial plates had, in his hands, quite refused to develop with hydrokinone. He had allowed such a plate to remain for half-an-hour in the hydrokinone solution, and it remained unchanged; other commercial plates developed properly with the same solution.

Mr. Montefiore suggested that as bromide acted so powerfully towards hydrokinone as a restrainer, there might be free bromide in the plates that had refused to develop.

Mr. Winter then handed round the series of negatives that had been shown by Mr. J. W. Swan at the previous meeting, and explained the divergencies in treatment that had produced the different results, particularly pointing out that where there was tendency to green fog it showed strongly with pyro, and scarcely at all with hydrokinone.

Mr. Cowan suggested that the green fog was due to the ammonia used with pyro; with soda development pyro did not give green fog.

Mr. W. E. Debenham considered that although soda development with pyro might prevent a fogging from showing as green in colour, it did not do away with the fog, but gave it as a grey fog, which would probably be as injurious as the green fog given by ammonia.

The Chairman, speaking of a particular pair of plates, said that it might be open to question whether the one showing a certain amount of green fog would not yield the better print of the two. He further remarked that he gathered from Mr. Swan's paper, that he did not succeed with metabisulphite of potash in conjunction with hydrokinone.

Mr. Winter said that one example that he produced showed that metabisulphite of potash almost entirely stopped development.

Mr. Montefiore said that the plate which he then handed round had been developed with hydrokinone and metabisulphite of potash in the proportion of two grains of the latter to one of the former substance. He had recommended a smaller quantity, but now thought this proportion better. The negatives developed with carbonate of potash as the alkali took a quarter of an hour in coming up, but now that he used caustic potash, they were fully developed in less than five minutes. The formula used to develop the plates then shown was hydrokinone from ¾ to 1½ grains per ounce, metabisulphite of potash twice the weight of hydrokinone, and carbonate of potash 8 grains. When caustic potash was, used, 2½ grains were taken instead of the 8 grains of the carbonate. The stronger hydrokinone developer had given greater density than the other.

Mr. Debenham enquired the temperature of the solutions which Mr. Montefiore had found to act in five minutes.

Mr. Montefiore replied that the room was very cold.

Mr. Debenham remarked that it had been said that the use of metabisulphite of potash did not enable one to dispense with the use of sulphite of soda.

Mr. Montefiore's results appeared to prove the contrary.

The Chairman said that it was difficult to think that negatives could be better than some of those shown by Mr. Montefiore.

Mr. Winter said that in Mr. Swan's examples the addition of 4 grains of metabisulphite of potash had had the effect of stopping development. The same amount of alkali had been used in all the examples, and the time of development was the same.

Mr. Debenham suggested that to make the examples more strictly comparative, there should be the same amount of free alkali present. In the case of metabisulphite of potash, therefore, it would be necessary to find the amount of alkali required to neutralize the acidity of the mebabisulphite, and then add that as well as the quantity that was used with a neutral solution.

Mr. W. Bedford said that when speaking of hydrokinone development, the addition of sulphite of soda was almost always implied. It was not therefore an equal comparison when tried in competition with pyro, unless sulphite was also employed with the latter. When the quantity of sulphite in the hydrokinone developer was reduced from 6 grains to 2 grains to the ounce of developing solution, the result was almost exactly like that obtained with pyro. Another point referred to in Mr. Swan's paper was the name Quinol, which it was proposed to take into ordinary use instead of the longer word hydrokinone. He should like to take the sense of the meeting on this point.

The Chairman considered this to be a good suggestion, and took a show of hands, which resulted in the approval of the shorter name.

Mr. J. R. Gotz said that sulphite of soda had been largely used with pyro. He had wanted solutions for developing containing respectively hydrokinone and pyro, the formula otherwise being the same; the negatives being almost exactly alike, and the time of development was the same. The development with hydrokinone took some time to start, but then went on rapidly, and had to be stopped rather suddenly.

The Chairman enquired whether any of the members had noticed any difference in the action according to the amount of lime in the water with which the developer had been made up.

Mr. Nowlan said that he had used distilled water, and water containing much lime, and found no difference. One point he noticed was, that unless the plate was well washed after development and before fixing, stains resulted.

Mr. Herbert Fry, on the contrary, considered it a special advantage with hydrokinone development for bromide paper, that prints could be put direct into the hypo without using an acid bath, and without much previous washing.

Mr. Bedford thought that there would be difference in different papers in their power of resisting stains when put into the hypo after slight washing.

The Chairman thought that the quality of the gelatine had a good deal to do with this matter. He had known plates that would bear to be put into the hypo direct from the developer without staining.

Mr. Arnold Spiller remarked that Mr. W. K. Burton had found the same thing.

Mr. W. England showed two plates taken with the magnesium flash light; one had been developed with hydrokinone, and the other with pyro. The latter had had a large quantity of ammonia, and a very small amount—$\frac{1}{5}$th of a grain to the ounce—of bromide as a restrainer The results were very similar. Ordinary pyro development with similar exposure gave effect of under-exposure. The hydrokinone had proved as powerful in bringing up an under-exposed negative as the strongest pyro and ammonia developer.

Mr. Chapman Jones had been taking a large number of photographs in the Alps. The subjects contained dark rocks along with ice and snow, and he had followed Captain Abney's advice in such a case—*i.e.*, had exposed for the shadows. He had been enabled to get out the details in the shadows without losing the light by over-exposure, by using a modified developer very slow in its action. He had taken a print-washing machine, and by making certain alterations in it had used it as a rocking table. Putting a dish upon this table he had placed the negative and developing solution therein, and then put a cover—in which a piece of orange glass was inserted—over all. He was thus enabled to go in and out of the dark room, and occasionally to examine the progress of development, which occupied about half to three-quarters of an hour. He thus got very nice negatives, which he was sure could have been obtained in no other way.

The Chairman stated that Dr. Lindsay Johnston had offered to subscribe ten guineas conditionally on other members making up an equal amount, towards a museum for the Society, of things historically valuable in connection with photography. He, the Chairman, was confident that considerably more than the sum mentioned would be forthcoming; but as the Society had no suitable storehouse, he suggested that the South

Kensington authorities should be approached, and he believed that they would receive such things as were collected, which would still be the property of the Society, and might be claimed when required either for particular occasions or altogether, if the Society acquired, at any time, suitable premises for such a collection. A show of hands was taken as to the desirability of forming such a museum, and was in its favour.

Mr. England then showed the arrangement for producing the magnesium flash that had been used in taking the negatives that he had exhibited. It consisted of two lamps, both connected with a pneumatic ball by rubber tubing attached to a 3-light gas burner. Each lamp consisted of a patty-pan standing upon a tin jar or mug. Through the centre of the patty-pan was fixed a brass gas angle piece, such as is used on the end of an ordinary bracket, but with the burner removed. A measured quantity of magnesium, estimated to be eight grains, was poured into each angle piece, and some cotton-wool which was contained in the patty-pans and surrounded the angle piece was saturated with methylated alcohol and inflamed. When the subject was ready, the pneumatic ball was pressed and the powder driven through the large flames surrounding the angle pieces. Two negatives were thus taken of the members present.

Mr. J. Hubert mentioned another arrangement consisting of two horizontal tubes sliding one over the other, and each having an opening in the side. When these openings coincided, the magnesium powder was poured in, and by revolving the outer tube the opening was closed, and the powder could be driven across a flame.

The meeting shortly afterwards adjourned.

Camera Club.

On Thursday, February 21st, a discussion on "Films" was opened by the reading of communications upon various branches of the subject from Mr. H. H. O'Farrell (in India), Mr. H. Tolley, and Mr. George Mansfield. Sir George Prescott occupied the chair.

Mr. O'Farrell's paper referred to the Froedman films and to methods of keeping stripping films.

Mr. Tolley wrote concerning oiled paper negatives and strippers, and he sent some superb specimens of the negatives from which prints then upon the walls of the Club were taken.

Mr. Mansfield forwarded excellent work upon the new celluloid films of Messrs. Carbutt, and gave particulars of exposure and treatment.

The Hon. Secretary also showed negatives made on Allen and Rowell's ivory films (celluloid), and a long and interesting discussion was taken part in by Captain Barnes, Messrs. Davison, Walker, Bellsmith, Robinson, Lyonel Clark, Sage, Shipton, Patterson, S. Bourne, and Elder.

On Thursday, March 7th, Mr. W. Adcock will read a paper entitled "Aims."

West Kent Photographic Society.

The usual fortnightly meeting was held in the Institute, Bexley, Friday, 22nd inst.; Mr. Pringle presided.

Mr. Dresser showed a number of 10 by 8 bromide prints of local frost and snow scenes, some of which he had exhibited and received a medal for them. They were mounted on the new plate-sunk mounts, and made very pretty and effective pictures. Some time since he (Mr. Dresser) advocated a novel competition. Instead of giving medals for one or two prints, give each competitor 24 sheets of paper, and award the prize to the competitor who had the best average. Out of the 24 pieces, he himself had obtained 23 perfect prints.

A negative of a snow scene was then handed round by the Secretary. It was marked all over by a sort of granular appearance. Various causes were assigned for this, but the conclusion arrived at was that the markings would not interfere with the printing qualities of the plate.

Mr. Pringle called attention to a feature of this negative which was well known to old photographers, but had not had the attention it deserved until Mr. Warnerke took it up. He referred to the relief of the image.

It was stated by one of the members that if a negative was dried with spirit, and heated in the drying, this relief was very prominent.

A negative was shown by Mr. Edwards which had a broad band of discolouration at the bottom. In the discussion, it was stated that either the hypo had not been properly washed out, or that it was insufficiently fixed.

At this meeting it was decided to move into more convenient rooms, and a vote of thanks was accorded to the Workmen's Club, whose rooms the Society had, up till now, been using.

Mr. Pringle then proceeded to pass the members' slides through the lantern. As each appeared upon the screen, he pointed out the defects and good points in each, also giving hints for the remedy of the former. He advocated a warm colour for landscape slides, and showed the members some examples of colour and density for their guidance. During the display, a running fire of criticism and discussion was kept up by the various members. There was also an informal discussion after the exhibition. There were a large number of slides shown, including scenes from nearly all lands, not forgetting the moon—Mr. Rushton bringing three splendid slides showing a mountain and two views of crater Capricornis. The slides were from negatives made by Mr. Nasmyth, of steam-hammer fame. Other slides were shown by the following members:—Messrs. Pringle, Dresser, Rushton, Jones, Gilbert, Reffell, and Adams.

A hearty vote of thanks to the President terminated the proceedings.

The next meeting will be held in the Board Room, Bexley, Friday, March 8th, upon which occasion an address upon "Lantern Slide Making" will be delivered by Mr. Chas. Hussey.

Cardiff Amateur Photographic Society.

The members of this Society were favoured on Wednesday evening with an interesting lecture profusely illustrated by lime light, by Mr. John Storrie, the Curator of the Cardiff Museum, on his recent discovery of Roman remains at Llantwit Major.

A full account of Mr. Storrie's researches in his district will shortly be placed before the public in pamphlet form, and perhaps photographically illustrated. It will prove a welcome addition to the antiquarian literature of Glamorganshire. The next fixture of the Society is March 6th, when Mr. W. Windsor will give a lecture on "The lantern and how to work it."

West London Photographic Society.

An ordinary meeting of this Society was held on Friday, 22nd, the President in the chair. Mr. T. Stafford Hazeon read a paper on the Autotype process with practical demonstration. He prefaced the practical portion of his paper by giving a brief history of the process. He considered autotype had strong claims on the amateur for support on account of its simplicity, the range of colours obtainable, and, more important still, by reason of its absolute permanency. A vigorous negative gave the best results; those developed with hydroquinone were specially suitable. Ordinary negatives required treating by the double transfer process, therefore it was better to make a reversed negative. A simple mode of doing this in the case of landscapes and portraits was to expose the plate with the glass side next the lens. Of course, all patches of emulsion must be removed from the back of the plate. The focussing screen also would require re-adjustment. In autotype printing no image was visible before development, and in order to judge the proper amount of printing an instrument called an actinometer had to be employed. The ready sensitised tissue as sold by the Autotype Company was about the rapidity of silver paper, but that sensitised by himself was much quicker. The operation of sensitising was very simple, and consisted in soaking the pigmented tissue in a bath consisting of one ounce of bichromate of potassium, dissolved in twenty ounces of water. The tissue is allowed to soak for three minutes, taken out, squeegeed, and put on a piece of blotting-paper and allowed to dry. The lecturer particularly recommended the process for the production of lantern slides. It produced a beautiful result very free from grain. The print after exposure is developed by immersion in water at a temperature of about 110° Fah. After development it is placed in an alum bath, and a final rinse in cold water completes the operation. Mr. Hazeon then gave a practical demonstration of the development of the exposed tissue by the single transfer process, the temporary support, pictures on opal and on glass, and concluded by remarking that expensive apparatus was by no means essential to work the process, although he had a lot of paraphernalia with him, when at home he developed small prints in an ordinary basin, and large ones in the sink of his dark room. All the necessary apparatus would be in every amateur's possession.

A large number of very fine prints in autotype, and also the

dishes and apparatus necessary for the demonstration, were kindly lent by the Autotype Company for the occasion.

Mr. Delvis Broughton suggested that the over-exposure might be due to the contiuuating action of light.

Mr. Hazeon had not uoticed the effect referred to.

Mr. E. W. Foxlee had had some considerable experience in working the autotype process. Continuating action had been observed by early workers in the autotype process, including Mr. Swan, but eminently French authorities had denied that any such action occurred, and some years ago Captain Abney read a paper ou the subject before the Photographic Society. At that time the nature of the action was found to be uncertain; sometimes it would go on more rapidly iu six hours than it would at other times in twenty-four. He (Mr. Foxlee) theu took the matter up, and made uumerous experiments, and he discovered that in damp and foggy weather the action was rapid, while in dry weather it was almost *nil*. He came to the conclusion that the phenomenon was due to the presence of moisture. If moisture was entirely absent from the tissue, no action would go on. To prove this he made a number of exposures of equal duratiou from the same negative—some of these he sealed up in an air-tight case—after 100 days no further action was noticeable upon development; the remainiug priuts were allowed to remain exposed to the atmosphere for varying periods of time, and, upon development, showed signs of over-exposure in proportion to the length of time they had been allowed to absorb moisture from the air. These, and other prints, he had exhibited at the Inventions Exhibition, and had received a medal for them. He did not agree that it was best to buy the tissue ready-sensitised. The operation was an easy one; and, if done at home, could be prepared to suit the negatives. A thin negative required a tissue lightly sensitised, and a hard negative wanted a tissue very strougly sensitised, to get the best result. He preferred to sensitise large sheets cut across the band. The dish should be the width of the paper (which should be rolled up), allowed to uncoil, and gradually drawn over the solution. A couple of glass rods placed across the dish facilitated the operation of draining the tissue, and removed the surplus solution from both back and front.

Mr. Hazeon had found some colours to print more quickly than others.

Mr. Foxlee: It depends upon the solubility of the pigment employed; blue, for instance, was more soluble than red.

Mr. Whiting said the actinometer which had been exhibited, although simple, was not very perfect in its action; light had a greater effect upon it than it had on a dense negative, and it required to be very carefully watched. He had brought with him an actinometer constructed of a series of thicknesses of coloured collodiou. You put all your frames out together; when No. 5 appeared on the paper, you turned down the frames which required that exposure; aud so on with the remaindcr. There was then no trouble in changing and watching the tints.

Mr. Walter Colls had found the addition of a few drops of glycerine to the sensitising bath an improvemeut in hot weather; it preveuted the tissue getting hard.

Mr. Foxlee strongly depreeated the use of glycerine in such a climatc as Englaud; it would greatly promote the continuating action.

Mr. J. A. Hodges wished to draw attention to the fact that the working of the Autotype process was atteuded with some risk. He thought beginners should be warned not to dabble too much in the sensitizing solutions, in order to avoid the danger of contracting what was known as the "bichromate disease." He would ask Mr. Foxlee whether any effective precautions could be taken, and whether the malady affected all persons alike.

Mr. Hazeon said not one in a hundred were affected. If he were attacked, he would discontinue working the process.

Mr. Foxlee had suffered severely. His case had been exhibited before the Medical Society. However, he did not think the amateur need with ordinary care anticipate danger. He could bring out the disease in two hours. He attributed his own attack to gross carelessness. The disease attacked about half the employées at the Autotype Works. Buying the tissue sensitised did not obviate the danger, which lay in the process of developing. If injury resulted from sensitising the tissue, it was owing to the bichromate getting into an abrasion of the skin, and produced a different effect to that known as the bichromate disease.

The President enquired whether the continuating action Mr. Foxlee had referred to had been utilised commercially.

Mr. Foxlee replied that it had very considerably. It was used first by the War Office authorities at Woolwich, and later at the Autotype Works, particularly during dull weather, when a large number of prints had to be got off; they were only half exposed, then placed in a damp situation, and kept the necessary time before development.

The next meeting, on March 8th, is a lanteru night; Mr. G. F. Blackmore will describe a new method of toning lantern slides. Visitors invited.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 21st ult., Mr. W. M. Hastings in the ehair.

Mr. J. B. B. Wellington passed round two bromide prints of the same subject, one developed with ferrous oxalate, the other with hydroquinoue. The opinion of the members was pronounced in favour of the latter.

Mr. A. Haddon, agreeably with a previous announcement, then proceeded to show some experiments with explosives. He said the flash light was now very frequently used for taking photographs. He had noticed that some of the mixtures and compounds published were of a very dangerous nature, and in the hands of inexperienced operators might lead to disastrous results. His experiments that evening would be chiefly with gun-cottou, showing under what conditions it was safe, and the reverse. Mr. Haddou said combustion of coal, wood, &c., was due to the oxygen in the air, which was a mixture of oxygen 21 parts and nitrogen 79 parts. The more easily a body can obtain oxygen, the more rapidly it will burn. Nitrogen was a very inert body; most of its properties were negative. Gunpowder was an intimate mechanical mixture of carbon, sulphur, and nitre; the carbon and sulphur forming the combustibles, the nitrate the store-house of oxygen. Gun-cotton was discovered in 1851 by Schœnbein. He found that cotton-wool or paper increased in weight after soaking in nitric acid, and became very much more combustible; treated in this manner the cotton-wool or paper may be said to be nitrated, one of the lower oxides of the nitric having entered into combination, in a certain way, with the cottou. By prolonged soaking in a mixture of strong nitric acid (sp. gr. 1·52) and sulphuric acid the cotton is rendered highly explosive. Three atoms of hydrogen having been replaced by three molecules of NO_2, thereby supplying oxygen and increasing the combustible properties of the cotton, it is possible to nitrate not only cotton, but also paper, sawdust, glycerine, and other substances. The lecturer then burnt ordinary cotton-wool, followed by gun-cotton, comparing the difference in the rapidity of combustion of the two. A piece of filter paper aud nitrated paper was burnt, and also some nitrated muslin. In pyroxyline or photographic gun-cotton, nitration has not been carried to its highest point, the cotton in this case being steeped in weaker acid. The most explosive variety of gun-cotton is prepared from cotton-waste for cheapness. The waste, after first being treated with alkali, is steeped for a period varying from twelve to twenty-four hours in nitric and sulphuric acids of the highest strength. Should the acids not be of full strength, the result would be a kind of parchmeut guncotton soluble in ether and alcohol. After the cotton has been soaked the necessary time, it is quickly transferred to running water, so as rapidly to remove the acids aud prevent rise of temperature. When thoroughly washed, it is reduced to pulp by a carding machine while still wet, and then compressed by hydraulic pressure into slabs or cakes. While still wet, it is cut up into cylindrical pieces, and then drilled to receive the fuse. In the wet state guncotton will not ignite; a piece of wet guncotton was held in the flame of a spirit lamp without it taking fire. Dry guncotton will burn at 300° C. In a loose state it burns very rapidly, so much so that it will not ignite gunpowder. To prove this, some loose guncotton was placed on the top of some gunpowder, and the cotton was then exploded without the gunpowder taking fire. Compressed, the rate at which it burns in air is retarded. A cylinder of compressed guncotton was then placed on the gunpowder, which took fire directly the cylinder had burnt down. Guncotton can be compressed so that its specific gravity is 1·1; if in this state it is confined and fired it will exert a pressure of 18·000 atmospheres, or 130 tons to the square inch. To explode it in air unconfined it is necessary to give it a sudden blow at the same time that it is ignited. This is best done by means of fulminate of mercury. Guncotton is usually stored wet. In that state it is much less liable to spontaneous decomposition, and is much more safe; for if the building in which it was stored was to catch fire the cotton would only burn as it dried. Though

wet, it is always ready for use. A Whitehead torpedo has a charge of from 80 lb. to 120 lb. of wet guncotton in its warhead. Unconfined guncotton can be ignited by a red hot body without danger, but directly the space round it is restricted, danger commences. The lecturer here referred to a flash lamp exhibited at one of the meetings, which he considered had a very considerable element of danger attached to it, inasmuch as ignition took place in a kind of box or chamber. He thought it not improbable that with a view to reduce bulk some photographers might be inclined to reduce the dimensions of this chamber, which could only end in a disastrous result, and throw a wet blanket on flash-light photography. To show its destructive nature when confined, a small pellet was placed in a soda-water bottle at the end of the two wires from a battery inserted through the cork, the two ends of the wires being connected by a fine thread of platinum. To prevent the pieces of glass from flying about, the bottle was placed under an inverted wooden packing case, upon which the Chairman mounted, as a 56 lb. weight was not handy, and the cotton was fired from the battery, causing a tremendous report, and blowing the bottle into minute fragments. Fulminate of mercury is easily detonated by a blow, and also, if confined, by a red hot body. The lecturer here fired some by percussion, and also a small quantity by touching it with a red hot wire. This latter led to a very pretty experiment then being performed. Some fulminate of mercury was sifted over a sheet of glass, and then touched with a hot wire. It fired at once, and the glass was instantly transformed into a mirror from the deposit of mercury. The lecturer, in conclusion, said the principal object he had in bringing the experiments before the members was to prove that although the most dangerous compounds are comparatively harmless so long as kept uncombined, yet directly this precaution is ignored, disaster would be sure to follow.

A hearty vote of thanks to Mr. Haddon for his interesting lecture, proposed by the Chairman, was warmly responded to by the members present.

Mr. F. W. Pask was elected a member of the Association.

North London Photographic Society.

An ordinary meeting was held on February 19th, at Myddelton Hall, Islington, Mr. J. Traill Taylor, President, in the chair.

Mr. James Martin presented to the Society a fine platinotype print of the President. He then called attention to the discolouration of the paper of a platinotype print which had been framed about two years—the part protected by the rabbet of the frame remained unchanged.

The Chairman explained that the same effect was noticed some years back in carbon prints, which were thought to have faded; investigation, however, showed that the paper alone had become discoloured by exposure to light and atmosphere, but the print itself remained unchanged.

Mr. F. W. Hart said that the discolouration of the paper was greatly influenced by the way in which it was framed. To properly protect a print, the glass should be pasted into the frame with a piece of card all round, the mounted print laid down, and the backboard fastened in and pasted round. He considered the discolouration to have been caused by fine dust and smoke getting in round the glass and settling in a fine film on the surface of the print.

Mr. E. Clifton said that paper made of wool pulp and bleached returns to its yellow colour when exposed to light; pure flax paper will not turn yellow when exposed to the light. He had fastened a line negative on a clean board and exposed it to the light, the result being yellow lines on a white ground; he, however, considered the discolouration of the print in question to have been caused by smoke or dust settling on it.

Mr. Clifton had noticed a way of sealing up an engraving; the print was damped and the edges turned over and pasted on to the front surface of the glass; when dry the print strained tightly over the glass, and the backboard was pasted in.

Rev. E. Healy showed a shutter by Newman for moderately short or time exposures. It worked with an up-and-down motion.

Mr. Hart exhibited an interesting 12 by 10 group taken by the London Stereoscopic Company on the occasion of the jubilee dinner of the Union Bank of London, the Hart and Bishop lamp being the illuminant employed. Fifteen lamps, each burning five grains of magnesium, were used, and a fully-exposed negative of a group of over seventy persons was obtained. Four such groups were taken, the whole time occupied in focussing, charging the lamps, &c., being only a few minutes. As a proof of the extraordinary power of the light, it was mentioned that an old Ross' doublet lens working at *f*-24 was used, the light being twenty-seven feet distant from the sitters. Mr. Hart then gave a demonstration connected with flames. He said: In the production of flame our starting-point shall be hydrogen. So far as we know it is a simple element; our accumulated experience, by which we test all theory, takes us no further at present. When I first began to study the nature and properties of flame, hydrogen was said to be a permanently elastic gas—our experience knew no more; since then it has been proved by experiment that hydrogen can be liquefied. See what a valuable thing experience is; it protects us in every direction, it enables us to devise new combinations for experiments, which are the buds of experience, likely to develop into a fresh limb of the tree of knowledge. The first experiment I show just comes within the range of the Victorian age. Here I have an ordinary Bunsen burner: turn off the air from entering below, and the luminous flame appears; I introduce a piece of tube, and you see that I draw off gas which is alight at the other end; this proves that that kind of flame at least contains gas ready to ignite so soon as it can find oxygen to combine with, and, inasmuch as magnesium also demands oxygen for its combustion, it is injudicious to allow the magnesium to be robbed of oxygen by discharging it into a gas already in the most favourable position to combine with oxygen. The gas is issuing at a very small pressure at the top of this tube, and when I turn on the air and convert the luminous into a non-luminous or Bunsen flame, the pressure is still less at the end of the tube where the gas and air are burning as a mixture; it is still short of its full complement of oxygen, which has to be made up by the air outside to complete perfect combustion of the gas in this form of burner. When I reduce the quantity of gas to a portion so near its theoretical quantity entering the air holes, the flame at the top of the tube will be so exceedingly unstable that it becomes an explosive mixture issuing under slight pressure, and, consequently, will fire down, as you see; so to make it a practical Bunsen flame we must leave a little excess of gas in the mixture for the outside air or oxygen to combine with. I now introduce the tube about an inch above the orifice of the burner, and you see a portion of the mixture of gas and air is drawn off alight at the other end of this tube, and although this flame is permanent for many purposes of the chemist, it is easily put out, as you see, when I send a puff of air, such as used for ejecting magnesium powder, up through the tube. The small air tube would have to extend to above the mouth of the gas tube to be able to use it all. In all cases, whether of spirit or gas, luminous or non-luminous, I employ double flames to produce a homogeneous flame, through which to eject the magnesium. Here is another experiment to show that the large spirit flames employed for igniting the powder are flameless in the centre from absence of oxygen. Here is a tray packed with cotton waste, saturated with spirit; in the centre I place a small metal tray containing a night light—there it is burning brightly; now on igniting the spirit you see that it goes out from loss of oxygen. The interior of that flame is hydrogenous vapour, most eager to combine with more oxygen than it already contains, so as to form carbonic acid with the carbon; so here we have two elements, hydrogen and carbon, both of which would rob the magnesium of oxygen under the circumstances, such as passing it through the flame.

A brief discussion took place upon this subject.

The next meeting will be on March 5, which will be the annual exhibition.

Talk in the Studio.

Visual Acuteness for Various Colours.—At the meeting of the Physical Society, held on January 25th, Dr. A. König spoke on the dependence of visual acuteness upon the intensity of light when objects are illuminated by spectral colours, his remarks being based upon experiments made by Dr. Uhthoff, and *Nature* gives the following account of his communication:—Earlier researches have shown that, for red, yellow, and green light, the visual acuteness increases at first very rapidly, then

more slowly, and then finally shows scarcely any further change as the intensity of the illumination is increased; and that the curve of visual acuteness on the abscissæ which represent the varying intensity of illumination is a parahola, whereas with hlue light the curve is a straight line. Dr. Uhthoff had repeated these experiments with spectral colours, taking care that the several lights used were in all cases of equal intensity, a result obtained by altering the width of the slit. The speaker described fully the apparatus he had used, and the series of preliminary experiments he had made, hy which he had proved that the narrower the slit is in the screen upon which the spectrum falls, the greater is the acuteness of vision, and that the observations are more trustworthy when a dark mark on a light ground is used as the ohject whose hrightness is to be determiued, thau when a light mark on a dark ground is employed. As regards the apparatus, it may he mentioned that the dispersion is produced hy a fluid-prism one decimetre iu diameter. The result of these experiments, as of former ones, was that the visual acuteness iucreases with the intensity of light in the blue part of the spectrum. When the visual acuteness is compared in the different spectral colours, the iutensity of light heing in all cases the same, a curve is ohtained with a maximum lying near its centre. When the intensity of the light is less, the curve of acuteness on the abscissæ of the spectral colours hecomes more pointed, and the maximum moves simultaneously towards the red end. When the intensity of light is the least possible, the maximum moves simultaneously towards the red end. When the intensity of light is the least possihle, the maximum for the visual acuteness coincides with the point of greatest hrightness in the spectrum. The ahove holds good not only for the normal trichromatic eye, hut also for the dichromatic or red-and-green-colour-hlind eye.

A Handbook of Patent Law.—Under the title "The True Position of Patentees," Mr. H. Moy Thomas has published, through Messrs. Simpkin, Marshall, & Co., a little book in which the patent laws and regulations, at home, abroad, and in our colonies and dependencies, are explained for the information of English inventors.

A Lantern Slide Competition.—Messrs. F. W. Verel and Co. send us the followiug as the result of their lantern slide competition:—The following are the successful competitors in the ahove:—First prize of £3, Mr. G. J. T. Walford, 10, Soames Street, London; second prize of £1 10s., Mr. F. Mackenzie, Lenzie; third prize of 15s., Mr. W. Marsden, 26, Sefton Street, Southport; fourth prize of one gross lantern plates, Mr. J. Huff, 10, Victoria Road, Penrith; fifth prize of half gross of lantern plates, Mr. J. Harriman, Heuley-on-Thames; sixth prize of half gross lantern plates, Dr. R. Atkius, Waterford.

Adhesives for Mounting Purposes.—Many photographers use nothing hut rather thin glue, which, however, should he made from a material free from any elements of putrescent fermentation, and not acid. The glue sold as French medal glue is generally clear, not in a state of incipient decomposition, and free from acidity. Half a pound in a quart of water is a convenient strength. Milk may be used instead of water, and is said to keep the glue from becoming brittle. An addition of sugar—say one-fourth of the weight of the glue—is perhaps more effective. The use of glycerine is open to ohjection. The following preparation is useful for gumming large sheets of paper, which may be kept on hand ready for use; when wetted they will stick well on glass:—Starch, two drachms; white sugar, one ounce; gum-arabic, two drachms; to be hoiled with a sufficient quantity of water. The same mixture can he used in making adhesive mounts upon which moist prints will adhere by pressure only.

Photographic Club.—The suhject for discussion on March 6th will he "Hydrokinone." Mr. J. B. B. Wellington will read a short paper on this suhject.

*** Everything relating to the Literary Department of the Photographic News, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," should now be sent to Mr. Spiller, who is alone responsible for all which appears under that heading.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, Photographic News, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

A. Ephron.—One plan of removing the black stains (sulphide of lead) from an old lens is by treatment with strong nitric acid; but this generally leaves a corroded surface, which will require re-polishing. It is, perhaps, quite as easy to begin with the putty powder, and rely upon this to work it off, particularly when the danger to balsam and mountings by contact with the acid is duly taken into account.

Draughtsman.—The want of permanence complained of in the case of some of your samples of blue printing paper may possibly be due to the sizing, or, if not to this, to the presence of a trace of ferro-cyanide in the ferrid-cyanide employed, or even to the use of a ferric salt (ammonio-citrate of iron) containing a minute proportion of ferrous oxide. To overcome all these disadvantages, and confer greater stability, we should advise you to try the effect of adding a small proportion of the salt known by the name of "nitroprusside of sodium," which has oxidizing properties.

B. Smith.—The effect of washing an exposed gelatino-bromide plate with a solution of potassium hichromate is to destroy the light-impression, and we know that an emulsion treated in this way, unless very carefully washed again, is rendered less sensitive. It is not a hopeful way of improving the keeping qualities, and as Mr. Swan recently stated that he had worked successfully with ten-year-old plates prepared with pure emulsion, it does not seem likely that such an expedient would prove in any way beneficial.

Sapo.—1. The prior sale of prints before securing the copyright will open a way of defence if known to the infringer. Of this you will have to take the risk. 2. The album will be immaterial; each of the twelve contained photographs ought to be registered. 3. Our publishers would undertake the business on payment to them of one shilling and sixpence each.

Climax.—Your showcase should not project beyond the line of the facia or stall board, unless you have a clear right to extra frontage. Try and come to an amicable arrangement with your next door neighbour by getting him to fit up one displaying his goods contiguous to your own.

A. M. M.—1. The effect of adding ammonia to an aceto-sulphate of iron developer will be to generate a certain amount of ferrous acetate, which is a milder reducing agent, and therefore acts more slowly. There is, besides, a corresponding proportion of ammonium sulphate formed, which has a useful mechanical effect, and acts as a restrainer. 2. The *rationale* of the sulphate of copper and bromide system of intensification is, that when the wet film is thus treated a double argentic and cuprous bromide is formed which is sensitive to light, and washing afterwards with nitrate of silver builds up a thicker image *pro rata* on the developed portions of the original negative. Other questions answered by post. The uranium method of toning the blue cyanotype prints was described at the meeting of the Photographic Society, April, 1873. Copper might be tried. Your attempt to transform the blue pigment into colour of less actinic quality by ammonium sulphide could only result in a transient effect, for the ferrous sulphide thus formed would speedily become peroxidised in the air, and lose its relatively greater opacity.

W. M. (Clapham).—Roscoe's "Elementary Chemistry," and Balfour Stewart's "Elementary Physics" (Macmillan and Co.), "Physical and Inorganic Chemistry," by Henry Watts, or Bloxam's "Laboratory Teaching" (J. and A. Churchill) would suit your purpose to begin with. For apparatus, either J. J. Griffin and Sons, 22, Garrick Street, or Townson and Mercer, 89, Bishopsgate Street Within. Your last question shall be answered next week.

Perplexed.—The yellowish-brown spots on your negatives appear to be silver stains due to the use of damp paper in the printing process acting upon traces of hypo left in the film. Notice their prevalence on the rims and thickened portions where this impurity would be likely to accumulate.

Amateur.—1. Marion and Co.'s print washer ought to meet your wants, if you cannot fit up a little syphon arrangement for yourself. 2. A lever handle connected with your supply tap would enable you to regulate the flow of water to a nicety, provided, of course, that the pressure remains pretty constant.

V. C. (Hulme).—The spoon system of measurement is not very accurate, for different samples of pyro vary in bulk or density, especially if allowed to get moist. Check by weighing until your eye becomes practised.

THE PHOTOGRAPHIC NEWS.

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THE AWARDS AT THE BIRMINGHAM EXHIBITION.

IT has been repeatedly pointed out that the best of those who have been long distinguished for the production of excellent, and notably pictorial photographs, continue to succeed time after time in obtaining high medal awards at provincial exhibitions, and indeed the Fathers of Photography, in very many cases, still carry off the highest awards; although, it must be confessed, that occasionally there are indications of certain styles of work, much appreciated in the early days, not being so highly estimated now.

At the Birmingham Exhibition, which remains open till the 9th instant, Mr. F. M. Sutcliffe comes out at the very head of the list, taking for his "Water Rats" the only gold medal given in connection with the Exhibition; a second gold medal, in the hands of the judges, not having been awarded for want of such notable excellence as should justify its bestowal.

We are speaking now more especially of the "Champion" Sections (Class X. and Class XVII.) of the Exhibition: sections confined to pictures that have already been awarded prizes; and after having congratulated Mr. Sutcliffe on taking the only gold medal, we are pleased to state that no less a personage than Mr. Adam Diston received the silver medal in the Professional Section for his admirable picture "Gloaming," while in the Amateur Section Mr. George Davison and Mr. D. G. Wilkinson take a silver medal a-piece. Three bronze medals were awarded in the Champion Classes, Mr. H. P. Robinson carrying off the only bronze medal in the Professional Section for his well-known sheet, "Carolling"; the two remaining bronze medals (Amateur Section of the Champion Class) being taken by Mr. A. G. Tagliaferro and Mr. J. E. Austen, respectively.

Numerous medals were awarded in the other sections, and the following is the official statement of the awards:—

Class 1 (Portraiture)—Silver medal, W. J. Byrne; bronze medal, J. A. Draycott; certificate, Harold Baker. Class 2 (Landscape)—Silver medal, H. D. Arnott; bronze medal, G. W. Wilson and Co.; certificate, F. M. Sutcliffe; certificate, J. P. Gibson. Class 3 (Genre)—Silver medal, Rev. F. C. Lambert; bronze medal, H. P. Robinson; certificate, F. M. Sutcliffe. Class 4 (Enlargements)—Silver medal, W. A. Skill; bronze medal, Lyd. Sawyer; certificate, Woodbury Co. Class 5 (Still Life)—Certificate only, C. H. Evans. Class 6 (Architecture)—Silver medal, W. A. Greene; bronze medal, J. E. Austin; certificate, F. W. Edwards. Class 7 (Mechanical)—Silver medal, E. Greaves; certificate, Thos. Scotton. Class 8 (Lantern Slides)—Silver medal, G. W. Wilson and Co.; bronze medal, P. H. Fincham; certificate, Woodbury Co. Class 9 (Instantaneous)—Silver medal, Louis Meldon; bronze medal, C. E. Wyrall; certificate, W. J. Harrison. Class 10 (Champion Professional)—Gold medal, F. M. Sutcliffe; silver medal, Adam Diston; bronze medal, H. P. Robinson; certificate, W. W. Winter; certificate, West and Son. Class 11 (Apparatus)—Silver medal, W. Tylar; bronze medal, J. Wood; certificate, Shew and Co. Class 12 (Landscape)—Silver medal, G. Davison; bronze medal, T. G. Hibbert; certificate, Geo. Bankart. Class 13 (Small Landscape)—Silver medal, G. Wilkinson, jun.; bronze medal, E. Ferrero; certificate, M. J. Harding; Class 14 (the Ladies')—Silver medal, Miss Clarissa Miles; bronze medal, Miss Florence Harvey; certificate, Mrs. Penton. Class 15 (Beginners)—Bronze medal, C. Court Cole. Class 16 (Lantern Slides)—Silver medal, B. Wilkinson; bronze medal, A. Leeson; certificate, A. R. Dresser. Class 17 (Champion Amateur)—Gold medal withheld; silver medal, Geo. Davison; extra silver medal, B. G. Wilkinson; bronze medal, A. G. Tagliaferro; extra bronze medal, J. E. Austin. Class 18 (Midland Societies)—Birmingham: Bronze medal, A. J. Leeson; certificate, W. J. Harrison. Coventry: Certificate withheld, only one exhibit. Leamington: Bronze medal, J. R. West; certificate, Sur.-Gen. Ranking. Leicester: Bronze medal, Geo. Bankart. Wolverhampton: Bronze medal. J. W. Evans; certificate, J. Forsyth. Class 19 (Special Society)—Society album, Birkenhead Society; certificate, Manchester Society. Class 20 (Fry's Plates)—Silver medal, A. Ellis; extra bronze medal, Walter D. Welford; silver medal for lantern slides, F. M. Brownrigg. Special Midland silver medal, J. R. West; bronze medal, Sur.-Gen. Ranking.

INSTANTANEOUS STUDIES.

THE DAGUERRE JUBILEE.

(*Probable Experience of an Active Member of any Society.*)

I AM asked by the Secretary of the Suburban Photographic Society to read a paper. As this is Daguerre's Jubilee Year, I think it is only right and appropriate that I should compile a biographical sketch. I mention the subject to the secretary. The latter does not seem so enamoured of the idea as I anticipated.

"Couldn't you suggest something else?" he says, a little hesitatingly. "The fact is, our President is going to read a paper himself on this very subject. You see, it's the Jubilee Year."

I own it is, but confess I am a little disappointed, as I've taken some trouble to collect the facts out of the back numbers of the NEWS.

It is a pity to lose my labour, and I write to the Pyro Photographic Association.

The Secretary replies:—

"Dear Sir,—Unfortunately I have engaged to read a paper myself on 'Daguerre and his Life,' as it is his Jubilee Year; otherwise we should have been delighted.—Yours truly, N. EGATIVE."

Very annoying. But I am determined to place the paper somewhere, and I write to the Slushton Amateur Photographic Society. I receive the following :—

"Dear Sir,—We should have been very pleased, but, by a curious coincidence, we have already received three papers on Daguerre and his Work by members of the Society. Although it is the Jubilee Year I am afraid more than three papers would be overdoing it. Thanking you all the same,—I am, yours truly, D. E. Veloper."

Very absurd, it seems to me. If *three* papers on Daguerre can be admitted, why can't they take a fourth? No doubt it's jealousy on the part of the provincials, I being a London man.

I am walking down the Strand when I meet Kynone.

"The very man!" he exclaims, putting his arm in mine. "Look here," he continues, sinking his voice mysteriously; "I want to consult you on a most important matter. Let us go into the Camera Club, and I'll tell you what it is."

We go, and he gets me into a quiet corner.

"Look here," he observes, dragging a manuscript from his pocket; "this is a paper I have written, and I want you to look at it and give me your opinion."

I unfold the MS. with some misgiving. Yes, my forebodings did not deceive me. "Daguerre; his Life and Labours," I read.

"It's a good subject; don't you think so? This is Daguerre's Jubilee Year, you know."

I own that I do know it.

"It occurred to me," Kynone goes on to say, "that nothing could be more interesting than the early history of photography. Of course, you know it, but the new men don't. Just run your eye through the paper."

I do run my eye, and find my own facts marshalled in the same order.

"You found the back volumes of the News very useful, I suppose," I remark innocently.

Kynone blushes slightly.

"Oh! of course, of course, facts are facts, you know, and you must get your information from somewhere. I'm thinking of offering it to the Suburban Photographic Society."

"I should, if I were you," I return, warmly; "and if they won't accept it, try the Pyro Photographic Association."

"I don't think I shall have any need," Kynone replies, cheerfully. "As this is Daguerre's Jubilee Year, the Suburbans will be only too glad."

I am silent on the point of my own experience, and I leave Kynone to the pleasure of again perusing his biographical effort.

I gradually begin to discover that this being Daguerre's Jubilee Year, every member of every Society has thought it his duty to write about the discoverer of photography. After my conversation with Kynone I meet O'Mulshon, who is in a violent hurry. He is rushing to the British Museum Library to hunt up material for a paper on Daguerre. Kammerer, who calls on me, it is refreshing to find, has gone out of the beaten track, and has fixed upon Fox Talbot; but then, as he says, he can't very well leave out Daguerre, "as it is his Jubilee Year," he adds.

The unanimity of sentiment is becoming wearisome. Three members of various societies respectively stop me in the street, and commence, "I say, old fellow, I've just thought of a splendid notion. This is Daguerre's Jubilee Year, and ——"

"And you are going to write a paper on his discovery," I break in with.

"Good gracious! how did you find that out?" says each one in surprise.

I smile sadly, and say no more.

Meanwhile my paper is ready, and, to forestall the publication of all other papers which are to be read at the various societies, I offer it to you, Mr. Editor. As it is made up out of your own pages, you can't well refuse it. But I know exactly what will be the result. You will of course favour me with a tag something like this:—

[We fully admit the inducement, but regret that want of space prevents us from printing our correspondent's paper.—Ed. P.N.]

THE CONSTRUCTION OF PHOTOGRAPHIC LENSES.

BY CONRAD BECK.*

We have hitherto treated light as if it were caused by a single vibration of the material we call ether, this vibration having always one wave length which is only altered when the light passes from one medium into another of different density. This, however, is not the actual fact, though in order to explain spherical aberration it was convenient to assume that such was the case.

The effect which gives rise to the sensation of white light in our eyes is supposed to be produced by the combination of a large series of vibrations all acting together on the retina of the eye. If we consider a vibrating ray emerging from the sun or some other powerful light-giving source, we shall find that it consists not of one vibration with a single-wave length, but of a great number all travelling together at the same rate, and differing only in their wave length. On more close examination of this ray we shall find that the vibrations consist of some with a long wave length, others with a slightly shorter wave length, others again still shorter, until we have vibrations with exceedingly short waves. In fact, the complete ray consists of an ascending series of vibrations, each having a slightly shorter wave length than the last, and all travelling together.

It is interesting now to see in what ways these various vibrations affect our different senses. If we isolate from a complete ray the waves only that have very long wave lengths we shall find that no effect of light is produced on our eyes; but if we place a thermometer in the path of these rays, we shall observe that these long wave-length vibrations have heating power. Let us now isolate a portion of vibrations with rather shorter wave lengths; we shall find that the effect of heat is still produced, but that our eyes are also affected by these rays, and the result obtained is that we see what we call red light. Isolating again another portion of the vibrations with still shorter wave length the effect they produce on the eye is again light, but of a different colour—yellow. The next vibrations produce the colours to the eye of orange, green, blue, and violet, in the order of the spectrum, until at last we come to a point where no further effect of light is produced. The vibrations do not, however, cease here. There are vibrations with still shorter wave lengths than those which cause light, and these, together with the green, blue, and violet vibrations are the waves which affect the photographic salts of silver.

One must not suppose that there is any radical difference between these rays beyond the difference in their wave length. They affect our different senses in different ways. The vibrations that are beyond the visible end of the spectrum would give rise to light, except that our eyes are not delicate enough to see them. We have every reason to believe that they are visible to some of the smaller animalculæ. The same applies to the heat rays, and if our eyes were but sensitive to them, we can conceive it possible that we should have no need to ask our companions in the room if they found it too warm; we should see if they did so.

Let us now retrace our steps. You will remember that refraction is due to the fact that the wave length of light is altered by passing from one medium into another of different density. This light, however, does not consist of one vibration, but of a series of vibrations, each with a different wave length, and it is a fact proved by experiment, and accounted for by theory, that these vibrations have their wave lengths altered in passing from a rare into a denser medium in a different manner.

We have shown that it is possible to construct an optical system which will refract a bundle of parallel rays to a single point, but, in doing so, we have assumed that the light was caused by vibrations of the same length, namely, that it was of the same colour. The rays, however, have not the same wave length.

This defect, namely, that a bundle of white light entering a lens does not come to the one point owing to the fact that light of different colours is refracted to different extents, is

* Continued from p. 107.—A communication to the Society of Arts. Revised by the author for the Photographic News.

called chromatic aberration, and the correction of this error is one of the most important of the optician's duties. The amount of the difference between the refraction of the extreme colours when passing through a glass is called the "dispersion" of that glass. Glasses can be made which have different refracting powers, and with the difference of the refracting power the dispersion generally varies. If the dispersion of these glasses were always in the same proportion to their refraction, it would be impossible to correct for this aberration, for suppose we have a convex lens which has a dispersion one-tenth that of its refracting power—by which I mean that if it brings the violet portion of a bundle of parallel rays to a point nine inches from the lens, it will bring the red portion to a point ten inches from the lens—and suppose we place a concave lens in front of this convex lens, which will give us exactly the same difference in the refraction of the different colours (but being concave it will be in an opposite direction), then, if the amount of the dispersion of this glass is also one-tenth of its refraction, we shall, in order to neutralise the dispersion of the convex lens, require a concave lens of exactly the same focus, and shall also neutralise the refracting power of the combined pair, and the compound lens no more acts as a lens, but as a parallel plate of glass.

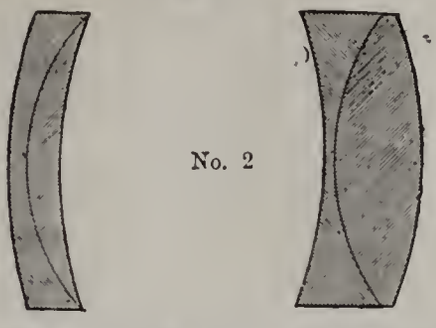
It is found, however, that glasses can be made which have different degrees of dispersion in comparison with their refracting power. In general the more highly refractive glasses have a higher proportional dispersion. We might perhaps find, for instance, that a glass had a dispersion equal to one-fifth of its refraction, instead of one-tenth part.

If, then, we make our convex lens of a glass that has a dispersion only one-tenth of its refracting power, and make our concave lens from the glass which has the higher dispersion equal to one-fifth of its refraction, we shall find that the latter will only require to be half as powerful in order to correct the dispersion of the original lens, and although it will have neutralized by one-half the original refraction, there will still be left remaining a power equal to half that of the convex lens. Thus, for the correction of chromatic aberration, it is important to note that the only essential condition is that the foci of the two lenses should be proportional to the relative dispersion. If one glass has a dispersion of one-tenth of its refraction, and the second glass has a dispersion one-fifth of its refraction, and if we make a positive or magnifying lens out of the first glass, and a negative or diminishing lens out of the second glass, provided the first lens has a refracting power double that of the second, the chromatic aberration will be corrected, no matter what the shape of the lenses, and it is evident that by altering the curves of the lens, but always having the same balance between the two curves, either of the lenses may be made in many different shapes, and yet give the focus required. Thus the correction for achromatism depends not upon the shape of the lens, but on the foci of the two component lenses, while, as we saw before, the correction for spherical aberration depends not upon the foci of the lenses, but upon their relative shapes. There is, therefore, no difficulty in correcting for both spherical and chromatic aberration in the same pair of lenses.

Suppose, now, we are anxious to make up a compound lens for photographic work, which shall consist of two lenses so contrived as to correct for both spherical and colour aberration. We suppose that we have selected two kinds of glass of which we know the properties, one of which has a larger proportional dispersion than the other, and between which there is a considerable difference in refraction. The two errors which we have hitherto been considering can be corrected by the use of any kinds of glass, provided they have these properties. Sometimes there are practical difficulties which are insurmountable, but, in general, the statement holds good. As we have before stated, the correction for achromatism depends on the foci of the positive and negative lenses respectively, while that for aberration depends on the relative shapes of the lenses. Now we shall find, if we work it out theoretically, or if we judge from practical experience, that, with a cemented combination of two lenses, the lenses must always be of one of two particular shapes, otherwise the correction of the two aberrations cannot be made. The shapes which lenses must be made depend upon the properties of the glass employed, and thus if it is desired to alter the shape of a photo lens and not destroy the corrections, other kinds of glass must in general be employed.

I have sketched the necessary shapes of the two forms of lens given by two particular kinds of glass which are in constant use, and it will be found that most of the glasses that have until recently been employed will give for their corrected lenses shapes that are more or less similar to the two forms figured.

Fig. 5.



It is interesting to note that the form No. 2 is that generally employed for telescopes, as the curves are less sensitive to slight alterations, while the shape No. 1 is that which is employed for a large number of photographic objectives, on account of properties which this form of lens possesses that I shall have again to allude to. In order to make this point more clear, I have sketched a series of lenses all made of the same two glasses, all corrected for achromatism, but in which only one is corrected, both for spherical as well as chromatic aberration.

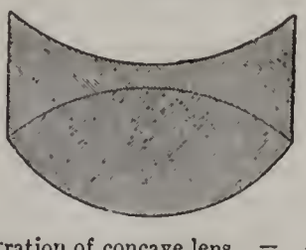
There are many ways of combining the lenses so as to correct one or other of the aberrations, but, as we have seen, in general, only two for correcting the two together.

Fig. 6.

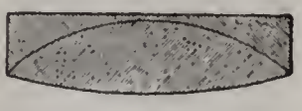
Series of Achromatic Combinations showing Different Degrees of Aberration.



Spherical aberration of concave lens = — ·198γ^2.
Do. do. convex lens = + ·4404γ^2.
Do. do. combined pair = + ·2424γ^2.



Spherical aberration of concave lens = — 2·769γ^2.
Do. do. convex lens = + 3·4056γ^2.
Do. do. combined pair = + ·6866γ^2.



Spherical aberration of concave lens = — ·8438γ^2.
Do. do. couvex lens = + ·5042γ^2.
Do. do. combined pair = — ·3396γ^2.



Spherical aberration of concave lens = — 10·52γ^2.
Do. do. convex lens = + 10·52γ^2.
Do. do. *combined pair* = 0.

We have, so far, only considered that bundle of rays which passes through the centre of the lens, and forms the centre of the picture; and, as we have shown, it is necessary, in order that this portion of the picture should be sharp, that there should be no spherical or chromatic aberration. The question next arises as to what method is employed in order to obtain sharp pictures at the margin of the photographic plate; that is to say, by

what means a bundle of rays, passing through the lens obliquely, may be brought to a single point.

Now, a good plan, undoubtedly, would be to make a globe of glass and use a spherical plate, except that the achromatism would be difficult to correct, and it would be difficult to use different apertures or stops. For it is evident that a bundle of rays passing through a globe would be affected in an exactly similar manner, whether they passed straight through, or at an angle. But the globe is impracticable; it has been tried, and has been discarded for many reasons.

Another plan, which would work equally well, is, that the complete lens should be two portions of a hollow globe, of which the surfaces are concentric—thus. Here, also, you will observe the oblique rays would pass through a similar set of surfaces to the central rays, and, although a certain alteration would take place, we may say that, practically, the oblique rays would be refracted to a single point, provided central rays were refracted to one point.

Now, what are the ways in which opticians have hitherto corrected for the aberration of the oblique rays, which is called astigmatism? The globular lens was tried, and found unserviceable, and, though hitherto the concentric lens has been an impossibility, we have reason to believe that in the future this form of lens will be made. The method of correcting for this astigmatism has been by making the lens as nearly as possible of the concentric form. If it were quite concentric, the lens could not, with our usual glass, be made of the required refraction, so that we have been obliged to make lenses which are far from being concentric, but which, being made in the form of as deep meniscuses as we can make, somewhat approach the concentric form, and thus improve, but in no way annihilate, the astigmatism.

Let us suppose we are anxious to make a lens to cover a plate that subtends an angle of, say, 30° to 40°, and that shall have an aperture one-eighth of the focus. Suppose the focus of the lens be ten inches, then the bundle of rays that enters the lens from any point of the object must be $\frac{1}{8}$ths or $1\frac{1}{4}$ inches. The lens cannot be smaller, therefore, than $1\frac{1}{4}$ inches, and it is found, for other reasons, that it must be at least $1\frac{1}{2}$ inches. The deepest curve we can conveniently make of that diameter is, say, $\frac{8}{10}$ths of an inch, or thereabouts, and this limits the convexity of the meniscus that can be used. Well, we know that in order to correct astigmatism we require the lenses to be as deep as possible, and as nearly parallel as possible, so we decide to have our lenses of such curves that the deepest is about $\frac{8}{10}$th inch. We decide to have a pair of symmetrical lenses in order to have no distortion, and that they shall be placed in a position to give as nearly as possible the form of a hollow sphere. Now comes the point, what glass shall be used? We observed before that with every two kinds of glass the lenses could only be made of two shapes. Thus, we must look through our glasses to see which pair will best give us this deep meniscus form. We shall find that for a lens of the type I have mentioned, the glasses known as light and heavy flint combined together will give the nearest approximation to the shape required. That is to say, in order to be able to make a lens with these very deep curves we must use two glasses whose refractive indices and dispersions are unusually close together, otherwise the adequate corrections cannot be obtained. For a lens with a larger aperture than one-eighth of its focus the lenses must be larger; it is then no longer possible to employ so deep a curve as $\frac{8}{10}$th inch, as it would be more than a hemisphere and could not be made, and the curves must of necessity be of a flatter form. We must again look through the kinds of glass at our disposal, and we shall find that glasses with a greater difference between their refractive indices and dispersion must be selected.

This will have, I hope, indicated very roughly and briefly some of the general defects of a simple lens, which we, as opticians, endeavour to correct. For portrait lenses we devote ourselves beyond everything to the correction of the spherical and chromatic aberrations of the central rays, because large apertures are necessary in order to make the lenses rapid, and the larger the aperture the more the defects in the aberration show up. That is to say, in portrait lenses we devote ourselves to the central definition of the lens. In rapid and wide angle doublets, although the central aberrations must be carefully attended to, the corrections for astigmatism and distortion are the most important. Again, with single landscape lenses a certain amount of distortion is tolerated in order to obtain better marginal definition. In order to describe all the different details of construction, it would not require a single paper, but a series, and I doubt if any but opticians would be interested. I have been unable to touch this evening on many points of special interest.

The flare-spot and its causes and modifications in various kinds of lenses would be a subject that, to be fully treated, would require considerable time. Wherever light meets a polished surface of glass a portion of the light is refracted and a portion is reflected, and thus with every lens a certain amount of light enters the camera which has not passed straight through the lens, but has been reflected backwards and forwards from the various surfaces of the combination before entering the camera. The amount of this light is exceedingly small, compared with the body of light which passes through the lens, and if it is diffused over the whole of the photographic plate, it has no appreciable effect. It, however, sometimes happens in a carelessly adjusted lens, more usually of the doublet form, that the greater portion of this light thrown into the camera by internal reflections is concentrated upon one part of the plate, and forms a patch of light called the flare-spot.

Another interesting point is the special chromatic correction which has to be made—owing to the irrationality of the spectrum—in order to make the focus coincident for the chemical and visual rays. In this connection I may mention the new optical glass which has recently been made at Jena. I think it has sometimes been supposed that the advantage that would be gained by the use of this glass for photographic objectives would be mainly due to the destruction of the secondary spectrum. I anticipate no improvement worth mentioning from this cause. Those who are familiar with that beautiful optical correction of a telescope object-glass, and who have compared it with the correction of the best photographic objectives which are purposely imperfectly corrected in that direction, will realise that the correction of the secondary spectrum is of very little consequence in the construction of photographic lenses. There are now being turned out from the glass factory at Jena, over ninety kinds of glass, and some of these possess very remarkable qualities, such, that I think it not impossible that we may be able to make in the future a doublet lens that is absolutely concentric, and in which the covering power is thereby largely increased. There are many serious difficulties in the way, and although the firm of which I am a member have been for many months working in this direction, the investigations are not yet sufficiently complete for me to be able to give any definite information as to their results.

I will not discuss the much debated point as to whether it is legitimate to leave a lens more or less imperfectly corrected for aberration in order to obtain the so-called "depth of focus." All such points as these may appear to be of a secondary importance, but they must nevertheless be carefully considered in the construction of photographic lenses.

ART IN RELATION TO PHOTOGRAPHY.

BY WM. COBB.*

Art is, without doubt, a happy theme to dwell upon, but many before to-night have made shipwreck of it and themselves ridiculous, and I have a sort of presentiment that before reaching the end of my short paper, I shall find myself rowing pretty much in the same boat. To the oft-recurring and still vexed question as to what really constitutes art, I do not intend to make anything more than a passing allusion, for I take it that he, indeed, would be a bold man who would dare to come forward with an avowal that he was prepared to offer a comprehensive and satisfactory explanation of the problem. I think myself quite safe, however, in hazarding the assertion that never before in the world's history has the faculty of art been developed to such an extent, or such extensive demands made upon its resources, as at the present moment; and I will even venture a step further—this is ticklish ground, I know—and say that no more powerful auxiliary has been, or is now operating in the development of this result than photography. Man is, by universal consent, a religious animal, and I maintain that he is also an art animal—by that I mean that he is a being constitutionally endowed and inherently imbued with art faculties; robbed of these he would at once descend to the lowest level of the brute creation. Art and civilization are twin sisters, inseparable and incomprehensible, springing into existence simultaneously, and at the moment when our first parents committed

* A Communication to the Photographic Club.

their first sin art played the leading character of that mystic programme, and the first creation of genius was the result ; and at what a priceless value would that relic of ancient art, that historical apron of fig leaves, be held if it could only be found and identified ! And who knows but what even yet some enterprising antiquarian, who would not think of allowing such a trifling thing as time to thwart his purpose, may discover it hid away in a lumber room belonging to the antediluvian ages, and bring it before the admiring gaze of the sometimes too credulous worshippers of ancient art and consecrated relics of antiquity !

It may be fairly argued that the age we live in is esseutially a scientific one ; that, however, affords no reason for supposing that the art instincts of man are blighted and impaired ; on the contrary, there is abundant evidence to prove that they are not only in existence, but in active exercise. Art has independent rights of her own ; she is, I was going to say, her own creator, and I don't know that I should be very far wrong if I did ; she is her own nurse, her own teacher and demonstrator, and she even feeds and flourishes upon her own creations. Now I really dou't know what else there is you could say so much for. The universality of art is an established fact. It is a somewhat significant circumstance, and it frequently happens that the very productions which are regarded by some as crowning efforts of genius are looked upon by others with feelings akin to pity as being the emanations of a disturbed balance of intellect, or what is even more damning, denounced as fraudulent impositions to catch the unwary ; pity 'tis possible to make art subservient to such artfulness. There seems to be a desire on the part of some who take an active iuterest in photography to circumscribe its art capabilities, to hedge it in, as it were, within the narrowest possible limits, to fix by figures and measurements what shall and what shall not be ascribed to art. This, I think, is greatly to be deplored—why, than that it would be no more absurd to attempt to give us the number of square miles contained in space, or a method by which to calculate how many years go make up eternity ? The universality of art prohibits entirely any such system of treatment, and precludes the possibility of its beiug contained within any limits which man can prescribe. Where, then, shall art be found ? Let me tell you. Not only in the great centres of civilisation, where its trophies are congregated together ; not only at the seats of learning, where the highest order of intelligence is naturally looked for; it may also be found in yon almost deserted old driftway, actuating by its genial and occult influence that poor little peasant boy, who in his ignorance never perhaps heard the name of art, and has no idea of its existencc. Regard him for a moment with his rusty old billycock hat and red woollen comforter twisted carelessly round his neck. He is breathing, although unconsciously, the very atmosphere of art, whilst surrounded with its choicest creations. See he goes to the hedge-row and provides himself with a stick which somehow he has taken a fancy to, and now—

> "He perches himself on the top of a gate,
> And whilst murmuring a rustic lay,
> He applies his old knife to that hickory stick,
> And he whittles and whittles away."

And what is the result ? Why, he has produced, in a humble form, I admit, a veritable work of art ; he has carved some original devices in the soft bark of that stick which may possibly become historical, and be handed down as an heirloom in his family. Ignorant of the fact himself, his art instincts have been at work, oozing out at his very finger ends. This is no unfair stretch of the imagination ; it is a picture true to the life. From such and similar haunts have come the brightest satellites that ever graced the firmament of art. Although art is an innate quality of human nature, capable of further development, it does not necessarily follow that it can be brought to a high standing of excellence in all its possessors, neither is it essential that one should be able to produce results in any of its branches to prove himself a repository of art instincts ; he may have true feelings of art, yet lack altogether the mechanical ability to put them into tangible shape or form. One may have his very soul aflame with poetic fire, and yet be utterly unable to give it expression. The recognised leaders in art incur serious responsibilities, seeing that they have, as it were, the moulding of the feelings and ideas of those who trust themselves to their guidance ; and how easy it is by dogmatic assertions of their own views to warp the judgment, to blight and chill the fervid aspirations of their pupils. It has often struck me that there is a very marked difference observable between those who devote themselves exclusively to artistic pursuits, and those who identify themselves with matters of a more scientific character. In the former there is a kind of Bohemianism and a manifestation of incipient lawlessness, call it devil-may-care if you like, which is quite refreshing to be brought into contact with, whilst the latter seem to partake more of a cold, arbitrary character of their own mathematical calculations.

All that glitters is not gold, and it is equally true that all which is pictorial is not art. Still, setting aside for the moment the question of art, it is by no means surprising that the practice of photography has endeared itself and become so popular with such a large section of the community as it has. This, of course, is partly accounted for by the fact that during the last few years the mechanical and manipulatory difficulties have been reduced to almost *nil*, so that now anyone who possesses the smallest amount of manipulative skill is enabled to prepare for himself results which form at least pleasing reminiscences of places he may have visited, or reproductions of objects which he values. Indeed, it is becoming a common practice for the proprietors of large concerns to make it a special adjunct of their business plant, so as to utilise it for advertising and various other purposes. The professional photographer probably regards this movement as a kind of innovation upon his vested rights, and feels that his nose is being put out of joint ; but if he finds he is getting too much spare time on his hands, let him, by a greater exercise of his artistic skill and training, bring it to bear more forcibly upon his professional work, and he will not find his occupation gone, but probably increased by his having raised himself upon a higher platform of art—for, depend upon it, there is still plenty of room upwards—and by so doing he will find that he will still be able to afford himself the luxury of a little bit of cheese to his bread.

I cannot allow this golden opportunity to pass by without breathing fervid anathemas at what I consider the most withering influence which has ever been brought to bear upon photography. You will have anticipated me when I say retouching—that insidious, treacherous photographic art. The older I get (and people tell me I am getting on), the more do I hold it in contempt. The introduction of albumenised paper, although hailed with delight by many, was, to say the least of it, a retrogressive step ; but the so-called art of retouching, fraudulent and libellous as it is, has done more to degrade the art side of photography than all other abuses combined. The full power and capabilities of photography pure and simple, especially in portraiture, will never be developed until the almost despotic rule of this dangerous usurper is suppressed. Let us, then, have more genuine photography, into which the art instincts of the photographer himself have been instilled, and the means at his disposal for assisting him in his endeavours are infinitely greater now than in days of yore, and we shall then find that there will no longer be the necessity for resorting to such mechanical and meretricious aids, and photography will rise with increased vitality into more elevated regions of art.

I would not have it supposed for one moment that I am indifferent to the advantages of art culture ; indeed, I regard such gatherings as this as highly conducive to our best interests in that respect, the bringing together and contrasting one with the other the various examples of our work, as on this occasion, is not only pleasant and agreeable, but highly instructive and educational ; and most sincerely do I appreciate, in common, I am sure, with all the other members of this Club, the warmth and geniality of feeling which prevails, as well as the willingness—indeed, I might almost say anxiety—to impart information one to the other upon matters connected with photography. The only regret I have is that, with hearts so expansive, our accommodation is not more extensive ; but I still hope that in the not very distant future, to use a commercial phrase, this long-felt want will be duly met.

DAGUERREOTYPE.

BY T. W. THOMAS HORTON.*

Five years after the death of Niepce, Daguerre was able to announce that he had overcome all difficulties, and that henceforth nature would depict her own likeness with a pencil of light. In January, 1839, the discovery of M. Daguerre was reported, and specimens shown to the scientific world of Paris. The extreme fidelity, the beautiful gradations of light and shadow, the minuteness and the extraordinary character of these pictured tablets, took all the world by surprise, and Europe

* Continued from page 134.

and the New World were astonished at the fact that light could be made to delineate on solid bodies delicately beautiful pictures, geometrically true, of those objects which it illuminated.

In the July following, after a bill was passed securing to M. Daguerre a pension for life of six thousaud francs, and to M. Isidore Niepce of four thousand francs, with one-half in reversion to their widows, the process by which these pictures were produced was published.

It is to be regretted that—after the French Government had thus liberally purchased the secret of the process of the Daguerreotype, for "the glory of endowing the world of science and art with one of the most surprising discoveries that honour their native land," on the argument that the invention did not admit of being secured by patent, for, as soon as published, all might avail themselves of its advantages—in the face of this, on or about the 15th of July, 1839, a certain foreiguer residing in France instructed Mr. Miles Berry, patent agent in London, to petition Her Majesty to grant Her Royal Letters Patent for the exclusive use of the same within these kingdoms. "This certainly needs no comment." It was unworthy the liberal spirit which should actuate the follower of science and art. The process was accordingly patented in England iu 1839, and in the specification is called "A new and improved method of obtaining the spontaneous reproductions of all the images received in the focus of the camera-obscura." Nevertheless, the Daguerreotype process was at the time of its publication very imperfect; aud it was destined to undergo important modifications and improvements during the next three or four years.

The news of Daguerre's wonderful discovery soon spread to other countries, and the inventor obtained a rich reward by the sale of apparatus, aud by the instruction of hundreds who flocked to Paris to learn the details of the new art. The materials employed by Daguerre in his early experiments, between 1824 and 1829, appear to have been the same as those used by Wedgwood and Davy—the chloride and nitrate of silver spread upon paper; and he did not advance upon, if indeed he equalled, the results obtained by the two English chemists. After entering into partnership with Niepce and learning the details of his bitumeu process, Daguerre followed for a time in the same track, but further study enabled him to work out improvements and modifications which led him ultimately to a greater success. We know that Niepce sometimes used metal plates coated with silver; moreover, he employed iodine to darken these plates after the picture had been developed. Using these two materials—plates of silver and vapour of iodine —Daguerre found that the iodide of silver formed by exposing silver to the vapour of iodine was sensitive to light. When such "iodized silver plates" were exposed within the camera, faint images of bright objects were impressed upon them in the course of two or three hours.

At this stage a happy "accident" occurred which revealed to Daguerre a method by which not only was the time of exposure necessary to secure a good picture greatly reduced, but the distinctness and beauty of the image were much enhanced. It appears that one day Daguerre removed from his camera a plate which, either from the shortness of the exposure or dullness of light, showed no sign of an image. He placed this blank plate in a store cupboard, inteuding to clean the surface and use it again. But what must have been our photographer's surprise when, on taking out this plate the next morning, he found upon its surface a distinct and perfect picture! Another prepared plate was quickly exposed for an equally short time within the camera, and again a sojourn of twenty-four hours within the magic cupboard sufficed to bring out a picture. The next step was to ascertain to which of the numerous chemicals kept within the cupboard this marvellous effect was due. By a process of elimination, it was at last traced to a dish full of mercury. Delighted by this fortunate discovery, Daguerre at once proceeded to place his exposed plates over a dish of warm mercury, when the vapour proceeding from the liquid metal was found to settle upon the iodized silver in exact proportion to the intensity of the light by which each part of the plate had been affected. This was, in fact, a process of development—an invisible or "latent" image being strengthened and thereby made visible. Some such method of "developing" the originally feeble impressions produced upon sensitive plates by a short exposure to light has been fouud necessary in every photographic process.

Another advance made by the French artist was the discovery of a fixiug agent. This was neither more nor less thau a strong solution of common salt, in which the plates were soaked after development, and which dissolved and washed away the iodide of silver that had not been acted on by light. But when, almost immediately after the publication of the Daguerreotype process, in 1839, Sir John Herschel drew attention to the superior qualities of hyposulphite of soda as a solvent of the silver salt, Daguerre immediately adopted it for clearing and fixiug his exposed plates. This substance, so valuable to every photographer, was discovered by Chaussier in 1799, and its power of dissolving the haloid salts of silver had been described by Herschel as early as 1819.

The first Daguerreotypes were so delicate that the merest touch of the finger was sufficient to mar their beauty, and when exposed to the air they rapidly tarnished and deteriorated. This defect was remedied by M. Fizeau, who gilded the image by means of a mixture of chloride of gold and hyposulphite of soda. This solutiou was poured over the silver plate, which was then heated until the liquid evaporated, leaviug a thin coating of gold upon the picture, which was thereby more distinct as well as more permanent.

Another great improvement was introduced by Mr. Goddard, a London science lecturer, in 1840. He exposed the iodised silver plate to the action of bromine vapour, thereby forming a bromide of silver upon the plate in addition to iodide of silver. In 1841, M. Claudet used chlorine vapour in a like manner. Plates prepared by either of these methods were found to be far more sensitive to light than those which had been simply iodised. In fact, the time required to produce a picture in the camera was thereby reduced to from one minute to five minutes, or, with a very good light, to less than oue minute. As the three elements referred to were only discovered—chlorine iu 1774, iodine in 1811, and bromine iu 1826, we see that photography was hardly possible before the present century.

After the improvements of Goddard and Claudet, which were quickly adopted by Daguerre, the production of portraits by the Daguerreotype process became comparatively easy. In the first attempts at portraiture, which appear to have been made in America by Draper and Morse, in 1839, the sitter's face was covered with white powder, the eyes were closed, and the exposure, lasting for perhaps half an hour, was made in bright sunshine. To lessen the glare of light, which painfully affected the sitter, Draper caused the sunlight to pass through a large glass tank containining a clear blue liquid—ammonia and sulphate of copper—before falling upon the sitter, thus filtering out most of the heat rays, which could well be spared, as they possess little or no actinic value.

In 1840, Beard and Claudet opened photographic studios in London. Davidson followed suit in Edinburgh, and George Shaw in New Street, Birmingham, and soon Daguerreotypy became a trade. For landscapes, &c., the Daguerreotype process was, however, but seldom employed, though we read of a fino instantaneous picture of New York Harbour being secured by its aid.

The expense of the plates, which were usually of copper, plated with silver, was a serious objection to the Daguerreotype process. As late as 1851 we find the price of Daguerreotypes in England was two and a-half guineas each for the quarter-plate size ($4\frac{1}{4}$ by $3\frac{1}{4}$), and four guineas each for half-plate size. The cleansing and polishiug of the silver surface on which the picture was to be produced was a most troublesome task, necessitating great care and a vast amount of labour in the production of the "black polish" which was uecessary. It must also be remembered that there was practically no power of multiplying a Daguerreotype, a fact due to the opacity of the silver plate. It is true that Grove (now Sir W. R. Grove, one of Her Majesty's justices) devised a method of etching Daguerreotypes with acid so that they could be used in a printing press, but, practically, this method was a failure.

The Daguerreotype held sway for about ten years only—from 1839 to 1851. It was moro popular in America than in England; indeed, in England specimens of the art are now quite rare. With all its faults, it was an immense advance on anything previously known, and entitles Daguerre to rank with the leading inventors of the nineteenth ccutury. Daguerre died in 1851, aged sixty-three. In 1883, a bust of this ardent worker was unveiled at Cormeilles, funds bcing contributed by photographers of all civilised nations.

Viewing his whole career, Daguerre must be considered as a fortunate man. Not only did he reap much honour and material benefit from his discovery, but he lived to see photography rise to an important place amongst the arts and sciences.

(To be continued.)

ON THE VALUATION OF COMMERCIAL HYDOQUINONES.

BY ADOLPHE M. LEVY, C.E.*

You will no doubt recollect that at our last meeting I had the pleasure of informing you that I have, for some time past, been engaged in examining various samples of hydroquinone, with a view to establish some method enabling one to form an opinion as to the value of a given sample. I now beg to lay before the Club the results of my investigation, and I will deal more especially with two samples which were entrusted to me by members of this Club.

I had thought at first that hydroquinone, being essentially useful in photography, because of its reducing properties, the determination of the value of a given sample might be arrived at by endeavouring to find out what quantity of a standard solution of potassium permanganate would be deoxidised by a weighed portion of the hydroquinone. I therefore proceeded to dissolve equal weights of both samples in water, to which a small quantity of sulphuric acid had been added. A titrated solution of permanganate was run into the solution, but I very soon found that there did not appear to be any satisfactory termination to the reaction. The final pink colour was obtained, but vanished soon, and could be reproduced at pleasure, vanishing again in approximately the same length of time as before. I think that this is mainly due to the fact that gradual oxidation transforms hydroquinone into quinone, and that the latter compound is not without action on the permanganate, especially in presence of the sulphuric acid, which is indispensable in the titration by permanganate. It is, of course, impossible to operate in an alkaline, or even neutral solutions, as these would darken so much through oxidation that the final rose tint of the permanganate would be obscured completely.

Schorlemmer says that by acting on hydroquinone by nitric acid, oxalic acid is produced, whereas quinone yields a mixture of oxalic and picric acids. It is not, however, stated whether one, two, or three molecules of oxalic acid are produced by this reaction, and if only one or two molecules, what the other products may be.

In order to ascertain whether the residue of the oxidation by nitric acid could be made use of as the starting-point of an analytical method, I weighed out a small quantity of each sample, and oxidised it with dilute nitric acid at first, and, after evaporating it to dryness, it was twice thoroughly moistened with nitric acid, and evaporated to dryness each time.

I must now allude to the two samples under consideration. The first was a product sold as permanent hydroquinone, and is in fairly large crystals, very bright, and lemon coloured. Under the microscope it showed magnificent prismatic crystals, well defined and regular all through the slide. The prisms showed plainly a well-marked longitudinal striation.

The second sample was given to me as an entirely new preparation of hydroquinone. It is snow-white, and shows the same crystalline form under the microscope as the previous sample, the longitudinal striation being also visible. The crystals, however, are very much broken up, and the sample seems to denote that very rapid crystallisation, and perhaps mechanical separation from the mother liquor, have been resorted to in its preparation.

I had the curiosity, also, to examine a sample of hydroquinone bought when this chemical was much more expensive than it is now. This was also quite white, and exactly similar in appearance to the one just described, only very much better crystallised.

Having now described the physical appearance of the two samples, I will now revert to the results afforded by oxidation by nitric acid. The white sample gave remarkably constant results. The oxalic acid obtained titrated by permanganate seemed to show that one molecule of hydroquinone only yields one molecule of oxalic acid. I shall revert to this later on. The yellow sample, designated as "permanent hydroquinone," on the contrary, yielded figures differing so much that it did not seem possible to place any reliance on them.

I then proceeded to make an elementary analysis of both samples, and I must state that this compound requires a good deal of care if good results are to be obtained by burning it in copper oxide. A high temperature is requisite, and even then there is a tendency to molecular deposition of carbon. I resorted, in each case, to a stream of pure oxygen through the combustion tube, after the process seemed complete in the ordinary way. The results were as follows:—

	Permanent Hydroquinone.	White Hydroquinone
Carbon ...	47·755	57·300
Hydrogen	6·745	6·196

The composition of hydroquinone, calculated from its formulæ, would be—

$C^6H^6O^2$	
Carbon ...	65·454
Hydrogen	5·454
Oxygen ...	29·092
	100·000

It will be noticed at once that the results of both analyses differ considerably from the actual composition. However, the amount of hydrogen shown by the analysis is greater than what it should be, and this excess may be due to water of crystallisation.

Admitting this, and calculating the amount of hydrogen required for the quantity of carbon formed, the two analyses show as follows, the oxygen in each case being determined by difference:—

	Permanent Hydroquinone.	White Hydroquinone.
Carbon ..	47·755	57·300
Hydrogen...	3·716	4·770
Oxygen ...	21·259	25·095
Water ...	27·270	12·835
	100·000	100·000

By calculating from these figures the composition of the samples, after abstracting the water, it will be seen that the hypothesis of the presence of water of crystallisation is correct, the figures being in close agreement with the theoretical ones.

	Permanent Hydroquinone.	White Hydroquinone	$C^6H^6O^2$.
Carbon ...	65·592	65·596	65·454
Hydrogen...	5·140	5·481	5·454
Oxygen ...	29·268	28·923	29·092
	100·000	100·000	100·000

The two samples would therefore consist of—

	Permanent Hydroquinone.	White Hydroquinone.
Hydroquinone ...	72·730	87·165
Water ...	27·270	12·835
	100·000	100·000

The white sample therefore would appear to be the better of the two.

I will now refer again to the transformation of the white sample into oxalic acid. One gramme of this, oxidised three times by nitric acid, yielded by titration ·600 of a gramme of oxalic acid. Theoretically, one gramme ought to give ·673, if only one molecule of oxalic acid is produced, the remainder of the hydroquinone being transformed into compounds which have no effect on the permanganate solution. The discrepancy in the yield of oxalic acid would amount to 11·7 per cent. of water in the sample. The composition would then correspond to—

	Sample.	$C^6H^6O^2$.
Carbon ...	64·600	65·454
Hydrogen	5·434	5·454
Oxygen...	29·966	29·091
	100·000	100·000

Of latter years, great importance has been given to the determination of the melting point of organic compounds. Schorlemmer gives 165° centigrade as the melting point of hydroquinone. The two samples afforded the following results:—

	Permanent Hydroquinone.	White Hydroquinone.
Melting point...	172·5° C.	165·25° C.

A member of the Club having enquired whether the statement that the permanent hydrokinone contains sulphite of sodium is correct, I tested the sample both for sulphur and for fixed alkali. The latter is absent, as the sample burns without leaving any residue. I found one-quarter per cent. of sulphur, and no trace of sulphurous acid, so that the sulphur must be due to sulphuric acid. The quantity being very small, sulphuric acid may be a simple impurity.

* A Communication to the Photographic Club.

Notes.

The collection of the photographs of Mr. H. Tolley, now exhibited at the Rooms of the Camera Club, 21, Bedford Street, Strand, will remain on view during the whole of next week. The Camera Club regards the "One Man" Exhibitions as a success, and they will probably be continued.

Mr. Edward Muybridge will discourse on the "Science of Animal Locomotion" on Friday evening, the 22nd inst., at the Royal Institution, Albemarle Street.

Some of the papers have expressed wonder that while Pellegrini has immortalised so many by his pencil, no portrait of himself is obtainable. The reason is very simple. Pellegrini had an unconquerable aversion to photography. Nothing could induce him to enter a photographic studio, and he was equally impervious to the blandishments of amateur photographers. One can easily understand this. Possessing an abnormally keen sense of the ludicrous, he recognised—perhaps, exaggerated—the artificiality of most photographs, and discovered caricature where it was not apparent to most people. A sense of humour, we must confess, is very often fatal to the proper appreciation of photography. We know a prominent artist, whose line is the humorous, who says that when he is dull and wants a hearty laugh, he can always find merriment in an hour's stroll and study of photographers' showcases. Possibly this is true, but, at the same time, it is unfair. The men who ridicule photography are those who know least about it. We have our doubts whether Pellegrini ever visited a photographic exhibition.

Since writing the above, we hear that a portrait of Pellegrini has been published. It is not, we need scarcely say, a photograph, but a characteristic sketch by Mr. Finch Mason, one of "Ape's" intimate friends, and a clever artist of the naturalistic school.

The manager of an electrotypic Agency has been interviewed. To those who do not know, we may say that an electrotypic agency furnishes a medium through which people desirous of bringing out illustrated books or periodicals cheaply can do so, by purchasing the electros of pictures which have appeared elsewhere, at home or abroad. Photography enters largely into this traffic, but not in a way that the agency likes. The manager told the interviewer that "we should almost double our business if the American Government and people could be brought to understand the meaning of the word theft. When an unscrupulous American editor sees a cut in the *Graphic* or *Illustrated* that he likes, instead of writing to us or direct to the publishers, he simply photographs the printed picture, and prints from the "zinco." This is all very well, but the American pirate has his fellow over here. There are English illustrated papers of the cheaper class which do not scruple in the least to appropriate American pictures in this way. Some of the early illustrated papers of the *Tit Bits* class were wholly made up of piracies from America.

If the "Theatre Libre" takes root in London as the *Daily News* foreshadows, it will not be complete without the amateur photographer. In the "Theatre Libre" the services of dramatic authors will be dispensed with; in their place the company will employ a practised band of "social stenographers," whose duty it will be to privately take note of scenes of actual life, both high and low; not only real conversations, but actual gestures and actions, are to be carefully noted, with a view to conscientious reproductions on the stage. But if real conversations are to be secured, why not real gestures and real facial expressions? In other words, why not employ "a practised band" of social photographers?

Each member of the band should, we would suggest, have his or her detective camera and magnesium flash apparatus, and with a little dexterity might, at "At Homes," "Matinées," "Private Views," "Dinner Parties," and "Cinderellas," obtain any number of society pictures. Probably the sudden illumination and glare would at first be rather alarming, but it is surprising how soon fashionable people get used to novelties, and the magnesium flash, at any of the functions enumerated above, would very speedily excite no more attention than the remark, "Oh, it's only one of the band of Social Photographers making a note."

Photography has killed the expert in handwriting. Over and over again doubts have been expressed as to the value of his evidence, especially when one "expert" has been pitted against another; but it was left to the Parnell Commission to oust him from his position. It is a matter of common knowledge that the *Times* had got "experts" ready to swear, "to the best of their belief," that the so-called signature of Mr. Parnell was genuine, and it is almost a pity they were not called before the collapse of this portion of the case, so as to put an end to a species of evidence which is never convincing and always unsatisfactory. Had the experts gone into the witness box they would have been met with rebutting proof which would have opened their eyes. This proof is well put by the *Weekly Dispatch*, which says: "So careless was the forger, that he actually copied, in his subsequent forgeries, the identical signature that was fac-similed in the *Times* itself. A photograph of the signature shown through the oxyhydrogen lamp revealed traces of the pencilling upon which the ink was superimposed by a pen." If the expert wishes to maintain his reputation, the sooner he makes photography a part of his profession the better.

Only remotely connected with the above is the often asked question, "Why is the *Times* allowed to use the Royal Arms on its heading and on its contents bill?" Our readers will remember that not long ago Messrs. Taylor, photographers of Regent Street, were convicted for using the Royal Arms without authority, and the question arises, has the *Times* the requisite authority?

THE DETECTIVE CAMERA: A SUMMARY OF EXPERIENCES AND OPINIONS.

BY HARRY T. DUFFIELD.*

What should be the focal length of a lens to cover with full opening the plate used?—Robert E. M. Bain: "The lens should be of about 6 inches equivalent focus; and should cover the plate all over with a stop of f_{11}." Archibald I. Carson: "I prepare a size larger lens than the plate used for various reasons; both for covering power and focal length. Sydney Bishop: "The lens should be one size larger than the plate, *i.e.*, a 4 by 5 for a quarter plate, &c." W. T. Wintringham: "Focal length should equal or exceed the diagonal of plate, and aperture should be as large as possible, f_4, it can be obtained with good covering power and definition." W. M. Murray: "Not larger than 7-inch focus for a 4 by 5 plate; that gives an angle of 39 degrees; 6-inch focus would be better, covering a view of 45 degrees.

Do you prefer a rapid rectiliuear or a wide-angle lens?—Thirty-five rapid rectilinear; two, wide-angle; one, both. Harry D. Williar: "For confined situations, of course, the wide-angle is best; but for general work give me the rapid rectilinear." Edgar Richards: "The lens for detective work is yet to be made, of an angle of view between 30 and 40 degrees." W. T. Wintringham: "The rapid rectilinear, at f_8, is a necessity, and f_8 is better; and these apertures cannot be obtained in a wide-angle lens." Robert Baker: "A medium wide-augle is best." W. M. Murray: "If a wide-angle is used it should be a moderate angle, so as not to greatly distort the perspective."

Is it not an advantage to have both of these lenses, aud should not all detectives be so constructed that the lens can be quickly changed? Twenty, no; fifteen, yes. A. A. Adec: "I do not think it would be an advautage to change from a rectilinear to a widc-angle lens, unless the necessary change of focal length could be effected automatically at the same time; to change one and not the other iu a hurry would cause disheartening failures." Richard H. Lawrence, Society of Amateur Photographers of New York: "Yes." L. M. Petitdidier: "This would involve too much complication, and would perplex the artist, and lead him into errors and regrets; too much choice is injurious." William E. Bond, Society of Amateur Photographers of New York: "I think it would be an advantage." Edgar Richards; "Do not see the necessity; would make construction of the camera proper more complicated, unless lenses of the same approximate focus were used; all lenses for any kind of work should have bayonet joints and fit in the same flange, within limits of course. William A. Bullock: "(*a*) Yes; (*b*) it would be a convenicut arrangement." E. J. Carpenter Cincinnati (O.) Camera Club: "The use of two lenses in a detective camera is not advisable; it is sure to confuse the operator, particularly in focussing."

How does the single lens do for this kind of work; is it rapid enough? The majority answer that they have never tried the single lens for detective work, and therefore caunot express any opinion. W. M. Butler: "No, except some high grade lenses, like Dallmeyer's, which costs as much as a rapid rectilinear." A. A. Adee: "A good single lens works quicker and with deeper range of definition than a doublet of the same aperture." Albert H. Pitkin: "Of two lenses of equal foci and openings—one single and one double combination—the siugle should be the quickest if made of the same glass." F. C. Beach, Society of Amateur Photographers of New York: "Yes, with good light; but it is apt to distort somewhat." W. A. Bullock: "It will do well where there is brilliant illumination; I have taken instantaneous pictures with it at the sea shore." E. J. Carpenter: "Single lens will answer for some kinds of work in summer."

Do you use a fixed or movable focus? Ten, fixed; twenty-eight, movable. A. A. Adee: "I use a fixed focus with all my cameras; the $4\frac{1}{4}$ by $5\frac{1}{2}$ works sharp for 40 feet and beyond; the $3\frac{1}{4}$ by $4\frac{1}{4}$ for 25 feet and beyond; the others still shorter range. The $4\frac{1}{4}$ by $5\frac{1}{2}$ camera has a Suter Aplanat series A, 7-inch focus; the quarter plate a Beck Rectilinear, $5\frac{1}{4}$-inch focus." Archibald I. Carson: "Fixed focus at 18 feet; Beck Rapid Rectilinear, quarter size, 5-inch focal length." W. A. Bullock: "Both, but mostly the *f* of the lens." E. J. Carpenter: "Focus for every view, estimating distances 8, 10, 12, 15, 20, 30, 50 feet and distance." L. M. Petitdidier: "Movable focus I think is indispensable." W. T. Wintringham: "Movable, but seldom used except for very near work." Frederick Bruce: "Movable from 10 feet to universal focus about 100 feet." W. M. Murray: "A movable focus with 7-inch lens on a 4 by 5; but if I used a shorter focus lens I should use a fixed focus."

What diaphragm do you chiefly use in summer and in winter, the summer season being from May to November, and the winter from November to May? Geueral answer: In summer, f_{32}; in winter, f_8 to full opening. James H. Stebbins, Jr., Society of Amateur Photographers of New York: "Always f_{32}, only changing the speed of the shutter." Sidney Bishop: "For street work the next stop to full openiug, and for water the next smaller in summer; for street work full aperture, and for water the next stop in winter." W. T. Wintringham: "The largest, varying exposure by the speed of the shutter." Frederick Bruce: "f_{11} always." E. Terry: "Third, whenever I can." Miss Barnes: "Full opeuing." E. J. Carpenter: "About f_8." George Marshall Allen: "Depends entirely on conditions; no one more than another." Charles Simpson: "Summer, medium or next largest; winter, the largest; I never usc full opening.'

Which diaphragm is best to use when the object is iu bright light and in shade? General answer: Bright light—summer, f_{16} and f_{32}; in winter, f_8 and f_{11}. Shade—summer, f_{11} and f_{16}; in winter, f_8 and f_4. Of course the diaphragm varies very much with the conditions of light, but the object of both of the questions was to ascertain the stops generally used. For marine views, f_{32}. William Hickmott, Camera Club of Hartford (Coun.): "I always use the largest diaphragm I can; don't think I ever over-timed a plate very much." Harry D. Williar: "I generally use the largest diaphragm that I consider will do the work." Miss Mary Thurstou Rice, Worcester (Mass.) Camera Club: "At the sea-shore, f_{32}; when snow is on the ground, f_{16} and f_{32}." Major George Shorkley: "f_{16} in bright light, summer, otherwise f_{11}; I prefer to use as rapid a shutter as possible." Walter Clark: "I vary my diaphragm very seldom."

What is the principal fault of your shutter? Fourteen are satisfied with their shutter. W. M. Butler: "No definite means of regulating its speed." R. H. Lawrence: "No means of knowing its speed." Albert H. Pitkin: "No means of adjusting speed." Archibald J. Carson: "Arranged simply for instantaneous exposure." Isaac T. Norris: "To control the speed more perfectly, or at least to know its speed." Rev. E. C. Bolles: "That it gives uniform exposure of the whole field." Edgar Richards: "That the speed of exposure is not uniform, being more rapid at the begiuning." W. A. Bullock: "That you can never be sure of the speed twice runniug the same." E. J. Carpenter: "Cannot change the speed as quickly as I would like." John Leshure, Springfield (Mass.) Camera Club: "Not quick enough."

What is the average speed of your shutter when making exposures?—W. M. Butler: Winter and summer, $\frac{1}{20}$ secoud." Harry D. Williar: "Generally give it slowest speed, except for marines, ice, snow, &c." Isaac T Norris: "From $\frac{1}{10}$ to $\frac{1}{100}$ second (?); in summer $\frac{1}{10}$ to $\frac{1}{100}$; in winter, $\frac{1}{10}$ to $\frac{1}{20}$." Major George Shorkley' "Summer, about $\frac{1}{40}$ second; in winter, $\frac{1}{20}$. Rev. E. C. Bolles "As fast as it will go, say $\frac{1}{10}$ second." Sydney Bishop: "As fast as it will go." Edgar Richards: Highest teusion of speed." W. T. Wintringham: "Highest speed $\frac{1}{200}$ second, lowest $\frac{1}{60}$." F. C. Beach: "Probably $\frac{1}{20}$ second." Walter Clark: "Prefer slow shutter." W. M. Murray: "Half-speed generally." D. E. McComb: "About $\frac{1}{50}$ second in summer; about $\frac{1}{20}$ second in winter." A. L. Simpson: "Except on the water, as slow as possible." H. M. Grisdale: "Summer, $\frac{1}{50}$ to about $\frac{1}{100}$ second; winter, as slow as it is possible to get; subject still and sharp." John Leshure: "Summer, $\frac{1}{40}$ second; winter, $\frac{1}{25}$ second." The majority of the answers reply: "Don't kuow," and "Can't find out." The beautiful candour of this general reply, when there was such excellent opportuuity to display scientific knowledge, shows that the character of the photographer is susceptible of the highest moral cultivation.

Should there not be some means of indicating the speed of the shutter?—Thirty answer, "By all means"; eight, "Not necessary." A. L. Simpson: "No, as any one with experience can guess." H. M. Grisdale: "At least some means of getting the same speed as often as wanted." Charles Simpson: "Yes, that is the fault which most detective cameras have; mine has a lever which can be moved forward and back one inch, and I can accurately judge the speed of my shutter." J. V. Black: "Yes, I could record mine by number only, which would be useless for comparison." R. E. M. Baiu: "Do not think it necessary; your judgment and experience should tell you what speed to use, aud it takes quite a long experience to do artistic shutter work." A. A. Adee: "Yes, if reliable; but I doubt if

* Continued from page 118.

a trustworthy indicator would show the degrees of speed above $\frac{1}{100}$ of a second." William J. Hickmott: "Don't think it would be any great advantage; detective cameras are already too complicated." L. M. Petitdidier: "Good photographs can be and are made without this means, but I think much better and more uniform results could be obtained with it." Sydney Bishop: "Yes; though I always use my shutter at full speed, and depend on development to correct any error, except in case of shade, when I slow my shutter." Edgar Richards: "A spring that is in tension constantly becomes fatigued and fails to give the same speed as at first; this is especially true of phosphor bronze; exposure at various speeds of the shutter on falling bodies, and measuring and calculating, gives the most correct results of the time of exposure, and a ready means of checking off results at any time; the speed of shutter and diaphragm of lens used depends on sensitiveness of plate employed, season, time of day, and rapidity of motion of subject, and must be modified accordingly." William A. Bullock: "Yes, there should; I consider it a much needed improvement." Walter Clark: "Not without one had some effective light gauge." E. J. Carpenter: "Desirable as a matter of curiosity."

Is it not desirable that the shutter should be so constructed that the foreground receives more exposure than the sky? W. M. Butler: "A diaphragm shutter, working between the lenses, is best; this will expose both alike." A. A. Adee: "It is desirable to give more exposure to the foreground than to the sky, but shutters so constructed necessarily work comparatively slow; I have had several, and the fastest was about $\frac{1}{10}$ of a second." Archibald I. Carson: "Do not think any such arrangement possible for very quick exposures." L. M. Petitdidier: "Not necessarily; an instantaneous picture generally shows uniform lighting." R. E. M. Bain: "Do not think it cuts any figure in shutter work." Rev. E. C. Bolles: "Yes; this is an imperative need, and one which the dealers should respect." M. T. Wintringham: "No; the most satisfactory work will be obtained with a shutter that distributes the light evenly." Charles Quartly: "I think not for detective work." Frederick Bruce: "Theoretically advisable, practically unnecessary." George Marshall Allen: "Yes, if you use the camera only one way; if used reversed, one side receives more light than the other; a round opening is best all around, if you cannot shift the shutter." Walter Clark: "It is an advantage in some subjects; with water in the foreground, uneven exposure would give the reflection greater value than the sky." Chas. Simpson: "I should hardly think so, as, for instance, in water and street views in summer the foreground requires in bright sunlight even less exposure than the sky."

On what part of the camera should the release of the shutter be? Nineteen on the side, nine on the bottom, two on the top. Charles Simpson: "On top or the right side; mine is underneath, and is very unhandy on that account." J. V. Black: "On the side, not on the top or bottom." H. M. Grisdale: "I like it best on the bottom, as it is less likely to to be set off by accident." A. A. Adee: "Not on the camera at all; the chance of jarring in a moment of excitement is very great; it should work by the pressure of a bulb held in the hand which does not touch the camera." Harry D. Williar: "I prefer right hand side, about two-thirds distance from the bottom, as this enables you to have use of the hand to steady, and the thumb to make the release." Isaac T. Norris: "Is not this purely a matter of convenience?" Major George Shorkley: "On the side, and to be worked by a movement backward, not sidewise." William E Bond: "I prefer it on the next side to the right of finder." Edgar Richards: "Underneath, so that the victim does not know when he is shot." A. C. Abbott: "Depends on wish of operator."

(To be continued.)

Patent Intelligence.

Applications for Letters Patent.

2623. John Leisk, 169, Commercial Street, Berwick, Shetland, for "A New or Improved Flash Lamp for the Rapid Combustion of Magnesium Powder, to be used for Photographic or other purposes.—14th February, 1889.

2678. Frederick Woodward Branson, 14, Commercial Street, Leeds, for "Improvements in Apparatus for Lighting Photographic Dark Rooms."—15th February, 1889.

2723. Frederick William Hart, 8 and 9, Kingsland Green, London, for "Apparatus for Controlling the Exposure of Photographically-sensitive Plates when using Flash Lamps."—16th February, 1889.

2847. Henry Norton Butler Good, 35, Southampton Buildings, Chancery Lane, London, W.C., for "Improvements in Instantaneous Shutters for Photographic Cameras."—18th February, 1889.

3115. Samuel Herbert Fry, 4, South Street, Finsbury, London, for "Improvements in the Packing of Photographic Plates, and means therefor."—21st February, 1889.

3174. George Knight, 12, Middle Street, Southsea, Hampshire, for "An Improved 'Magazine' Camera for Photographic Purposes."—22nd February, 1889.

3279. Frederick William Hart, 8 and 9, Kingsland Green, London, N.E., for "Improvements in Appliances for producing Flashing or Continuous Lights (at pleasure) for Photographic, Scenic, Signal, and other purposes."—23rd February, 1889.

Specifications Published.

3115. Joel Cadbury, of Great Hampton Street, Birmingham, in the County of Warwick, Manufacturer, and William Henry Richards, of Long Street, Sparkbrook, Birmingham, Manager of Works, for "Improvements in Frames or Stands for holding Photographic and other Pictures and Tablets."—Dated March 1st, 1888.

The following is in the words of the Patentee:—

This invention relates to what are known as frameless photographic holders, consisting essentially of a back provided with certain fittings, and spring and other clips, which embrace and secure the glasses, with a photograph or other picture thereunder to the said back framing, which is made of wood, *papier-maché*, or other solid substance. This invention has for its object the securing of the said fittings, clips, and the like, to the backs, as hereinafter described; by which improvements the method of attachment is greatly simplified and the appearance of the article greatly improved. Heretofore the spring, and other attachments and fittings, have been secured to the wood backs commonly employed by rivetings.

According to our invention the said fittings are attached by ears or spike-like extensions, made in one piece with the metal of the said fittings, and passed through piercings in the said backs, and clenched or turned down upon the inner side.

In carrying out our invention, we will describe it in connection with fittings for photographic and other frames, as described in Application for Letters Patent made by us on the 25th day of November, 1387, and numbered 16,212. To form the rest, which comes at the lower back part of the frame, we take a blank of sheet metal, making, as it were, a bar, with ear-like extensions at its two opposite ends, which are turned inwardly at right angles to the other part. The underside edge of the bar is provided at its two opposite ends with extensions, which are bent forward under the bottom edge of the frame, like claw-rests, upon which the lower edge of a photograph or other picture and the covering glass is supported.

The ears or spike-like extensions, bent from the extreme outer ends of the bar, are passed from back to front, through longitudinal piercings, made through the back, and with the extreme ends of the said ears bent flat to the plane of the front face of the said back.

The spring clip, which consists of two flat bars, sliding one upon the other, with a spring interposed between a shoulder of one of them, and an abutment formed by the cutting away of the back part, wherein a portion of the said clip lies, is secured by the under-bar having ears or prong-like extensions at the upper and lower ends, which pass through like piercings, made through the said wood back part, and then clenched or turned down upon the front face.

The movable bar has a cross-pusher bar at its lower end, and a hook-like claw at its upper end. Thus, the fittings are secured in their respective positions by ears or prong-like extensions, which pass through piercings in the wood or other back, and then clenched. The piercings in the wood, or other like back, are cut or punched out by tools, worked in a press or the like.

4149. John Taylor, Journalist, Trinity Road, Wood Green, London, N. (acting as agent for William A. Brice, Genova, Italy), for "An Improved Photographic Camera and Changing, Box Combined."—Dated, March 17th, 1888.

A photographic camera so constructed as to have two

chambers, in one of which is stocked a pile of sensitive plates sufficient to fill it, the other being an exposing chamber. These are separated by two thin partitions capable each of being moved upwards and downwards to a limited extent by means of small knobs or handles on the outside. By the action of these, the upper plate of the pile can be tranferred to the empty exposing chamber, and dropped to its rear, where it is securely held conjointly by the pressure against one of the partitions aforementioned, and that of a hinged flap, both being operated from the outside. This hinged flap serves the double purpose of conveying the sensitive plate or film gently from the upper opening through the empty space of the operating chamber by acting as an inclined plane whereby the plate, paper, card, or other sensitive film is ultimately conducted into accurate position at the point of focus, and also of acting as a moveable abutment on one side, against which the plate or other sensitive film is pressed by a spring stud underneath, so as to ensure accurate register of focus. On releasing the plate from pressure after exposure, this plate, now impressed with a latent image, may be slidden into and at the bottom of the stock chamber, the upper one of the series of plates being by like means slidden over the top of the partition and made to take the place of the one removed at the focussing plane in the exposing chamber ; and so on, in rotation.

It is fitted with a finder, and the lens is covered by a shutter which may be operated either instantaneously or as slowly as may be desired. Suitable arrangements are provided for focussing.

After the chamber has been filled with sensitive plates, all the operations of transferring and exposing them are made without the camera being again opened.

16,224. James Lyon, Engineer, for "An Instantaneous Photographic Shutter."—Dated November 9th, 1888.

The Patentee says :—

The movements of the two leaves which form the covering to the lens are effected by a disc having in it two pins each of which operates a leaf. The pins work in two slots, cut in two sheets of metal called sliders, the slots being so shaped that when the disc revolves the sliders move through a certain distance ; the pins then arrive at a portion of the slots, which are concentric with the centre of rotation of the disc, and therefore the pins move through portions of their paths without moving the sliders ; the pins then arrive at portions of the slots which are so shaped that the sliders are moved in the contrary directions.

The movements of the sliders are multiplied in the leaves by means of levers or otherwise. The disc is made to rotate by means of a suitable spring, and the exposure is effected by releasing the disc by means of a catch operated by a pneumatic cylinder or otherwise. The momenta of the working parts are so adjusted as not to shake the camera.

18,640. Newnham Browne, of 73, Cheapside, a communication from Friedrich August Fichtner, of Gluck Strasse 6, Dresden, in the Empire of Germany, Cabinet Maker, for "An Improved Box or Case, known as a Changing-Box, attachable to and adjustable upon the Camera of Photographic Apparatus."—Dated December 20th, 1888.

A reservoir changing-box, in which each plate is in a separate frame.

Correspondence.

HYDROQUINONE DEVELOPMENT.

Dear Sir,—I note, in the report of a technical meeting of the Photo. Society in this week's News, a slight error in the quinol developer I use, and as it might mislead anyone wishing to try it, I think it advisable to rectify the same. It should stand thus, say—

Quinol	1 grain
Meta-bisulphite of potash	2 grains
Carb. of potash	8 „
Hydrate do.	2½ „
Water	1 ounce

If the hydrate were omitted, it would need at least 12 grains of the carbonate, and the picture would probably take fifteen minutes to develop, whilst with the above formula development does not exceed five minutes.

Another good formula is obtained by omitting the carbonate of potash, and using, in all, 6 grains of the hydrate. I prefer the potash to the soda salts, as they appear to me to act more energetically, and produce a better modelled picture.

I do not find the meta-bisulphite, used in the proportion stated above, to slow the development, having made comparative experiments between it and the sulphite of soda, using the latter salt in the proportion of three to one of quinol. Leslie J. Montefiore.

London, 2nd March, 1889.

AZALINE AND ORTHOCHROMATIC PHOTOGRAPHY.

Dear Sir,—In the answer to my correspondence, published in your issue of February 22nd, Mr. Spiller maintains his wrong assertion that my azaline contains eosine, in spite of my word of honour I have given in my mentioned correspondence, rectifying him.

Well ! If Mr. Spiller does not respect my word of honour, I have no reason to respect him further. I say shortly : Mr. Spiller has made his so-called "careful examination" of azaline (which I have proved as a blunder by the citations of Messrs. A. W. Hofmann, Skolik, and Mallmann) not in the interest of truth, but in the interest of Mr. Edwards, whose notice against me is published (p. 107 of this journal) on the same page with Mr. Spiller's. Mr. Edwards makes all possible efforts to hinder the introduction of my colour-sensitive plates in England, and even tried a lawsuit against my patent (A.D. 1886, No. 15,532) containing the application of eoside of silver for making highly colour-sensitive plates—a lawsuit finishing in favour of my claims.

Mr. Spiller says that he has Dr. O. Witt's handy little pamphlet on qualitative analysis of dyes. That is no excuse for him, but a self-accusation ; for if Mr. Spiller would have used Dr. Witt's pamphlet he would have easily recognised the quinoline red mentioned by Dr. Witt on the first pages of his pamphlet as such, and not as "eosine or erythrosine" ; and if he says that Dr. Witt does not mention the marked difference between eosine and erythrosine, so is that also no excuse for a man who asserts that he has worked twenty years in a colourman's factory. Even I have given him (p. 123 of this Journal) another work where this very marked difference is pointed out.

Berlin, 4th of March, 1889. Dr. H. W. Vogel.

Sir,—The question of what is azaline having been raised by Mr. J. Spiller in your journal, may I ask you to publish the result of another analysis upon the said sensitizer.

To Mr. J. R. Gotz.

Dear Sir,—I have made a careful examination of the "Azaline Tincture" received on February 16th and 19th ; I have investigated its physical and chemical properties, and have compared it with solutions of quinoline red, a large number of the cosine dyes, and mixtures of these with cyanine.

I find that the said "Azaline Tincture" is a solution of quinoline red in methylated alcohol. I was unable to detect in it the presence of any cyaniue, but since the tincture has been made for several months, any cyanine that was put in may have decomposed. Such decomposition would be accelerated by the foreign substances present in the methylated alcohol. I was unable to obtain any evidence of the presence of any dye belonging to the eosiue group.—I am yours faithfully,

The Yorkshire College, March 2nd, 1889. C. H. Bothamley.

It is not the question whether I am entitled to sell any tincture of eosine for photographic purposes—which, by the bye, I hold that I am—but whether Dr. Vogel has supplied me with, and I have prepared and sold knowingly or not, a solution of what is said to be eosine, under the *pseudo* name of "azaline."

Taking the substance of the two letters of Mr. J. Spiller and Mr. Edwards together—as no doubt they are intended to be—I am charged with palming off as "azaline" what is in reality eosine; and so to get the benefit of that valuable sensitizer, of which Mr. Attout Tailfer, according to this version, is the first and true inventor, to make it appear to be that of Vogel's Patent, No. 7,963, in which no eosine is mentioned.

I may at once state that both analyses are made from samples of the same stock solution made years ago; hence the decomposition of the cyanine.

Mr. Edwards' letter is of no interest whatever, save as an illustration of how to make a loose assertion without any evidence whatever to support it.—I am, Sir, yours very truly, J. R. Gotz.

19, *Buckingham Street, Strand, March 5th*, 1889.

Sir,—Mr John Spiller, in reply to my challenge of his statement that Attout-Tailfer was the first and true inventor of orthochromatic photography with eosine, now says that we are talking of gelatine plates. I made no reference to gelatine, nor can the statement I have quoted by any construction be made to refer exclusively to that vehicle, but is general and sweeping.

Assuming, however, that Mr. Spiller now wishes to alter his assertion by limiting it to the use of eosine with gelatine, and having regard to the question of patents to which he refers, it may be remarked that one of the conditions of the validity of a patent is that the process shall be so completely described as to bring it within the capability of a person skilled in the particular art. It happens that I was present at a meeting of the Photographic Society of Great Britain, at which Mr. F. Bedford stated his inability to produce orthochromatic effect with eosine, following Tailfer's description. The licensee of the patent (Mr. B. J. Edwards) then said, that with ordinary eosine that would be the case, but that a special kind was necessary. At a subsequent meeting, if I remember rightly, Mr. Bedford said, that having been furnished by Mr. Edwards with a sample of this particular kind, he had succeeeded perfectly. There is nothing in Tailfer's patent to point to Mr. Bedford, or to others, the particular kind of eosine necessary for success, and on this head it would certainly appear defective in its description. The pre-Tailfer experiences with eosine were by no means limited, as might be inferred from Mr. Spiller's last letter, to Waterhouse and wet collodion. We need only go back to Capt. Abney's experiments in 1882, with eosine on bromide paper, to show this. However, by substituting the name Waterhouse for Tailfer, as the first and true inventor of orthochromatic photography with eosine, Mr. Spiller's statement might be made correct beyond challenge or question.

Mr. Spiller's reference to his twenty years' experience, and statement that he discovered every indication of erythrosine in Dr. Vogel's azaline, imply that he maintains the charge which he brought against Dr. Vogel of supplying one article whilst professing to supply another. If Dr. Vogel could be supposed to be capable of this conduct, especially in view of his direct contradiction, such conduct would merit the contempt which Mr. Spiller's statement is calculated to induce. If, on the other hand, Mr. Spiller proves to be mistaken in his analysis after such a positive declaration, such a liability to error will tend to diminish the respect with which it is desirable that scientific witness should be received, whether it has been retained to support a certain case or not, both in courts of law and by the public.

Dr. Vogel, whilst denying absolutely the existence of eosine in his azaline, has referred to the tests by which such substances are examined. I think it is due both to him and to the public, who may have been intimidated from using Vogel's solution by Mr. Spiller's statement, that the latter should state what constitutes in his analysis "every indication of an eosine of the kind known to us as erythrosine." It will then be open to independent experimentalists to discuss any possible source of error, or to verify the one or the other statement. W. E. Debenham.

London, March 6th, 1889.

Proceedings of Societies.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 28th ult, Mr. A. Haddon occuping the chair.

Mr. H. M. Hastings exhibited one of Zaehnsdorff's albums. The mounts, being eyeletted on one side, were easily bound together by means of a lace or cord at the back of the cover, admitting of the mounted photographs being readily rearranged.

Mr. W. England exhibited a half-plate transparency of a group of the members of the Photographic Society of Great Britain, taken by him at the last technical meeting with a flash light apparatus he had recently devised. Some prints from negatives taken at various times with the same apparatus were also shown. Mr. England then proceeded to take a photograph of the members present, using two lamps. The arrangement for producing the magnesium flash consisted simply of a small patty pan, in which a hole is bored through the centre to admit a small brass tube bent at right angles to be passed through and fixed; to this is attached a pneumatic ball and tube, the patty pan resting on a tin cylinder. A measured quantity of magnesium powder is poured through a funnel into the tube, and the patty pan filled with cotton wool, over which methylated spirit is poured and lit, through which the magnesium powder is forced by pressure of the ball. To prevent the flame or powder being drawn back, the ball has a hole in it, the thumb being placed over this when in use.

A question from the box was read:—"Can any member explain the cause and cure of the enclosed example of failure in enamelling?"

After examination of the photograph referred to, the Chairman said the failure arose from imprisoned air between the collodion and gelatine films. He thought it was probable that the gelatine solution used was too weak.

Mr. A. Cowan said, to ensure perfect optical contact, it was always necessary to bring the glass plate and print together in the gelatine solution, afterwards squeegeeing in the usual way.

A question was asked: "Is enamelling conducive to permanency?"

Mr. W. Prestwich said, in his experience, it was the reverse.

The Chairman said some prints in his possession, in optical contact with glass, had faded in two years.

Mr. F. P. Cembrano had recently returned from a tour in Spain. He had been principally engaged in photographing architectural subjects. In this he had experienced more than the ordinary amount of difficulty, owing to the construction of many of the buildings. However, by careful development and a large amount of dodging, using a brush for forcing the more obstinate parts of the negative, he had been fairly successful. Neither London nor Paris, he thought, could equal Madrid in the display made by the principal photographers. The specimen photographs were beautifully framed, and, together with the handsome show-cases in which they were exhibited, formed an attractive feature to the photographic establishment. The amateur element was not yet developed in Spain, photography being almost entirely confined to professionals. English plates are not to be had except at a very high price, half-plates costing fourteen francs, this being due to the high rate of carriage. French plates could be bought at less than half that price. To save trouble in the examination of his luggage by officials, he carried his plates separately in a brown paper parcel and wrapped in a rug, taking his packages always with him in the railway carriage.

Liverpool Amateur Photographic Association.

The usual monthly meeting of the Association was held on Thursday, 28th Feb., at the New Rooms, Crescent Chambers North, No. 3, Lord Street, Mr. A. W. Beer in the chair. In the

unavoidablo absence of the Hon. Sec., Mr. W. Hughes kindly acted in his place. The minutes of the last meeting were read and confirmed.

The President, before proceeding with the business of the meeting, said:—"I have a sad and distressing duty to discharge this evening: since our last meeting I have seen laid in his resting place, William Page Riley, one of our most promising and enthusiastic members, and I am glad that this Society, whose welfare he had so much at heart, was not unrepresented on that sad occasion. To all who knew him he endeared himself by his unselfish nature and pleasant grace. It is not necessary for me, nor would it be seemly, to do more than refer to the irreparable loss of those intimately related to him; but to us his fellow-members in this Society, colleagues in the council or various committees, and particularly the house committee of these rooms, his vacant place appeals most affectingly to our hearts and minds; so recently was he associated with us in the work of the Society, and the preparation of these premises. The council have passed a resolution embodying the feelings of the members, to be forwarded to his sorrowing family, which it is not requisite for me to formally put before you, as I am fully sure it meets your wishes in the matter."

Messrs. A. E. Chevalier, H. S. Craven, R. R Daly, A. Fraser, B. Mackerell, W. Mulhall, H. Poulton, S. Parry, W. A. Roberts, H. H. Williams, and W. D. Williams, were unanimously elected members of the Association.

The President acknowledged with thanks the receipt of a "Chairman's Mallet," of a very unique and useful pattern, presented by Mr. B. J. Sayce. He then gave a hearty welcome to the members on this the first meeting in the new rooms, expressing the hope that although the opening ceremony was to a certain extent informal and homely, yet the members of the Association could now "feel at home," and trusted that the possession of club premises would conduce not only to the rapid increase and prosperity of the Society, but also to the comfort and pleasure of the members. A proposition was made some eight or nine years ago to secure club premises, but this was not attainable until now, as the council were firmly resolved not to run the Society into debt or pledge future resources. Thanks to the house committee and to Mr. Day, their valuable and painstaking secretary, a number of works of art have been secured, for the adornment of the room, from the following gentlemen, who are so well-known for their artistic productions:—Messrs. H. P. Robinson ("Carolling" and Own Etching), F. M. Sutcliffe ("Water Rats"), R. Keene ("Tissingtou Spires"), A. Pringle ("Dove Dale"), Rev. H. B. Hare ("Thirsty Moments"). W. W. Winter, J. P. Gibson, B. Wyles, H. S Mendelssohn, M. Auty, Rev. H. J. Palmer, and F. Whalley. Though the room is not finished, yet every effort has been made to have it so far completed as to enable the meeting to be held this evening. The room will be open for the use of members on and after Monday next, the 4th of March, at 10 a.m. The house committee have drafted rules for the governance of those using the room—of which copies would be supplied in due course—trusting that, having a room of their own, it might lead to an increased membership and general success of the Society, and be of advantage to the members socially. The elections of the council to fill vacancies were confirmed, viz., Mr. P. Lange to be vice-president in place of Mr. H. M. Atkins (resigned); Messrs. Tyerman and C. A. Timmins to the council, in place of Messrs. Ryley and Lange. Mr. H. N. Atkins was elected an honorary member, and a vote of thanks to him for his past services carried unanimously. The medals were then presented to the gentlemen who were successful in the annual prize competition, as follows:—Silver medals—Messrs. T. B. Sutton, A. W. Cornish, C. W. Huson, B. S. and Paul Lange. Bronze medals—Messrs. D. Cunningham (2), T. K. Glazebrook, and A. W. Beer. The president announced that the presentation prints were received, and would be ready for distribution at the rooms on and after Tuesday. Letters were read from the Liverpool Gymnasium, asking for assistance in the way of photographic prints and lantern demonstrations at their fancy fair; from the Boston, U.S., Camera Club, offering to present a series of views, entitled "Illustrated Boston," to the Association, in trust, which was accepted with thanks. Circulars were also distributed relating to the American Exhibition, Gaedicke's lamp, Viae's exposure table, &c.

The Rev. F. A. Bartlett, M.A., then gave his paper entitled, "A Month in Normandy and Brittany," and Mr. Joseph Earp read a paper on "Ten Days in Holland and Belgium with a Hand Camera," illustrated by numerous slides. Both papers were very interesting, and fully one hundred slides were exhibited.

Mr. Phillips operated at the lantern in a very expert way, and Mr. Earp's paper in particular was somewhat hurried, and the members had little time to admire many of those slides which wore of great merit.

At the conclusion, a vote of thanks to Messrs. Bartlett and Earp was carried unanimously.

The President strongly recommended members to secure a copy of the *English Magazine*, in a recent number of which was an able article on "Normandy and Brittany," with beautiful illustrations.

The thanks of the meeting were given to the Autotype Company for having lent a number of pictures.

Mr. Roberts showed two stereoscopic glass slides, prepared in 1865 by the original process of the collodio-bromide, as published by Mr. Sayce in 1864, of rare merit, and as brilliant as when first made; also two slides prepared on Thomas's new gelatine transparency plates.

Mr. Kenneth Bean exhibited a print of the "Dance of Death."

Mr. Rogers exhibited a compact detective camera holding six plates and set of lenses.

Messrs. Atkinson, Sharp, and Hitchmough showed a number of photographic novelties.

The meeting concluded at a late hour, a most enjoyable evening having been spent, as was shown by the reluctance of the members to leave.

Bath Photographic Society.

A meeting was held at the Royal Literary and Scientific Institution, Terrace Walks, on the 27th ult., Mr. Austin J. King, Vice-President, in the chair.

The Chairman, in opening the proceedings, remarked that the whole world might be placed under the category of those who understand photography, and those who do not, and the object of the Society was to diffuse the knowledge of photography among the latter. We have here (said the Chairman) Mr. Talbot, who very early in the history of this young Society came forward and promised us his assistance. This was a great help to them, for his father, who was an honour to this country, was for all practical purposes the inventor of photography as at present practised. Mr. Talbot had presented to the Society about fifty of the very earliest photographs. These, owing to their great historical value, as well as the clear manipulation of detail, rendered them quite unique, and the Bath Photographic Society was indeed fortunate in possessing such a rare collection. The pictures would be exhibited by the Society at the Jubilee Photographic Exhibition, which opens at the Crystal Palace on the 19th proximo. These examples, dating 1844 to 1846, were then laid upon the table for inspection previous to despatch to London. A portrait of Fox Talbot produced by his own process of photo-engraving slightly modified by M. Dujardin, of Paris, from a carte-de-visite taken by Moffat, of Edinburgh, and two original cartes by Moffat, were also given by Mr. C. H. Talbot, also a copy of the biographical sketch of Mr. H. Fox Talbot which appeared in the Transactions of the Society of Biblical Archæology in 1879, prepared by Mr. R. Cull, F.S.A., from material furnished by Mr. C. H. Talbot, of Lacock Abbey.

The Chairman having thanked Mr. Talbot for his valuable presents to the Society,

Mr. Talbot said he had a few examples of the photo-engraving process left which he would give to the members if they so desired. He explained that his father's portrait was from the best of Moffat's negatives, and Dujardin had considerably modified the photoglyptic process; but he believed that his father's later improvements made it capable of much finer results, and he thought a good many of the processes used in illustrating newspapers were modifications more or less of the photoglyptic process.

The Chairman said that looking at the calotype pictures presented to the Society, he was not only impressed with the delicacy of the process, but the permanency, which in many cases compared favourably with much that was seen now, although above forty years had elapsed. Notwithstanding that some silver prints fade quickly, these had not done so.

Mr. C. H. Talbot gave an outline of the calotype process by which the prints were made, and said they had been selected out of a great number as being suitable for exhibition. He said he had brought thirty-two still earlier specimens, mostly

dated and signed. These were handed round, and details concerning each were given. The supposed earliest example was undated, but the paper bore the water-mark of 1835. Starting with this print, the others either bore dates soon afterwards, or could be fixed by events until the last (No. 32), dated September 1st, 1840, which, said Mr. Talbot, came very near to the date of the discovery of the latent image, September 20th, and 21st, 1840.

The Chairman thanked Mr. Talbot for his paper, and for showing these specimens, which he said were probably the first ever taken by any photographic process in England or anywhere else. There was a great difference between those early pictures and what was done now, but they were the germs of the present processes.

Mr. Talbot, in acknowledging thanks, said that some of the pictures he had shown were amongst those his father exhibited before the Royal Society in 1839.

Mr. Friese Greene remarked that in the very early specimens of photogenic drawing it was wonderful how well they had been preserved, and it was curious to notice that every colour which from time to time has since been adopted was to be found in these experimental photographs of Fox Talbot's made previous to 1839, with ordinary salt, potassium, iodide, and silver nitrate. In one case the colour resembled that of the Bartolozzi engravings, which tint was now very much imitated by photographers. Some remarkable photographs of lightning flashes, taken by Mr. A. H. Binden from a window of his house at Wakefield, Massachusetts, U.S.A. No. 1 was taken July 29th, 1887, looking west across the crystal lake. The landscape and houses (distinctly visible) were lighted by another intensely brilliant flash which took place at the same moment in the opposite quarter of the sky. Nos. 2 and 3 were taken on June 23rd, 1888, and were the most perfect yet produced in the camera.

Mr. J. Dutton said his earliest photographic experience was with the calotype process. He then detailed the wax paper process, which consisted in waxing the paper, then ironing it until the wax had soaked into the body of the paper. It was next soaked in potassium iodide and dried, sensitized by floating on a thirty-grain silver bath acidified with acetic acid, and after an exposure of half-an-hour or more, the negative was made by development with a cold saturated solution of gallic acid. A number of wax paper negatives taken in the locality between 1852 and 1856 were handed round, and greatly admired. He also exhibited several collodion negatives on curved glasses in which a water lens similar to that referred to by Mr. Braham in his recent lecture was used to form the image. Prints from these semi-circular glass negatives were shown and praised.

Mr. Friese Greene thought circular plates might be used with advantage in astronomical photography.

The Hon. Secretary then explained the working of Krugener's patent book camera, which, as its name implies, resembles an ordinary book. It contains twenty-four plates in metal sheaths, which are exposed in rotation ; each sheath is numbered, and a coloured glass window permits the number of an exposed plate to be read without opening the camera. The lens is of the new Jena glass, and by means of a safety shutter working outside the active shutter, either a very rapid or slow exposure can be made at will. This little camera was examined with much interest, as also were a number of specimens taken in a similar manner. The secretary stated that Marion and Co. had presented to the Society for their new dark room a quantity of concentrated developers, and some sample boxes of Britannia plates. The same firm had further sent to the Society on loan two complete sets of grenatine dishes, deep and shallow, up to 16 by 14, for use in the dark room. He also announced that Mr. Dyson, of Huddersfield, had sent the Society as a present a sample background of opaque cloth, which could be washed with soap and water when required. Messrs. Piper and Carter presented a copy of the current Year-Book of Photography. Circulars and entrance forms relating to the Joint Societies of New York, Boston, and Philadelphia Exhibition were announced, and placed upon the table, as well as a number of photographic journals and trade catalogues.

The Chairman then reviewed the business of the evening, thanked those who had contributed matters of interest, and, after congratulating the members on the unprecedented prosperity of the Society, the proceedings terminated.

Camera Club.

On Thursday, February 28th, Rev. J. Perkins, M.A., read a paper on Lenses. Dr. G. Lindsay Johnson was in the chair.

The lecturer treated of depth of focus, the cause of flare-spot, the relative rapidity of different forms of lenses, and other points of interest, giving mathematical formulæ, and explaining the subject by diagrams, negatives, prints, and various forms of lenses, some of which were kindly lent for the occasion by Messrs. Hinton and Co.

A prolonged discussion followed, Mr. Taylor (of Leicester) and Mr. W. E. Debenham adding some very interesting remarks upon the subjects treated by the lecturer. Others who spoke were Messrs. Elder, Lyonel Clark, Davison, Ferrero, and the Chairman.

On Thursday, March 14th, a lantern exhibition will be given at the Club. Meeting at 8 p.m.

Society of Amateur Photographers of New York.

The Committee on Papers and Publications send the following report :—

At the regular meeting of the Society at its rooms, 122, West 36th Street, on the evening of February 12th, Mr. Ernest Edwards, of the Photogravure Company, read an interesting paper on the "Improvements in Photogravure Processes," supplementing it with a demonstration before the audience by actually printing (in a press he had set up in the rooms) from prepared plates, several photogravures, which were distributed among those present.

He also presented to each person present a neat souvenir picture, commemorative of the occasion, representing a study of a tree, which he said was produced from a negative on Carbutt's celluloid film originally taken by an amateur. He exhibited the negative, the photogravure printing plate, and printed from the latter in the press. The old way of printing directly from the gelatine film supported on a copper plate was much slower, and was not capable of giving as many impressions as his improved method, which consisted in first treating the film after printing, and then immersing the plate in an electroplating solution, and coating the face with a thin layer of steel. This produced a hard steel-faced copper-plate, which, when polished, was susceptible of withstanding ten thousand impressions before the face would wear off enough to be injured. It could again be very easily renewed.

A vote of thanks was accorded Mr. Edwards for his interesting paper and exhibits. In reply to a question as to whether the amateur could print his own pictures in the same way, he answered that after spending fifteen dollars for the first outlay, he could try it, but he did not know how much more he would have to spend before he could obtain satisfactory results.

President Canfield exhibited a new oil optical lantern sent by Mr. J. B. Colt, which was very neatly made, and was tested after the meeting adjourned. It gave a well illuminated disc. An Argand lamp inside of a true parabolic silvered reflector sent forward the rays in parallel lines, illuminating every portion of the slide equally. Later in the evening he presented the lamp to the Society, and received a cordial vote of thanks.

The President announced the election of eight new members, urged members to prepare exhibits for the Philadelphia Exhibition, and stated that a special ladies' meeting would be held the latter part of March, at which papers on photographic subjects would be read, and prints and lantern slides by ladies shown, and it was expected a lady would preside over the meeting. Examples of photographic fancy work would be shown. He called attention to an exhibit of photographs hung on the wall, sent by the Springfield Camera Club, representing the prize pictures at their first annual exhibition. He then read a paper on "Lantern Slide Matt Cutters," presented by Joseph P. Beach. Following it Mr. F. C. Beach exhibited specimens of the steel dies made out of dress steels bent around a wood form. Ink sketches illustrating how the dies were formed were also shown.

A new shutter called "The Queen Shutter," invented by Mr. Frank Burrows, and sent by Queen and Co., was also explained by Mr. Beach. It is placed between the lenses, and operates on the open to close principle. Some of the members thought it not quite fast enough. It was very neatly made, and worked with little or no friction.

Mr. David Williams made some interesting remarks on the difficulty of putting the celluloid films in holders like that made by Barnett, and explained a design of a holder he had thought of, which made it much easier, and required less fingering of the film than is usual.

President Canfield then read a paper on "Development by Separate Solutions," by Mr. Bachrach, of Baltimore, in which some former statements were corrected; and, after a motion was made and passed re-electing Mr. F. C. Beach as the representative of the Society in the American Lantern Slide Interchange for another year, the meeting adjourned.

Birmingham Photographic Society.

The ordinary meeting of the above Society was held at the Grand Hotel, Colmore Row, Mr. E. H. Jaques in the chair.

Messrs. J. C. Newry, Thomas Taylor, and H. S. Gents were nominated for election.

Mr. A. W. Hills exhibited negatives he had taken on Carbutt's films, and remarked upon their lightness and the ease of manipulation. There is no difficulty in developing or in the drying; he simply reared them on end same as an ordinary glass plate, and they dried perfectly flat. They are made of a substance similar to "Parkesine," which was invented by one of our townsmen some years back.

Mr. W. J. Harrison said he thought this was certainly the best improvement in films as yet, and he imagined they could be used with advantage in "Pumphrey's film holder."

Mr. A. A. Bonehill presented a bound copy of *Anthony's American Annual* for the library.

Mr. H. F. Hall Edwards then gave his paper on "Photo-micrography," giving much practical insight into the whole process, exhibiting the apparatus used, and showed by the lantern many of his own and members' micrographic slides.

The next meeting is on March 14th, Mr. E. H. Jaques on "Holiday Trips with the Camera."

Yorkshire College Photographic Club.

The meeting on Feb. 28th was devoted to a discussion on "Fine Art in Photography." The President (Mr. C. H. Bothamley) occupied the chair.

Messrs. H. P. Robinson, F. M. Sutcliffe, and H. Tolley had very kindly sent for exhibition a large number of fine examples of their work, and examples of the work of Messrs. Green, Emerson, and Sutcliffe were contributed by the President. In fact, the exhibition was quite remarkable, both in size and quality. Amongst the questions raised in the discussion was that of fuzziness *versus* definition, the general opinion being distinctly opposed to anything in the shape of decided fuzziness. The prevailing tendency to over-crowd genre pictures with unnecessary accessories was also condemned.

Photographers' Benevolent Association.

The annual meeting of this Society was held at the Committee Rooms, 181, Aldersgate Street, on the 22nd ultimo, there being a good attendance.

From the Secretary's report which was read, it appears that the total disbursements for the year have been £74 14s. 6d., against total receipts £109 15s. 10d., showing an increase of £35 1s. 4d. on the year's transactions. The fund has therefore been raised from £273 6s. 6d. to £308 7s. 10d.

The officers elected for the ensuing year were:—

President—Mr. J. Traill Taylor.

Trustees—Capt. Abney and Mr. W. S. Bird.

Treasurer—Mr. John Stuart.

Secretary—H. Harland.

Auditors—Messrs. J. S. Rolph and A. Mackie.

Committee—Messrs. W. Bedford (Chairman), T. J. Collins (Deputy), H. D. Atkinson, W. F. Benham, F. H. Berry, T. Bolas, J. J. Briggingshaw, E. Clifton, T. E. Freshwater, W. J. B. Humphreys, H. J. White, and J. Zachusdorf. The Committee, in accordance with powers with which they are invested, afterwards added to their number Mr. F. W. Cox.

Sheffield Camera Club.

The ordinary monthly meeting was held on Friday, March 1st, at Whiteley's Institute, New Surrey Street. There was a good attendance; Dr. Morton presided.

After transaction of the formal business, an exhibition of lantern slides took place. About one hundred slides, the sole work of members, were projected on the screen.

Mr. B. W. Winder (Vice-President) ably managed the lantern (oxyhydrogen lime light), which he had kindly lent for the occasion. The contributor of each set of slides gave a short description of the process he had used.

The President said that he employed hydrokinone for all gelatino-bromide lantern plates, and found it the best developer. The formula was almost identical with that mentioned in the Photographic News, November 4th, 1887, page 698. He made two stock solutions. The first—

Hydrokinone	½ drachm
Sulphite of soda	3 drachms
Water	3 ounces

The second—

Carbonate of potash (anyhydrous) ...	1½ drachm
Water	3 ounces

Dissolve.

An ounce of potash solution was mixed with an equal part of hydrokinone in a measure, and the combined two ounces would develop at least a dozen plates. He found no necessity for citric acid or bromide if the exposure was correct, but occasionally added a little old developer, one or two days standing, which had retarding qualities in case of over-exposure.

Mr. Yeomans used pyro-alkaline and meta-bisulphite. The slides shown were of an agreeable brown tint, and being mostly landscape, proved very effective.

Mr. J. O. Arnold had taken his negatives on Ilford ordinary, and positives Mawson's plate, developed with ferrous oxalate, principally snow scenes.

Mr. Maleham sent a number of slides taken on Thomas' plates (developer hydrokinone) intensified with mercury. They were reduced from half-plate and 9 by 7 negatives, and exposed to magnesium ribbon light.

Mr. Winder's slides: a set of micro-photographs by contact, from negatives of objects obtained with 2-inch to ¼-inch objectives. He preferred ferrous-oxalate developer, but had occasionally used pyrogallol.

Mr. Whittaker: Various subjects by contact—Mawson's plate and ferrous oxalate.

Mr. Harrop contributed several slides taken by contact (iron developer); as also Messrs. Taylor and Nowell.

Mr. Hardy (Hon. Sec.) used Ilford for negatives, and Mawson's lantern plate, with satisfactory result.

As the evening was well advanced, discussion had to be postponed. A cordial vote of thanks was given to Mr. Winder for his efficient manipulation of the lantern. Many of the slides exhibited possessed excellent qualities, and evoked much applause.

Talk in the Studio.

The New Works of Messrs. Watson and Sons.—A few days ago we had an opportunity of visiting the factory recently established by Messrs. Watson and Sons at Fulwoods Rents, Holborn, and the most notable feature is the full extent to which they avail themselves of modern wood-working machinery. An Otto gas engine in the basement drives a number of thicknessing, planing, dovetailing, moulding, and other machines on the ground floor, while the upper floors are occupied by the cabinet makers, brass finishers, and other shops. One point we noticed is the large stock of mahogany kept on the upper floors to season, the banks being sawn into slabs, which are distanced by slips, and then replaced in juxtaposition. Another noticeable feature is the stocking of large numbers of camera framings, jointed but not finished, so that any tendency to wind or to warp may develop itself before the wood is trimmed. We may incidentally refer to the highly finished camera Messrs. Watson are now selling as the "Acme Camera," an instrument in which we have the double-sliding base-board, with tripod head inserted, independent movements to front and back, and conical bellows. One excellent point is the easy action and wide range of the rising front, a sort of rachet holding up the sliding portion; and we must mention that Messrs. Watson have obviated the greatest objection to this type of camera, as compared against the old form with hinged tail-board—namely, the exposure of the ground glass in travelling. Messrs. Watson's plan is to provide a simple clip by which any one of the double backs can be instantaneously fixed over the ground glass of the folded-up instrument. The work, both of wood and brass, is admirable.

Brighton Photographic Society.—A meeting was held at 36, Vernon Terrace, on the 26th ultimo, the President (Dr. Rean) in the chair. The meetings in future are to be held in the Lecture Hall, New Road. Mr. Rean, after some remarks,

proceeded to deliver his opening address, which dealt with several points of interest to photographers generally. It was proposed by Mr. Roberts, and seconded by Mr. R. Wicks, that the committee report as to the feasibility of holding a photographic exhibition in Brighton during the autumn.

PROPOSED CONFERENCE AS TO CONDITIONS OF SAFETY IN USING COMPRESSED GAS.—In order to remove unnecessary alarms, and to attain the most absolute security in the use of the compressed gases, it has been suggested that a Committee of Enquiry should be appointed, and issue a report as to the result of its deliberations The photographic societies might well take the initiative in this matter, and we have no doubt that among the members would be found all the elements of which such a committee should be constituted. It should comprise experienced workers with the optical lantern, who would be able to judge of the compatibility of any proposal with the exigencies of regular practice; dealers in materials, who could judge of suggestions from the commercial standpoint; and scientific experts, who could deal with such questions as strength of material, conditions of testing, special strain owing to conformation of the vessels, and the pressure under varying conditions of temperature and internal combustion. The conditions under which flame passes back through tubes also require re-investigation, little having been done in this direction since the time when Sir Humphrey Davy made researches relating to the safety lamp.

THE DEATH OF JOHN WILLIAMS AND FREDERICK HUDSON.—Mr. Williams, so well known as one of the eminent firm of Hopkin and Williams, and an original member of the Photographic Society, died at his residence, 63, Warwick Gardens, S.W., on Sunday, March 3rd, within a few days of completing his 65th year. Mr. Williams was born in London on March 9th, 1824, and was for many years assistant with the late Mr. Morson, and subsequently, for nearly forty years, partner with Mr. W. King Hopkin in the firm of Hopkin and Williams. Mr. Williams was for seventeen years a member of the Council of the Pharmaceutical Society of Great Britain, for three years of which he acted as Treasurer, and for three years he filled the office of President of that Society.

FREDERICK HUDSON, one of the old school photographers, and well-known as a landscapist, died a few days ago, in the town of Ventnor, Isle of Wight, at the age of sixty-seven. Born in England, but passing his early years in America, he settled in Ventnor now some thirty years ago on his return, and devoting all his energies and ability to landscape work, stood in the front rank of photographers noted for this class of work some fifteen years ago. His negatives of the little village of Bonchureh, produced by the wet process, and of large size (20 by 16), taken direct, have never been surpassed, and gained for him medals at Philadelphia, U.S.A., 1876, also London, Falmouth, and Southampton, &c. He carried on a successful business, but retired some ten years ago through failing health. No doubt many old friends will be sorry to hear of his death.

PHOTOGRAPHIC EXHIBITION AT BERLIN.—The Vienna Club of Amateur Photographers asks us to state that it will, in its corporate capacity, with its patroness, H. J. and R. H. the Archduchess Maria Theresa at its head, take part in the International Photographic Exhibition, being obtained by the Photographic Club in Berlin, and that it hopes the Exhibition in question will include pictures by the leading English photographers (amateur and professional) who exhibited at the Vienna Exhibition.—All communications to be addressed to Dr. Stolze, Salzufer, 23, Charlottenburg, Berlin.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Ordinary meeting Tuesday, March 12th, at 8 p.m., at the Gallery, 5, Pall Mall East; when will be resumed the adjourned discussion upon the paper "Hydroquinone as a Developing Agent," read at the annual meeting February 12th, by J. W. Swan.

PHOTOGRAPHIC CLUB.—The subject for discussion on March 13th will be "Weights and Measures." Mr. Levy will read a short paper on this subject. Mr. England will take a flash light picture of the members.

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," should now be sent to Mr. Spiller, who is alone responsible for all which appears under that heading.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

V. A. (Belge).—Many thanks for your long and interesting letter. Will it not be possible to add a final dose of the small quantity of hyposulphite of soda which you find so efficient, mixed, perhaps, with a little plain gelatine, to the ready-made, washed, and liquefied bromide emulsion? Then you would not disturb the proportions, and gain thereby the needful uniformity in the constitution of your plates. Your remarks about the difficulty in rendering browns, reds, and other dark colours with your normal emulsion are but so many arguments for the adoption of the orthochromatic system of photography. Why not introduce a little eosine, and in this way accomplish your object? We have no experience of the use of nitro-prusside of sodium in emulsions or developers, but it is, as you say, well worth a trial. Your statement takes no account of the chrome alum, which is sometimes added in very small quantity with acetic acid to emulsions for the purpose of hardening the film.

ADJUTANT.—The developer does not require to be alkaline. The salts used in the platinotype process are the *neutral* oxalate of soda (or potash), sodium ferric oxalate, and potassium platinous chloride—sometimes called chloro-platinite of potassium. Dilute hydrochloric acid is used afterwards for clearing. See details in YEAR-BOOK, p. 162.

W. B.—You cannot do better than employ a rapid rectilinear lens for photographing machinery. For 10 by 8 plates, one of about sixteen inches focus ought to suffice, and you would hardly require to get another of twenty-four inches focus.

AMBLE.—The new lens first mentioned is very highly recommended, but we have not yet had an opportunity of testing its performance.

PHOTARGUS (Mallorca).—We cannot say why orthochromatic plates are not universally employed in the studio for blue and grey eyes, red hair, and freckled complexions, now that the retarding screen is no longer necessary. Their use is extending, but sure progress is always slow. For landscape work in England, their employment is becoming more general. Read Captain Abney's paper, concluded in the NEWS of 22nd ult., for modes of treatment applicable to your wants.

ANTISEPTIC.—The addition of glycerine to starch paste is sometimes advocated as a method of preserving it, but a trace of camphor or oil of cloves is preferable, for these will not bring about moist conditions. Liquid gum-arabic made with camphor water never changes. See Editor's note in last week's NEWS, page 144.

AID.—You will be able to get ebonite in thin sheets from the India Rubber and Gutta Percha Company, Silvertown Works, E., and Cannon Street, E.C. For xylonite sheets, enquire of the British Xylonite Company, Homerton, E.

B. C. (Wolverhampton).—It is impossible to say with certainty how the small fragment of wood-block has been treated, and the microscope reveals nothing. If you wish to try experiments, rub some dry oxalate of silver on the surface of the wood, and so get your photographic impression, immerse momentarily in hypo to fix it, and wash off quickly. Another very good way is to float off a collodion transparency, receive it upon the wood-block, dry, and cut through that.

A. R. S.—"The Relation of Photography to the Pictorial Art" is a subject which Mr. John Brett, A.R.A., is about to bring before the Camera Club Conference, at the Society of Arts, on the 26th inst., and you will do well to attend. Photographers are freely invited. The paper will come on at about half-past two o'clock.

INSURANCE.—Answered by post. Our letters have crossed.

E. S.—By "common turpentine," as used for retouching (p. 135), one should understand spirits of turpentine—the rectified oil—and not the thick Venice turpentine.

H. W. (Leyton).—Mr. W. T. Wilkinson has a book in the press treating of collotype. 2. The best way of throwing down silver from old hypo baths is to treat them with crude sulphide of sodium (hepar sulphuris); always do this out of doors.

GEORGE WILSON.—The slow development and fixing in the production of your micro-photographs may be the result of employing a very horny collodion. Above all considerations, ought to be the structureless character of the film, so that if successful in this respect one ought not to complain of a few minutes longer spent over each plate. However, it may be that the exposure is not right.

W. F. YOUNG.—Consult the table of solubilities at the end of the YEAR-BOOK. For other salts of less frequent use, see Storrer's "Dictionary of Solubilities."

THE PHOTOGRAPHIC NEWS.

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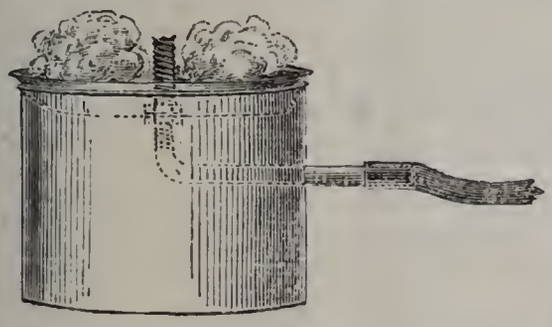
MR. WILLIAM ENGLAND'S FLASH LAMP.

A FORTNIGHT ago we alluded to Mr. England's excellent and easily-constructed form of the magnesium flash lamp, and we promised further particulars.

One capital point about Mr. England's lamp is the fact that a photographer may easily construct it in a few hours out of materials to be readily obtained; these materials costing about a shilling. Another notable feature is the extreme lightness and compactness of the arrangement, making it available almost anywhere; moreover, it is independent of gas—the latter being a point of importance.

We do not mean to put forward Mr. England's lamp as a "great invention," for this it is not, and in this circumstance rests its real merit. It is an easily made arrangement available for every day use.

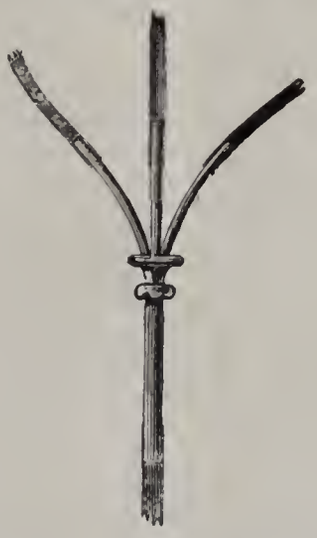
A tin pot about four inches in diameter—say, a small saucepan with the handle removed—forms the base of the



lamp, and on this rests a tin patty-pan with a brass elbow fixed in its bottom, as shown in the drawing. The most convenient brass elbow is that sold at the gas-fitting material shops as a "bent nose-piece," this being about three-eighths of an inch external diameter, and screwed on one branch; it being then easy to fix it with two screw nuts as shown in our drawing. A charge of magnesium powder is poured into the open end of the brass tube, and some loosely pulled out cotton wool is piled up round the tube, after which methylated spirit is poured on the wool, and the spirit is lighted. All is now ready for the flash, which is brought about by sending a sharp puff of air into the horizontal branch of the bent tube. To supply the puff of air, an india-rubber ball may be used, but a small pair of kitchen bellows is quite as convenient in use, though not so portable. Toy bellows, about eight inches long, and obtainable at the fancy shops, answer very well.

At the last technical meeting of the Photographic Society, Mr. England used two of his lamps with about eight grains of magnesium powder in each for making an exposure, including as much of the room as could be got in with a medium angle lens set well back in the doorway, and some prints that Mr. England has since sent to us show the exposure to have been sufficient for a strikingly successful picture. We have also received several other very remarkable group-photographs taken by Mr. England with his flash-lamp, one showing a meetiug of the London and Provincial Photographic Association.

When several lamps are to be operated for one exposure a several-way piece, like that represented by the subjoined cut, must be used, the requisite connections being



made with india-rubber tubing. Branch tubes of this sort can easily be obtained where gas fittings are sold. In case two lamps are used it is convenient to use a four-branch tube like that shown, and to connect one branch with the pneumatic release of the shutter. Mr. England finds that in such a case the fall of the shutter and the flash are sufficiently coincident to give the required result.

As an aid to work in the studio on dull days, Mr. England has found his flash light to be of service; and in this way—especially when connected with the pneumatic shutter as explained above—it may do excellent service in obtaining portraits of children and animals.

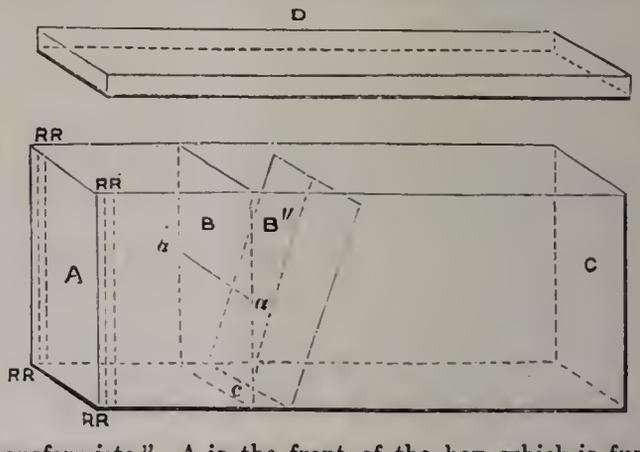
Why, it may be asked, do photographers generally turn the gas down before making a flash-light exposure? The shock of the bright light on the eyes of the patients must surely be much greater if the flash takes place in darkness than if made in a moderately bright light; and although ordinarily the exposure is finished before this shock causes the patients to move, it is surely uudesirable for the photographer to submit those whom he photographs to any unnecessary strain or inconvenience.

FRENCH CORRESPONDENCE.

Fiftieth Anniversary of Photography—Photography without a Lens and Transformism—Apparatus for Defining the Various Elements of the Photographic Objective—Photographic Car—International Congress of Photography—The Universal Exhibition—Platinum Paper Without Development—Photography in Direct Colours—Development two and a half Years After Exposure—Negatives Developed During Exposure.

The jubilee of photography is occupying just now many nations, notably the United States of America, Russia, Anstria, the Scandinavian countries, Germany, &c. The French Photographic Society has received letters from several countries asking for its assistance in obtaining anthentic documents relating to the inventors, and to the invention itself. Original portraits, busts belonging to the time, &c., are in great request. France, having been the cradle of this invention, it would appear that it is there especially that we onght to find the most trne souvenirs of the labours of Nicephore Niepce, and of Daguerre. In connection with this idea, we are of opinion that it would be desirable to think of collecting, while there is yet time, all that can be found concerning Poitevin, himself and his works. A commission composed of elements drawn from all the photographic associations in Paris is about to set to work with the object of organising, in the most worthy manner possible, the celebration of this important fiftieth anniversary. It should not be forgotten that the invention of photography is one of the most remarkable of this century, in which so much progress has been made in the way of scientific discovery.

Photography without a lens seems destined to come more into current nse, and to render greater services than was at first foreseen. The greatest obstacle to its common use arises particularly from the long exposure necessitated when taking photographs by small apertures. It is very evident that for long focal distances the time of exposure reaches a length terrifying at the present epoch of instantaneity; but in working with short focal distances it is not the same thing, and the dnration of the exposure becomes shorter than would at first sight be imagined. We have been making some experiments in this direction, limiting ourselves to focal distances of four and five millimetres (from the fifth to the sixth of an inch) with very sensitive plates, and have obtained impressions with exposnres not longer than from one to two-tenths of a second. In snch cases, working in the opeu air, it is not possible to dispense with a mechanical shutter. This relative rapidity has led ns to the idea of constructing a pocket apparatus, which we design in the form of a sweetmeat box, or cigar or cigarette case, and in fact it forms an instrnment essentially portable, and does not resemble in any way a photographic apparatus. The opening is easily concealed in the end of the case, and the focal distance is only four centimetres; this suffices to cover a surface of eight centimetres square, a convincing demonstration of the vast field covered by the bundle of reflected rays. We are about to pnrsue the subject further, with a plate pierced with a hole not quite two-tenths of a millimetre in diameter. With this apertnre we shall not employ a focal distance of more than two centimetres. Up to the present we have worked with an opening of not less than three-tenths of a milimetre, and it will be curious to verify whether with a more diminished apertnre we shall stumble npon effects of diffraction injurious to the goodness of the image. Our pictures are, with the foci above mentioned, endowed with sufficient sharpness, and such that for documentary reproductions better would not be desired. It appears, from what has been said, that much remains to be studied, and consequently to be discovered, in the direction of photography without a lens. One of our brethren, whose name is well-known in the photographic world, has just found another method of applying the system of photography without a lens. In place of a circular opening he makes use of two slits. He arranges these slits so that they may lie across one another either at a right angle, or at a more or less acute angle, enabling him to obtain very odd effects—caricatures such as result from the use of concave or convex mirrors. The disposition of the apparatus is very simple: it consists of a rectangular box furnished with grooves, into which are slid, one near the other, two plates bearing slits, and a transparency is placed at the other end of the box. According as the double system of slits is arranged, very diverse caricatures are obtained. To these results M. Ducos du Hauron gives the name of transformism by photography. In order that the arrangement of M. Ducos dn Hauron may be better understood, we give a sketch of his "boite



transformiste." A is the front of the box, which is furnished with an exposure shntter formed of a simple sliding piece fitting into the grooves RR, RR. BB'' are two screens pierced with slits, *aa*, *cc*. C is the rear end of the box where the dark slide is placed. D is the lid of the box, which is lifted either for placing the slitted screens, or for putting in the sensitive plate. When not working direct from natnre, the transparency is placed in the grooves RR, RR, at A. The name adopted is, perhaps, rather pretentions, for it wonld seem to imply a sort of philosophical law, whilst in fact there is only in question a purely optical fact, interesting, doubtless, but to which the much more modest name of photographic transformations would be better applied. But, nevertheless, the fact does not the less merit our attention, for it is not wanting in a certain amount of originality, and it may be that practical or artistic applications may be made of it; whether or not will be shown in the near future.

Commander Moessard has just designed a very ingenions apparatus destined to determine in a very exact manner the diverse elements affecting a photographic lens, viz., its focal length, depth of focus, focal plane, angle of view, and distortion if there be any. There is only the chemical focus which cannot be determined by it. A photometric arrangement is added to the instrument to determine the comparative clearness of the lenses tested. The commission charged by the Minister of Public Instruction with judging at the competition of lenses for the prize of 2,000 francs, makes use of this apparatus to arrive at comparisons which shall be as unchallengeable as possible, and by this means its responsibility will be considerably dimininshed.

Mr. Mario Carquero, still another engineer, has contrived a car to serve as an ambulating photographic vehicle. The model is installed on a seat which is placed under the hood of the vehicle; he pnshes a button, and is instantaneously photographed by a lens placed in front of him at the front of the car. How the consequent photographic operations are performed has not been told.

The committee of organisation of the International Congress of Photography are proceeding with much activity in preparing the basis of discussion, so that the

work may be rendered more easy when the Congress itself is in session. Savants of the Institute, such as MM. Jansen, E. Becquerel, Wolf, and Cornu do not neglect being present at any of the meetings to which they have beeu convoked, and they bring to the subject their unquestionable ability. Thauks to them, the Congress, from which we did not at first expect marvellous things, will certainly result in some interesting solutions. Already accord is established on some of the most important points; it remaius, it is true, to get them accepted by the international gathering, to get them internationalised, but there is every chance of success with the aid of men so eminent, whose works are recognised as authorities both in France and elsewhere. The question of a practical standard of light has formed the subject of one of the most interesting meetings. It is almost certain that our propositiou to make use of a candle of a certain recognised make in connection with a diaphragm placed before the source of light, as indicated by a learned Englishman, will be adopted. There will remain to be determined the conditions of the experiment, so that it may be possessed of the character of good comparability. This will form the subject of an early meeting.

The works of the Universal Exhibition are carried ou with the greatest activity. When speaking of the famous Eiffel Tower, which has now reached the height to which the public will ascend, above this is to be a space devoted to scientific experiments, and it is very probable that many photographic lenses will be pointed from this height in all directions, with the view of establishing, I don't exactly know what. The fact is that it is said that very pronouuced oscillations will be experienced by this immense piece of ironwork during high winds, and doubtless photography will have its part in the various experiments that will be made, although there are elevations much greater, without having to go so far as the summit of Mont Blanc. Meantime, it has been legally decided that this exceptional monument belongs to the public domain, M. Eiffel not having reserved the right of reproduction at the time of his contract with the State and with the City of Paris. In consequence of this decision no one need feel disturbed at having directed his camera towards this immense note of interjection. Besides, it would be impossible to make any sort of picture of the entire Exhibition, without including this tower, which serves as the entrance gate, and one could not help depicting it, however much goodwill one might put forth in trying to do so. It would be in vain to attempt to arrange a drapery capable of dissimulating this immensity. Will the Exhibition be ready for inauguration at the date fixed? We doubt it, but in any case it is to be inaugurated on the 6th of May, and will not be really ready till the end of June. Exhibitors from all countries promise interesting displays. France will be represented by nearly 300 exhibitors; we are speaking, of course, only of the class which relates to photography aud its accessories.

Poulenc and Co. have just put iuto the market a platinum paper for direct printing without development, after the process of Capt. Pizzighelli; but from our ñrst trials we fear that the make will have to be improved before it can be said to leave nothing to be desired.

Mr. Chardon, who has repeated with a certain amount of success the experimeuts in taking direct photographs in natural colours upon paper covered with violet chloride of silver made by M. E. Becquerel, and afterwards taken up by Niepce de St. Victor and by Poitevin, has shown us one of his polychrome photographs, the colours of which have been pretty well preserved, notwithstanding the three years that have elapsed since it was made. We possess ourselves two prints in direct colours that M. Niepce de St. Victor gave us more than twenty years since, and although they have often been shown, they have scarcely changed colour; they always seem to us to retain their primitive condition. This is a circumstance worth noting.

M. Grassin, a very distinguished amateur, especially in instantaneous work, has just had an interesting experience in the successful development of a negative exposed two and a-half years ago. The picture is a beautiful one, and has lost nothing of the qualities which would have characterised it if development had followed closely upon exposure. It establishes the fact that exposed plates may be kept for a very long time before development.

M. Tondeur has succeeded iu obtaining development in the camera itself during exposure, by introducing the developing agent (hydrokinone, we believe) into the emulsion. It remains to be seen whether these plates will keep, and if there is any advautage in the method of proceeding which has, if we mistate not, been already tried in England.

Leon Vidal.

FIGURE IN LANDSCAPE AND GENRE.

BY GRAHAM BALFOUR.*

There is an excellent hint for finding figures, which was given by an old artist to Constable; he remembered it and acted upon it all his life, and I will now repeat it to you: "Do not set about inventing figures in a landscape taken from nature; for you cannot remain an hour in any spot, however solitary, without the appearance of some living thing that will in all probability accord better with the scene and time of day than will any invention of your own."

When all the world is before us, suggestions are not much less likely to occur than when we see the right man, woman, child, or animal in the right place; *then* it is easier to find for our subject the appropriate and becoming attitude and action.

There is also a lesson to learn from it, although it may be a hard saying to those who have little time to spare,—that the first requisite for landscapes is to spend much time in the country, always observing and treasuring up for future use occurrences and phenomena as well as localities suitable for our work. To painters, of course, this is a truism, but I do not believe that landscape photographers study nature half enough. They know they can turn on the machine and take a landscape, and between whiles they neither open their eyes nor occupy their minds with what they have seen.

In story-telling, however, it is evident that to evoke any human sympathy some human emotion, however faint, must be portrayed. And this brings me to my next point, that all emotions are not suitable for photography. For instance, there are griefs which are sacred against all art. And some subjects are too revolting or too harrowing for the painter's use.

But for photography the limits are even more narrow than for painting, and all strong emotions are unsuited to it, for the following reason. The painter can paint a picture from reminiscences of a scene which he has witnessed, using models for the purely mechanical part, and rendering the actual expression from memory, if not from imagination. The photographer, as I have insisted, can only photograph a subject actually present before him. If he were to photograph the originals in their sufferings, he would be a heartless and intruding brute; if he were to photograph the scenc with models, so far as it failed, the result would be theatrical and empty, revolting to our humanity, so far as it succeeded.

I have made these remarks here already on Mr. Bramley's Academy picture, "A Hopeless Dawn," which I had already thought of in this connexion before it was mentioned by Mr. Lake Price. There are numerous instances among Mr. Frank Holl's subject-pictures now at Burlington House. His love of harrowing subjects was made a reproach to the painter, but conceive a photographer who should be accused of illustrating every sentence of the Burial Service!

Perhaps I might take the Coventry legend as a sort of example. If the purity of Godiva herself could have been photographed, I fear the photographer would have been a degree worse than Peeping Tom. (Would his lens have gone blind, or got a flare-spot, or what?) If he were now to photograph the sham Lady Godiva, I think we should deservedly get a vulgar picture, artistically, for our pains.

The rule may be laid down in relation to our sympathy. If we should be so carried away at the time as to be unable or

* Continued from page 104.

unwilling to photograph the scene, then equally we ought not to reproduce it afterwards. Thus soldiers under fire, when the war-correspondent could give them no help, or a lifeboat putting to sea, would be good subjects enough; a broken-hearted widow or a dog drowning would not.

How far the snap-shots of detective cameras are decent, or how far they have the taint of the interviewer about them, I hardly like to say: I think that much depends on the extent and degree of publication. For instance, there was a photograph widely circulated of the Queen laughing, evidently an enlargement from a snap-shot. I am not a believer in the divine right of kings, but that did seem to me to be taking an unfair advantage, and publishing a libel calculated to bring into contempt. There is just a touch of eavesdropping about it (I have a detective camera myself), but to overhear a thing and keep it to oneself is very different from shouting out one's discoveries to the world at large.

Since writing these remarks, I have seen the decision of Mr. Justice North, in Pollard *v.* The Photographic Company. Time will, I hope, show that this is good law; the analogy between photographs and letters, which belong to the recipient, but may not be published without leave of the writer, who nevertheless has no property in them, seems to me to be, at any rate, very good natural justice. It is very doubtful, however, whether this principle could ever be strained to cover cases where the original photograph had not been taken for payment.

A cat may look at a king, and so may a detective camera, but I do not see why this natural right should entitle a photographer to publish ugly libels of an innocent individual, solely for the photographer's own profit or glory.

But to return to subjects taken with consent of the sitter, and the emotions which make good pictures. What about love-making? Is that too tender, too intimate, altogether too sacred a process, so that to publish any even of its lighter passages, not to say the fraudulent version of flirtation, is a sin and shame? That is too hard a problem for me; I will leave it to experts, merely noticing that, as a matter of fact, lovers have, time out of mind, been regarded as fair game,—if you can catch them.

In photography, the actual exposure of the plate is so short, and it is so wise a precaution to take a second version, with very slight changes, that there is some danger of repetition. If both copies are of nearly equal merit, of course each might be exhibited in its turn. Most of us, too, are badly off enough for models, and these must be so very far superior to the ordinary model of the painters, that they are very hard to get; consequently the same person has a tendency to appear in all our pictures. It is true that I never heard of such blind persistence in the same models as was shown by Cignani, a Bolognese painter in the seventeenth century. Sir W. Stirling-Maxwell tells us that there are two pictures of his extant in the palace at Copenhagen, in each of which the same two models—a man and a woman—have been painted. The first picture represents Joseph and Potiphar's wife, the second the Rape of Lucrece.

But in getting models to express our ideas the great obstacle, and one which increases proportionately to the definite aim and heightened interest of our effort, is self-consciousness. As soon as a sitter knows what you are doing, however willing she or may be, on comes self-consciousness, and unless you can dodge it or banish it, there is an end of all naturalness. It is, no doubt, mere nervousness, and some people have a dramatic power of putting it away and successfully assuming some desired expression at will. But these are rare birds indeed. Sometimes the attention may be diverted, but unluckily for our purposes, one set attitude is generally required, and there can be no free movement or action, or assertion or power, such as generally dissipates stage-fright. But to acquire by rule the art of being at one's ease is like learning liveliness by jumping over chairs.

Luckily, besides mechanical objects of human use, which may serve in landscapes as substitutes for the presence of man, there are two whole classes of models which are practically free, at any rate, from self-consciousness, if they compensate for it by other failings—I mean, children and animals.

I know that a small child is often justly a natural bugbear to photographers: "It is far sharper than a serpent's thanks to have a toothless child"; and, in proportion as the infant learns to obey directions, it loses naturalness. But there is an intermediate stage, and we must sometimes risk a plate or two on the chance of a good thing. Children soon forget constraint, and are generally ready for play; their feelings and expressions are more on the surface and more self-evident; even if they are not beautiful, they have a grace and freshness wanting to plain middle age; there are larger possibilities and greater adaptability about them; and, lastly, they are the only subjects for nude studies possible to photography.

A great deal of abuse has been heaped on the academy baby which blossomed in such large numbers every May at Burlington House, and the execrations and scorn were not altogether undeserved. In every corner there seemed to be a pinky infant or two with waxen flesh and vacant, sentimental smile, and it was not only the corners or the sky-lines which were so tenanted. But these darlings of the British matron were so bad because they were so artificial, and though the camera might not make them so sweetly pretty, yet it would turn out a version much closer to nature and much less repulsive to art.

To turn to history. No subject was more monotonously common than the Virgin and Child, to which was often added the Infant St. John. This particular version of the religious picture would never have been so multiplied from ecclesiastical reasons alone, had it not answered to the requirements of art and the deeper needs and affections of human nature. But in spite of occasional traces of realism, of independent study from nature, childhood was hardly appreciated before the rise of the English school of painting, and there has been a further development in the present century. However this may be, much of the charm of children lies in fleeting expressions and sudden turns, and to capture these no means has yet been devised so prompt as the camera. If anyone wants suggestions for subjects, they lie in abundance in Mr. Louis Stevenson's "Child's Garden of Verses"; indeed, the whole book might be illustrated by photographs, if only they could be perfect enough.

From children to animals is an easy transition, for they have many merits and many failings in common. As the value of animals arises from the fact that they do not subject themselves to our will, and so retain their own natural expression and attitude, they are of necessity hard to manage and to arrange. But they will stand a good deal of handling without acquiring the painful look of some worried adult human models. They are generally to be found in appropriate localities in the fields (you remember Constable), and we need have no scruples about taking up their time or paying them for their services. Their fashions do not change in fur or feather; they have the beauty of nature with few of the drawbacks of civilization; and they are near enough to humanity for their expressions to be intelligible, and yet different enough not to be anything else than inferior. Not only are they good in themselves, but they react usefully on any lord of creation who is taken along with them; they are so unconcerned, and there is so much in their looks and actions to interest the man, that he may even forget himself for a moment, and look as natural as his dog or horse. At times they are unmanageable, and both wear and cause expressions neither happy nor free from anxiety. Infinite patience and experience, many small devices and much knowledge of animal nature may be necessary for success, but these are excellent things in themselves, and not too much to demand from the perfect photographer.

Of course, we are almost entirely confined to animals domesticated or semi-domesticated, and are at a great disadvantage compared with the painters, who can insert the shyest of birds or most nocturnal of beasts in a light and locality suitable to it, while we have been forced to conclude that unless the creature could actually have been seen and photographed in life, as it is shown in the print, it cannot be inserted at all.

For animals, as I have said, very short exposures are often useful, and sometimes absolutely necessary. I then dwelt on the fact that certain instantaneous attitudes are wrong because they can never be seen by human eyesight, and so are not real to us; and I need not go over that ground again. But besides being offences against reality, they are also wrong in art, because they have not that permanency and stability which are required in a permanent representation. Dr. Stillman's theory of the horse in motion, as laid down in Mr. Leland Stanford's book, is "uniform support to the centre of gravity and continous propulsion of each extremity in turn"; and many of the attitudes are such as can only be maintained for a brief instant. Now, though the best art often represents life and action, yet it selects the typical, the representative crises, and never the intermediate transitions. For instance, there was a picture posted all over London a few years ago, I think an advertisement of a "penny dreadful"; a girl throwing herself

off a bridge was suspended between the parapet and the river, and never fell any further. If any copies of the abortion survive, no doubt she is there still, not an inch nearer to the water yet. In like manner some of these instantaneous attitudes are bad art, not only because they are unreal, but also because they are forced into an unnatural and incongruous existence,—they are only possible as rapid transitions from one pose to another, yet they are isolated and perpetuated on paper which can never change or explain them.

COLLODIO-BROMIDE EMULSIONS.

BY F. C. BEACH.*

Mr. L. C. Laudy, of the American Museum of Natural History, Central Park, New York, a well known worker in the collodion processes, has, at my request, kindly given in a formula which he obtained from Mr. Newton, and which, he says, at the time it was used they kept secret. He says they regarded Mr. Newton, in those days, as the "shining light" in this country on collodion emulsions. The formula is very practical and gave beautiful results, and all looked for a great future in collodion emulsions, until one day gelatine emulsions appeared, and the glory of the beautiful collodio emulsion departed. The following are the particulars as given by Mr. Laudy.

For Newton's emulsions, use Hance's delicate cream cotton.

Bromide Emulsion.

Formula for one ounce.

Silver nitrate 18 grains to the ounce. First dissolve in 10 drops of water, then add 5 drops nitric acid for each ounce of solution, then add ½ an ounce of alcohol in which is dissolved 12 grains bromide cadmium, then add 6 grains of cotton, shake well and add ½ an ounce of ether; let it stand twelve hours, then add 4 grains chloride calcium.

Bromide Iodide Emulsion.

Formula for two ounces.

Silver nitrate (crystals) 30 grains, dissolve in 20 drops of warm water, then add 10 drops nitric acid.

Alcohol	1 ounce
Bromide cadmium	18 grains
Iodide ammonium	2 ,,
When these are dissolved, add cotton	12 ,,

then add the silver solution and shake well, then add 1 ounce of ether and let it stand twenty-four hours, then add 8 grains of chloride cobalt, dissolved in a little alcohol. If the iodide is not used, let the amount of silver be 28 grains, and add the chloride cobalt after the emulsion has stood for sixteen or eighteen hours. Plates thus made with this emulsion may be at once exposed in the camera after coating, and be developed with the following developer.

Make a saturated solution of neutral oxalate of potash in water, then add to each ounce 15 grains of pulverized protosulphate of iron, and lastly, just enough citric acid to the solution to turn litmus paper red.

But if the plates are to be preserved in a dry state they should be put in a special solution made as follows and called

Japan Tea Preservative.

Saturated solution Japan tea in alcohol	1 ounce
Water	16 ounces

The tea solution is prepared by soaking one ounce of Japan tea in six ounces of alcohol, let it stand until a strong tincture of tea is made, then add one ounce of the tincture to sixteen ounces of water. Or better, make a saturated tincture of tea in alcohol, and add two or three drops to each ounce of bromide emulsion. After coating, simply wash the plates in one or two changes of water until the oily lines disappear, and rear up to dry.

To make the plate more sensitive when it is desired to expose it in the camera, while wet flow over the surface the following accelerator :—

Water	12 ounces
Sal soda	180 grains
Bromide of ammonium	2 ,,

Mr. Laudy has also sent me a copy of Mr. Newton's printed directions concerning the use and manipulation of the plates. His developer, called a stock solution, is prepared as follows :—

Water	10 ounces
Yellow prussiate potash	1 ounce
Carbonate of soda	100 grains
Bromide of ammonium	15 grains

* Continued from page 92.

After exposure the plate is washed under the tap a few moments to remove the preservative; then the developer, consisting of half an ounce of the above solution, to which four grains of dry pyro has been added, is poured on. The image soon appears, and the development is accelerated by the air by frequently pouring the developer off and on. If more intensity is desired, add to the developer a little more pyro. Fix in hypo solution one ounce of hypo to four of water. Give the plate a good washing and set up to dry. When dry, varnish the plate to protect the film.

Dr. J. J. Higgins tells me the formula he used successfully is that which was employed by Mr. Albert Levy, and known as Levy's emulsion.

In the *Photographic Times* of September 4th, 1885, Mr. Levy thus describes his method of working.

I will explain the manipulations in the way I think is the most practical, and by following them closely success will be certain.

For 54 ounces of emulsion mix the following:—

A.—Bromide of cadmium...	648 grains
Alcohol (absolute)	18 ounces
Iodide of ammonium...	162 grains
Cotton (Hance's)	586 ,,
Ether (concentrated)...	27 ounces
In another bottle—	
B.—Nitrate of silver	600 grains
Distilled water	360 drops
Alcohol	9 ounces
Nitric acid	270 drops

Pour A into B, and leave exactly ten hours, then add 99 grains of green chloride of copper.

The excellent flowing qualities of my emulsion, its sensitiveness, &c., I ascribe, first, to the minimum quantity of water I put into it, and also to the correct measurement and timing.

First, I would advise to weigh out the required quantity of bromide of cadmium, and then desiccate this in a porcelain capsule on a gentle heat. It will first soften and boil, and the heat must be applied so that the bubbles do not blow any out of it and change the quantity, however small the loss, as every particle is closely calculated. Then it will form in a lump (I forgot to say that during this evaporation the bromide should continually be stirred with a strip of glass, so as to prevent its adhering and consequent burning), when, by continuous stirring it will granulate, and this should be pushed long enough, until the granulation is fine enough and powdery, showing that all the dampness has gone.

This powder, well scraped out of the capsule, is put into one-half of the given quantity of alcohol and shaken until well dissolved. The iodide of ammonium is now added. This should be of a light yellow colour. When this is melted, add to it the cotton and shake well, after which the ether is added, and another good shaking given.

This first operation in one of the bottles previously well cleaned. It is well to have the bottles about twice as large as necessary, as it allows better shaking, and of course mixing.

In the second bottle put the nitrate of silver, and the water (which must be counted by actual drops, and not measured), the actual amount of which must dissolve the silver; but as it will not do it while cold, it must be gently heated until the required result, when the second half of the alcohol is added. On a small quantity the addition of the alcohol leaves the solution transpareut, but on a larger quantity the silver is precipitated. This does not in any way affect the result.

All of these manipulations may be performed in full daylight, but the subsequent ones must be done in the dark room.

After having well shaken the silver solution, add to this the collodion in small quantities of four drams to an ounce at a time, shaking very well at every new addition, until all is transferred.

The emulsion is now almost finished, and should be shaken occasionally during ten hours (exactly, neither more nor less), when the chloride of copper is added, giving a thorough shaking again, so as to dissolve it well, and also for other reasons.

Before adding the chloride of copper it must be put in a capsule and well evaporated. This can be easily perceived by the colour, which must be thoroughly brown when fully dried. Contrary to the bromide, the chloride should and must be weighed after the drying process is gone through. I may add that the dried chloride will keep very well in that condition if placed in a well-closed glass-stoppered bottle. If it gets green it must be again evaporated.

Filtering now is advisable through Japanesc filtering paper or cotton, when the emulsion is finished. The preservative is composed as follows :—

Preservative for 44 ounces.

Tincture nux vomica	100 drams
Tincture scillae	42 „
Tincture cochineal	120 „
Honey	20 ounces
Acetic acid	20 drams

Of the above takc 22 drams and add 64 ounces of water.

After coating the plate, allow the film to set well, and then rinse in water before applying the preservative. Dr. J. J. Higgins also gives me his formula for developing the above-made plates as follows :—

Carbonate soda	½ pound
Ammonium bromide	640 grains
Water	2 quarts
Honey	1 ounce

The above is strong for extra cases. When diluted one-half it forms the usual normal developer.

To half-an-ounce of the above, add a mustard-spoonful of dry pyro previous to applying to the plate.

It will be observed in these various formulæ that considerable restrainer is added to prevent fogging, which is quite different in the case of the gelatine plate. If the alkali and pyro are poured on a collodion plate without containing a restrainer, the film will darken almost instantly. Very little practice is required to obtain excellent results, and I hope the reviving of this subject may lead to further improvements, especially when it is noticed that collodio-emulsions for orthochromatic work is being agitated.

A PERMANENT TEN PER CENT. HYDROQUINONE FORMULA.

BY J. B. B. WELLINGTON.*

The subject of hydroquinone has been so much written and talked about that it is pretty well done to death by this time ; but as the season is just upon us when we shall all be ready to rush out into the country to secure some fresh scenes which perhaps may have escaped our notice before, this, then, will be the time when hydroquinone will have to fight its brother on the battle-field of developers. I am not going to say at present that I prefer this chemical to pyro until I have had greater experience in its use ; but when I use pyro and ammonia, or soda, I am inclined very often to cry out "Good old pyro !" and I am sure many besides myself here will agree with me that it requires a good deal of beating. However, in many hands hydroquinone is capable of producing quite as good results as any other developer, and, moreover, it has the quality which I am sure many will hail with delight, that it does not stain the fingers, and the negatives produced by it are of a brilliant and clear character, which makes them extremely useful during the dull winter months for quick printing.

Of the chemistry of hydroquinone I do not intend to touch this evening, as it is quite outside my sphere. I must leave this side of the question to my friend, Mr. Levy, who has already given us valuable and interesting information respecting its nature, and who has, I know, a great deal more to say respecting it.

Hitherto all the formulæ that have been published have been rather too bulky—that is to say, that it was impossible to get a very large proportion of hydroquinone into solution owing to its being sparingly soluble in water. This, of course, is a serious drawback, not so much to a portrait photographer as it is to the tourist, who, of course, requires that everything should be in as concentrated a form as possible.

In some of the early formulæ alcohol has been recommended as a solvent for hydroquinone, it being extremely soluble in the liquid—namely, to the extent of about 30 per cent—but it has this drawback, that the solution very soon becomes a very dark brown colour, almost worse than pyro in the same oxidised condition. In the formula I have just perfected, alcohol is still the liquid in which the hydroquinone is dissolved, and in order to preserve it from oxidation I employ sulphurous acid, which appears to keep it good without any change at all ; but I can only speak from three months' experience at present.

As it was the wish of the majority of members of the Photographic Club that some reform should take place in the weights and measures of formulæ, I have taken this opportunity of giving the proportions of this new ten per cent. hydroquinone in the French measures—viz., grammes and cubic centimetres—pending their decision as to something better ; although extremely convenient and easy in use, I am afraid it will be a long time before the method becomes general, because as long as things continue to be sold by the ounce, so will formulæ be given in the same.

The formula stands thus :—

Hydroquinone	30 grammes
Spirit (meth.)	100 c.c.
Sulphurous acid	100 „
Water, sufficient to make	300 „
Sodium hydrate	30 grammes
Sodium sulphite	30 „
Water (to make)	300 c.c.

Take three c.c. of each solution, and fifty c.c. of water,

You will notice that I have endeavoured to keep the proportions in as round numbers as possible. There is nothing I abominate more than a complicated formula ; the simpler it is the better, not only in chemicals, but also in the proportions.

The strength I have given will develop a plate in about five minutes with normal exposure. The addition of bromide is not necessary. (I may say here that I have experimented with Thomas's plates only, so cannot say if the developer is suitable for other plates.) Potassium hydrate may be used instead of the sodium, but then a larger proportion may be used. By so doing you naturally get more sulphite of soda as well ; this tends to keep the developer clearer for a much longer space of time. I may just say that the sulphite may be left out entirely; although the solution discolours a good deal, the appearance of the negative is just the same as though sulphite had been used.

I feel I have sufficiently exhausted the subject, at least from my point of view, as writing a paper to me is not such a work of love as carrying out experiments. However, one is always well repaid by the attentive manner in which a paper is received by members of the Photographic Club.

* A Communication to the Photographic Club.

Patent Intelligence.

Applications for Letters Patent.

3,309. William James Smith, 11 and 12, Broad Street Corner, Birmingham, for "Improvements in Photographic Cameras for Use with Wide Angle Lenses."—February 25th, 1889.

3,347. Henry William Taunt, 9 and 10, Broad Street, Oxford, for "Perforated Books for Exhibiting and Selling Photographs."—February 25th, 1889.

3,369. Marcus Kattentidt, 77, Chancery Lane, London, for "Machine for Casting Gelatine Dry Plates."—February 25th, 1889.

3,398. James Heber Taylor, Little Trinity, Cambridge, for "Improvements in what are known as 'Instantaneous Photographic Shutters.'"—February 26th, 1889.

3,465. Henri Jules Le Boulch, 35, Southampton Buildings, Chancery Lane, London, for "Improvements in Processes for Reproducing Pictures and Designs."—February 26th, 1889.

3,532. Thomas Young, 28, Southampton Buildings, Chancery Lane, London, for "Improvements in Apparatus for Timing Photographfc Exposures and Taking Observations."—February 27th, 1889.

3,541. Henry Herbert, 119, Hartfield Road, Wimbledon, for "A New or Improved Photographic Camera."—February 27th, 1889.

3,542. Henry Herbert, 119, Hartfield Road, Wimbledon, for "A New or Improved Changing-back for Photo-cameras."—February 27th, 1889.

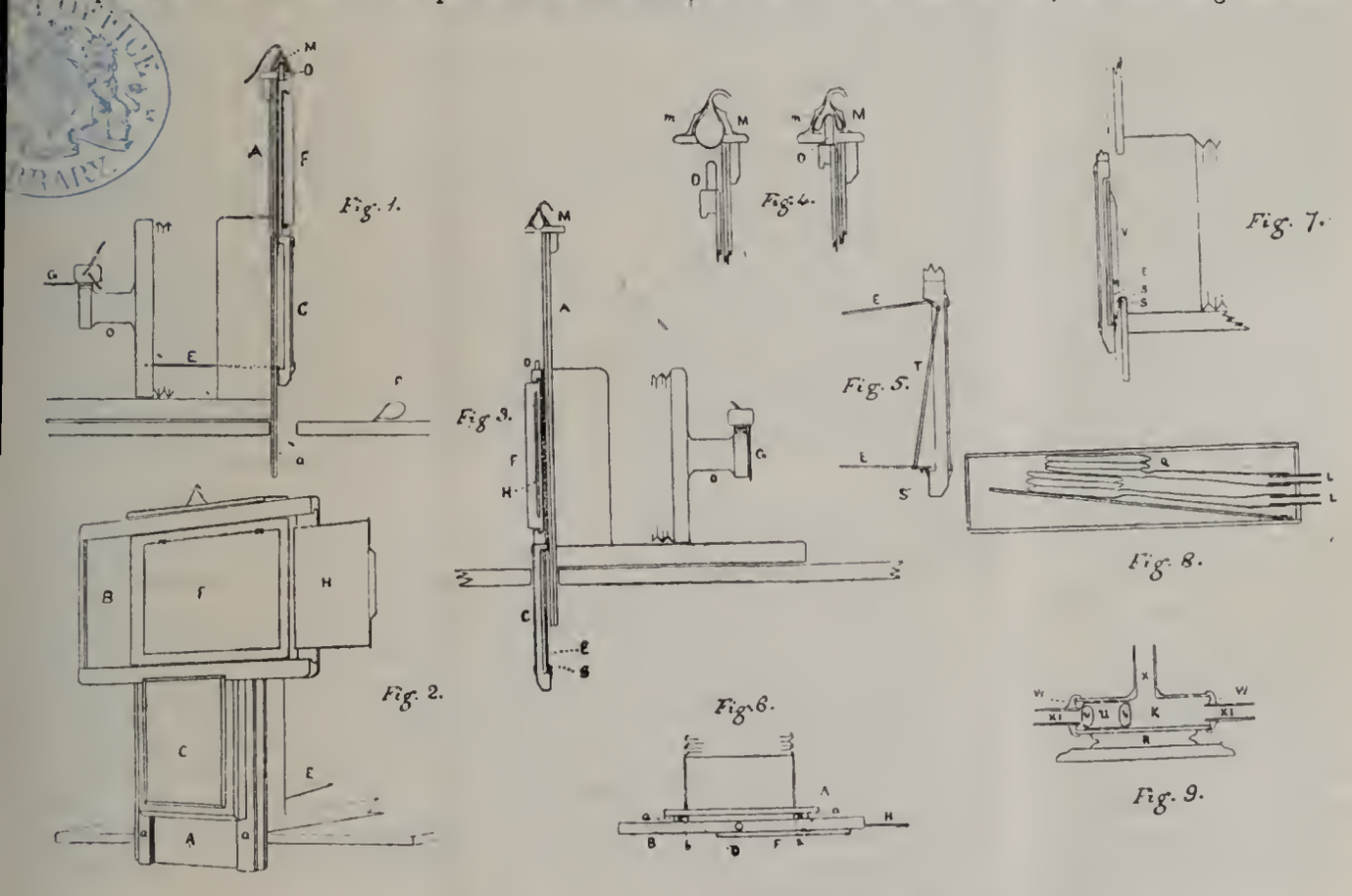
Specifications Published.

5,869. John Harmer, Photographer, Wick, Littlehampton, Sussex, for "Improvements in Photographic Cameras."—Dated 20th April, 1888.

I add to the back frame of the camera, and make detachable or otherwise, as required, an opaque board or shield A, pierced opposite the lens with an aperture the full size of plate used and extending a suitable distance above or below and to either side,

to form a shield for the sensitive plate. On this board or shield are fixed, in the direction of its greatest length, two grooved strips *a a*, in which slide the feathered edges of two other strips *b b* affixed to the frame or dark slide holder B. B is in all respects similar to the shield or back frame of the usual form of repeating back camera, but has the focussing screen fitted and affixed to form one piece; the whole sliding together upwards or downwards on the shield A by means of the feather edges of the strips *b b* engaging the grooves of the strips *a a*. On the upper edge of the sliding back B is fitted a plunger D, which, as the back is raised, compresses the rubber ball M, which is closely confined in a turned brass or wooden case *m*, and whose compressed air is conveyed by means of tubing to the pneumatic shutter G, and utilized to raise its lid and uncover the lens O. In an inside rebate of the frame holding the ground glass or focussing screen C, and to its lower edge, is hinged a lid or shutter E to open downwards into the camera immediately the focussing screen moves into position for focussing. Its fall at the right instant is ensured by the projecting catches S S on the shield A and door E, respectively, being so arranged that they cannot pass each other till the lid E is upset and has fallen inwards; and its immediate rising, when the back B is lowered to cover the screen C, and to exclude all light from the camera, by the strip of wood V, the width of the space intervening between the shield A and rising back B, fastened to and continued to the bottom of the lid E, where it is rounded off to avoid jerkiness. This strip can only pass downwards when the lid is shut quite close. Should the sliding back be required for use with very short focus lenses, I divide this lid E across the centre, as shown in fig. 5, and hinge either half to the top and bottom of the rebate in the focussing screen frame on pivots, and make them to open and close together by connecting them by means of a link, in the manner shown; the arrangements for their opening and closing being by the engagement of the catch S with that on the shield A, in the same way as when the door E is in one piece.

The pneumatic shutter employed may be of the usual form, and either placed before the lens or behind it, that is in the camera. In the latter position it must be adjusted to open flap downwards. These usual forms, however, require the addition of a second bellows in their pneumatic arrangements, as shown at Q, fig. 8, one of which, by its nozzle L, is connected to the hand-ball P in the usual manner; the other being connected to



and operated by the ball M at the top of the shield A, by the plunger D on the sliding back B. With those forms of shutters which, from their construction, will not admit of the addition of this supplementary bellows, the threeway tube or cut-out fig. 9 is needed to prevent the compression of one ball from expending its energy in expanding the other, instead of operating the shutter.

This threeway tube, as illustrated, consists of the main tube K, with three nozzles, X, XI, XI, two of which have screw caps W W, and are screwed on the main tube K, the tubes being continued through the caps to project as a lip on the inside. In the main tube K is a close-fitting piston *u*, whose ends *y y* are padded with wads of india-rubber or greased leather to ensure air-tightness when in contact with the projecting lips of either nozzle. Its method of use and mode of operating is as follows:—The nozzle X, at right angles to the main tube K, is connected to the shutter, the others respectively to the balls M and P. When either of these latter are compressed, the piston U is forced by the air pressure to close the passage to the opposite one, and free the passage X for the air to pass to expand the bellows of the pneumatic shutter, and to prevent it finding its way into the compressed ball; therefore, whichever ball is squeezed, the other one is immediately cut out without any loss or misapplication of its compressed air.

On the back of the shield B, and around the aperture through which the image is admitted to the sensitive plate, and between the feathered strips *b b*, are placed strips of wood sufficiently thick to work light-tight to the shield A, the lower one being cut away to receive the catch S on the shield A.

At the lower part of the shield A are screwed some wood stops to support B when it is in its lower position, and on the side a brass spring to support it when raised to its upper one.

The manner of use of the sliding camera back is illustrated in the three sheets of drawings herewith, which contain the following figures.

Figs. 1 and 2 illustrate the camera in the condition for focussing. The dark slide F, containing the sensitive plate, is here shown placed in the frame A, with its shutter H drawn. The focussing screen C is opposite the lens, and is uncovered by its lid E being down, and the plunger D, on the top of B, has compressed M, and raised G to admit light through the lens O.

Fig. 3 shows the camera with plate in position ready for exposure. Here the plunger D, having withdrawn its pressure from M, has permitted the shutter G to cover the lens O,

opposite to which the dark slide F has moved. The lid E is up and covers the screen C, the operation of sliding the back B downwards having automatically rendered the camera fit for the exposure of the sensitive plate in the dark slide F by pressure on the hand-ball in the usual way.

Fig. 4 shows enlarged views of the operations of the plunger D on the ball M.

Fig. 5 is an illustration of the door or lid E when divided for use with very short-focus lenses.

Fig. 6 is a plan of the back as illustrated in figures 1, 2, and 3.

Fig. 7 illustrates in section the door E, and the method by which it is operated by the rising and falling of the back.

Fig. 8 shows how the supplementary bellows may be added to the usual forms of the pneumatic shutter.

Fig. 9 is an illustration of the threeway tube or cut-out whose object and manner of use have been described.

Notes.

The President of the Photographic Society has, of late, so mellowed, and has shown himself so amenable to the wishes of the members, that he only needs a hint to immediately act upon it. For instance, the rule as to the suspending of the name of a candidate for membership on the black-board, so that the members can see for themselves who it is who is proposed, has been observed in the letter rather than in the spirit. The name has been "suspended" somewhere—presumably in the Council room—but not in the room where the general meetings are held. However, Mr. Mackie had only to call attention to the fact for the President to admit that he was right, and to promise that for the future the names would be exhibited on the black-board in the large room.

This concession is very satisfactory, but, like Oliver Twist, we would ask for more. We have never been able to see why the meetings of the Photographic Society should be conducted on the lines of a Local Parliament. The rules which govern a debate on political matters are salutary and necessary; but when the object is the elucidation of a subject by the light of practical experience, their enforcement is a little out of place. There seems to be a notion—we write, of course, under correction—that certain members are possessed of knowledge on every photographic subject under the sun, and that when these gentlemen have delivered themselves there is no more to be said. The consequence is that the younger and less known members never open their mouths, and the discussions necessarily are rather monotonous. A case in point nearly happened last Tuesday, when a really practical piece of information, which Mr. Arnold Spiller desired to give, had a narrow escape of being shut out simply because Mr. Swan had made his reply. We are quite sure that this rigidity is only the outcome of ancient tradition, and not of intention or desire, and that as time goes on the Photographic Society's meetings will be as elastic as those of the more social organizations.

"If we cannot make beautiful things now, we can at least reproduce them and show them!" The above was a spontaneous tribute to photography made by Mr. Walter Crane last Monday, when delivering the second of his course of Cantor Lectures on the Decoration and Illustration of books.

Mr. Davenport had been passing through his lantern a series of splendid photographic reproductions from some of the finest books of the early period of printing, and so clear and brilliant were the images on the screen that Mr. Crane made the above remark as to photography with more enthusiasm than we should have expected from an artist of his habits of thought.

Mr. Davenport tells us that there is now scarcely a technical lecture at the Society of Arts in which the optical lantern is not brought into requisition: and at present he is using a small Hefner-Attneck (Siemens) electric lamp, which gives about treble the light of the best limelight burners. Indeed, this brilliant light was needed to fairly penetrate the slides made from time-stained old books.

The slides were made by Mr. Emery Walker, assisted, we understand, by Mr. Pellat; and many of the negatives were taken on orthochromatic plates; this being about the only way of reproducing from some yellow old books, when bleaching of the paper is not admissable.

Next week we hope to commence the second series of Professor Bothamley's articles on orthochromatic photography. The series will contain an account of the quinoline dyes which are used as sensitisers, and a detailed description of recent observations with respect to azaline. There will also be an account of the eosin dyes, &c., and also the use of orthochromatic plates for landscape.

The *Illustrated Medical News* gives some interesting information on "Photography in its Application to Clinical and Pathological Work," but goes rather wide in saying "One of the main things to be aimed at is to get what is known in the art of photography as a quick lens." It is not getting the quick lens that is a main point, but knowing when to avoid using it at its quickest—that is, with full aperture. Very little pathological work, of any real use, could be done with an aperture of $\frac{1}{4}$. Like the high power in microscopic research, the quick lens is sometimes a necessity; but the greater part of the useful work is done without either.

Photographers are supposed to make enormous profits. The balance sheet of the Stereoscopic Company does not support this view, five per cent. upon the year's returns being the dividend declared. This small profit, the chairman of the meeting held last week explained, was due to the bad weather of the summer of 1888 and to the keen competition. With regard to the first cause we rather fancy that the shareholders will put a construction upon the chairman's words different from that which he meant to convey. He said: "Photography is more or less dependent on light, without which you cannot do much, and last year the sun was very little seen in this country." On the face of it this looks as if the bad light was the cause of the depression in business, whereas, we imagine that the real reason lay in the fact that dull weather does not pre-

dispose people to go and have their portraits taken. As to the "keen competition," the chairman did not explain whether it referred to the sale of apparatus or to photographic work pure and simple. We presume the first must be meant, as it does not appear that photographers in 1888 competed with each other any more keenly than at any other period.

Naturally, a shareholder in the room who expected the seven or eight per cent. held out in the prospectus was disappointed at five per cent. only being declared, and expressed his sentiments on the subject. But there is nothing unusual in this. The expenses of a business as carried on by a company are always heavier than those of the same business when conducted by private individuals. At the same time, five per cent. *is* a small return for a photographic trading income, and it shows that the fortunes once possible in photography are no longer so easily made.

An examination of the "Estimates" which the House of Commons is about to be asked to vote for 1889-90 shows that the Government has no immediate intention of carrying out the suggestion made in these and other columns as to the appointment of official photographers; or, at all events, the taking of official photographs, which might serve to supplement with sun-pictures of passing events of national importance, the public records which are being stored up in Fetter Lane. Private enterprise will have to supply for at least one more year the authentic pictorial representation of State ceremonies, and various national functions which in time to come will be of such incalculable value to posterity in general, and the historian in particular.

Meanwhile, the total sum of public money to be expended in photography is virtually the same in amount as it was in last year's "Estimates." As for many years past, a vote will be taken under the head of "Convict Establishments" to defray the cost of securing negatives of all the convicted inmates of our gaols, and a certain sum will also be asked on behalf of the South Kensington Museum and the British Museum authorities to enable them to continue making photographic copies of unique works of art, rare literary treasures, and so on.

The photographic department which does such excellent work in connection with the Laboratory at Woolwich Arsenal is to be provided with funds, too, as usual, and beyond these items the Government expenditure in photography is not to be extended. This is a somewhat disappointing fact, for it was confidently expected, after the statements made by the Secretary to the Treasury last session, that a partial attempt would be made towards illustrating those pages of the Estimates which detail the pensions and other allowances of the kind, with photographic portraits of some of the more lucky of the pensioners. Probably the Chancellor of the Exchequer objects to the extra expense which illustrating the Estimates would involve, though the outlay would be amply repaid if, as many imagine would be the case, M.P.'s were led by the photographic embellishment to display an additional personal interest in the discussion of the votes they now pass in what is almost a perfunctory manner.

An exhibition to be shortly opened at the Gainsborough Gallery, Bond Street, will be of special interest to the members of the Photographic Society. The exhibition will consist of the photographs taken by the late W. F. Donkin, in the Caucasus, where he met his untimely death. In addition to Mr. Donkin's photographs, there will also be shown the photographs of Mr. Fox, who, it will be remembered, perished at the same time.

As an advertisement, the prizes recently awarded by a patent food manufacturer for the best photographs of infants reared on his particular preparation no doubt fully answered the purpose, but we have doubts whether the photographs by themselves can be considered as convincing proofs of the excellence of the food. We read that "in consequence of the great number of competitors, the marked excellence of the photographs, and the difficulty of selecting four for prizes, Mr. —— had adopted the advice of the judges, and granted eight additional prizes," which, of course, is very satisfactory, and we have nothing to say against the information that "in all cases the committee had selected those photographs for prizes which are characterised by the greatest beauty and best form without regard to dress." But what we would like to know is, how did the judges satisfy themselves from the photographs that these infants had been nourished on the diet specified? We may pretend to know something about photographs, but we own our unfitness to judge babies, and it would be an exceedingly interesting discovery if these "judges" have found they can tell from the photograph of an infant what the said infant has been fed on.

One room in the villa at Biarritz, where the Queen has taken up her residence, will be of much interest to her. It contains a screen composed of carte-de-visite photographs taken at the time when the carte was a novelty not much less than thirty years ago. These photographs are nearly all of celebrities, and among them are Mr. Gladstone, with mutton chop whiskers and no bald head, Lord Palmerston in stand-up collars and stock, Lord John Russell, the late Lord Derby, the Duke of Cambridge with something that might pass for a waist, and Lord Dufferin, a mere stripling. Somehow there is no style of photograph which at the present day looks so strangely unnatural and even absurd as the carte. Perhaps it may be that the carte came into fashion just when taste in dress was atrocious. The carte flourished with the crinoline, the "kiss curl," and the peg-top trousers, and it has preserved all these monstrosities. The odd thing is that these fashions did not appear quite so ridiculous in the time of the carte.

THE DETECTIVE CAMERA: A SUMMARY OF EXPERIENCES AND OPINIONS.

BY HARRY T. DUFFIELD.*

PLEASE give the formula of the developer you use? Pyro and potash, or pyro, soda and potash seem to be the favourite developers.

* Continued from page 153.

Walter Clark: On Seed's, Murray's developer, *i.e.* :—

No. 1.—Sulphite of soda .. .. 1 ounce
Water ... ... 8 ounces

No. 2.—Carbonate of —— ... ... 1 ounce
Water ... ... 8 ounces

Normal developer; No. 1, 1¾ ounce; No. 2, ¼ ounce; pyro, dry, 4 grains.

A. C. Abbot: Equal parts of

No. 1.—Hydroquinone or pyro .. .. 10 grains
Water ... ... 1 ounce

No. 2.—Carbonate of soda ... ... 40 grains
Water ... ... 1 ounce

and the ferrous oxalate developer, *i.e.*, one part of saturated solution of ferrous-sulphite and three parts of potassic-oxalate.

D. E. McComb: Modified Ripley; normal developer, as follows:—

Pyrogallic acid...	6 grains
Sulphite of soda	30 ,,
Carbouate of potash	13 ,,
Carbonate of soda	5 ,,
Bromide of ammonium	⅜ ,,
Citric acid	¾ ,,
Water	1 ouuce

Albert H. Pitkin: Eastman's formula for ferrous-oxalate for stock solution; to each ounce of developer I try to add two ounces of brains. (Too much brains causes "fog.")

James H. Stebbins, junr.: His own formula:—

No. 1.—Pyro ... ... 50 grams
Hydroxylamine chloride ... ... 6.5 ,,
Water ... ... 500 c.c.

No. 2.—Sulphite of soda (crystals) ... ... 100 grams
Carbonate of soda (crystals) ... ... 200 ,,
Water ... ... 500 c.c.

Normal developer. For use take one dram each of Nos. 1 and 2, and add two ounces of water.

George Marshall Allen uses this:—

No. 1.—Pyrogallic acid ... ... 1 ounce
Sulphite of soda ... ... 4 ounces
Sulphuric acid ... ... 1 dram
Water to make 16 ounces.

No. 2.—Carbonate of soda ... ... 2 ounces
Carbonate of potash ... ... 2 ,,
Water, to make ... ... 16 ,,

Edgar Richards: The Washington Camera Club developer. The club formulas have been so proportioned that a single alkali solution can be used either with the pyrogallic acid or hydroquinone solutions. The hydroquinone developer is the one the members of the club most generally use either for time or instantaneous work. I prefer the hydroquinoue because it does not stain like pyro; but I use them all indiscriminately; of course, not at the samc time.

Potash Solution.

Carbonatc potash, granular, c.p.	15 per cent.
Sulphite soda (crystals) c.p.	10 ,,
Distilled water...	75 ,,

Commence with using one-half of the quautity of pyro solution used to begin development, and increase gradually to the full amount, 8 drams in four ounces of water, if necessary to obtain the desired contrast.

Pyro Solution.

Pyrogallic acid	5 per cent.
Sulphite soda (crystals) c.p.	20 ,,
Distilled water	75 ,,

For time exposures, use 2 drams in 4 ounces of water, and increase to 8 drams gradually, if intensity of negative appears too weak.

For instantaneous and portrait work, commence with 1 dram in 4 ounces of water until developmeut starts, when increase gradually to the full amount—8 drams.

Hydroquinone Solution.

Hydroquinone	2·25 per cent.
Sulphite soda (crystals) c.p.	10 ,,
Distilled water	87·75 ,,

Use 2 ounces with 2 ounces of water; add 3 to 6 drams of potash solution. Development is slow at first, but once started the negative gains density rapidly. Continue development further than with pyro, as density is lost in the hypo. The mixed developer cau be used repeatedly, and does uot cloud nor stain.

Mr. R. E. Bain gives the following:—

Sal soda	¼ ounce
Sulphite of soda	½ ,,
Water	15 ounces

To 2 ounces of the above add 2 ounces of water and 6 grains dry pyro.

Mr. W. M. Butler uses this formula:—

Granulated carbonate of soda	4 grains
Granulated sulphite of soda	8 ,,
Pyro	1-3 ,,
Water	1 ounce

Miss Alice Thurston Rice says that this developer gives excellent results:—

No. 1.

Hydroquinone	48 grains
Alcohol	1 ounce

No. 2.

Sulphite of soda (crystals)	2 ounces
Carbonate of potash, c.p.	3 ,,
Water	12 ,,

Normal developer No. 1, 1 dram; No. 2, 2 drams; water, 2 ounces. If not strong enough, the hydroquinone can be increased up to 2 drams.

Dr. H. G. Piffard gives the following developer, which, as it does not stain the hands, he names

The Ladies' Developer.

Hydroquinone	1 gramme
Carbonate of soda	3 grammes
Carbonate of potash	4 ,,
Sulphite of soda	7 ,,
Water	100 c.c.

Isaac T. Norris: Pyro and soda or pyro and potash; either works well; the latter, however, needs a little care not to fog sometimes the high-lights.

Please state your manner of usiug it (weak, normal, or strong) in summer and winter? The general custom is to begin weak, and as soon as details begin to appear flow the plate with normal solution, and add, if necessary, either or both of the solutions as may be required. A. A. Adec: "The temperature of the solution is one of the most important factors. In summer it should be as cold as possible at starting, as it gets warm enough as the development continues. In winter it should be about 65 degrees, and stay so. I generally begin with a well diluted solution, and build up as required." Archibald I. Carson: "In summer I generally succeed in bringing the picture out with a weak developer; in winter, normal, warmed." A. C. Abbot: "Either method, with the above formulæ, will give good results. I prefer to start development with normal developer, and as soou as density is obtained get detail by treatment with dilute alkali. Potash or ammonia gives equally good results."

Have you ever used in detective camera work ferrous-oxalate, hydroquinone, or hydroxylamine developer? What has been your experience? The majority answer they have not used either of these developers. Richard H. Lawrence: "Have used all of them with perfectly satisfactory results." Albert H. Pitkin: "Prefer ferrous-oxalate for all work to anything else; have used many formulæ and always returned to my favourite, contented with it." Edward Leaming; "Yes; all kinds of experiences." Rev. Dr. Bolles: "Ferrous-oxalate gives me weak negatives; hydroquinone fogs." William E. Bond: "Unsuccessful with ferrous-oxalate; successful with hydroquinone." F. C. Beach: "Used ferrous oxalate in 1884 with good results, but it was too slow and was difficult to get detail out in the shadows. Have used hydroquinone to a limited extent, but have found it much slower than pyro." William J. Hickmott: "Never used ferrous-oxalate after trying pyro and potash. I believe in using oue developer—first, last, and always. Get a good one and stick to it until you can get your negative every time or most every time."

(*To be continued.*)

Correspondence.

AZALINE AND ORTHOCHROMATIC PHOTOGRAPHY.

Sir,—Most readers of your valuable matter will probably agree with me that in the question of colour-sensitizing agents things have reached a very pretty pass. We have Mr. B. J. Edwards making plates as licensee under the so-called Attout-Tailfer patent, and claiming monopoly of the use of eosine as colour-sensitizer; and we have Mr. Gotz selling plates sensitized, as he says, by other processes, and selling also a liquid which ostensibly comes from Dr. Vogel, and is used as a colour-sensitizing agent. But Mr. Edwards, and with him Mr. John Spiller, say that Dr. Vogel's—or, at least, Mr. Gotz's—liquid consists of, or contains, eosine; while Dr. Vogel naturally denies the use of eosine in any shape in his liquid. In some of the correspondence in your columns, the insinuatiou is pretty plainly made that Mr. Spiller's aud Mr. Edwards's interests are identical; I know nothing of this, and, for myself, disclaim all thought of any such considerations.

But we have to face the following: either Mr. Gotz, with or without connivance of Dr. Vogel, has been deceiving the public, and defrauding Mr. Edwards if the Tailfer patent is valid; or else Mr. Spiller is either incompetent to verify the presence or absence of eosine in a compound, or is wilfully evading the truth. Mr. Spiller may perchance have obtained for examination only one sample of azaline, and that sample accidentally contaminated by eosine, but we do not expect a professional chemist to be led into error by analysis of one sample only. I agree with Mr. W. E. Debenham now, as usually, that Mr. Spiller "should state what constitutes in his analysis every indication of an eosine of the kind known to us as erythrosine," and I think that Mr. Spiller should also state how many samples of azaline he examined, and where he got them. The character of Gotz-Vogel is at stake, and is even more important than the pecuniary interest of Mr. Edwards.

I am incompetent to analyse any substance for the detection of eosin, and never attempted such a task. But I have used large quantities of eosin-treated plates; have used eosin kindly supplied to me by Mr. Edwards himself; have experimented somewhat largely with eosin, erythrosin, cyanine, &c.; have got and used four separate supplies of azaline; have used plates, ready colour-seusitized by two processes, supplied by Mr. Gotz. The result of all this is, that I use eosin-treated plates for certain subjects, and azaline for a different class of subject, and cyanine where the other two fail; that is to say, that whatever may be the real compositiou of azaline, it works with me in a manner quite differeut from the manuer in which eosin works; in fact, I cousider that azaline gives me more red-sensitiveness than eosin, and this poiuts to the presence of cyanine in azaline. But with cyanine alone, when I have not failed entirely, I have got greater red-seusitiveness than with azaliuc, and this may arisc from the addition of something (as quinolin red) to the cyanine. My opiuion, however, on such a subject is of no value.

I write this because the public has before it a very serious charge of what amouuts to a deliberate fraud, aud I think that somc foundation beyond what is now before us ought to be forthcoming. In fact, proof or apology is needed.

Andrew Pringle.

Sir,—Will you be kind enough to find room in your journal for publishing the results of another scientific analysis of the above compound as sold by me. It is from Dr. O. W. de Witt, of Berlin, aud is in complete agreement with that published in your last issue by Mr. C. H. Bothamley.

Sir,—According to your wish, I have examined the packet of "azaline" sent me, testing it for eosine, and find that there is not a trace of any colouring matter belonging to that group in it. The analysis was carried out in the following manner. The contents of the small bottle were reduced by evaporation, the residue dissolved in water, and then acidified with sulphuric acid, and shaken up with ether. This left the ether colourless, as also did the addition of ammonia. If ever so little eosiue had been present the solution must have shown it by colouring. This was proved by a controlling experiment, in which a small trace of eosine was purposely introduced.—I remain, sir, yours respectfully,

Dr. O. W. de Witt.

To H. W. Vogel, Berlin.

It is certainly to be regretted that Mr. Spiller's analysis should lead him to results entirely at variance with the finding of other men of uudoubted authority and iudependence, specially when being confronted with his finding that eoside of silver was actually formed in the orthochromatic emulsion process, as described in Attout-Tailfer's specification, an opinion which was at total variance with that of Dr. Eder and several other almost equally good chemical authorities.

I havc only to add that the abovc translatiou is my own, from the original letter of Dr. O. W. de Witt, which may be seen at my office.—I am, sirs, yours truly,

J. R Gotz.

19, *Buckingham Street, Strand, London, March 11th.*

Dear Sir,—Dr. Vogel's statement iu his letter which appeared in your last issue, that Messrs. B. J. Edwards and Co.'s "lawsuit" in opposition to his application for a patent, No. 15.532, 1886, was decided in favour of his claims, is not strictly in accordance with the facts. Messrs. B. J. Edwards and Co. opposed the application on the ground that the process described in the specification was a direct copy and infringement of Tailfer's patent: the result of this opposition being that, by order of the Comptroller, three out of five of the claims in Dr. Vogel's specification were struck out, aud an important disclaimer added, as will be seen on reference to the original and the amended specifications. The effect of this, as admitted by Dr. Vogel's counsel at the hearing, and as shown by Mr. Aston's opinion—a copy of which is appended—being that Dr. Vogel's curtailed and amended patent can only be worked in this couutry under licensc from Messrs. B. J. Edwards and Co.

Mr. Debenham's suggestion that a pateut would be invalidated because Mr. Bedford or any other person failed to work the process successfully with an impure or possibly adulterated sample of cosine would, if scriously inteuded, be a new and curious reading of English patent law.—Yours faithfully, S. J. Woodham-Smith.

3, *New Inn, Strand, March 13th*, 1889.

Copy of Mr. Aston's Opinion.

In my opinion the patent rights secured to Mr. Edwards in respect of Abel's patent, 101/83, are in no way affected by the grant of Vogel's patent, 15,532/86. If anyone iu effect uses the former invention he will infringe Abel's pateut, whether he has, or has not, a patent of his own which may be valid or invalid. The question whether or not the use of the process described by Vogel comes within the claim made in Abel's specification so as to infringe Abel's patent is a question of fact which must be decided according to the evidence that can be adduced. As at present advised, I think Vogel would infringe if he worked his process without the license of Mr. Edwards.

ALBUMENIZED PAPER AS A BASIS FOR CARBON PRINTS.

Sir,—I think that a hint as to the usc of common albumenized paper for the single transfer carbon process may be of use to some of your readers. In the early days of the carbon process—before it was discovered that, with a non-porous support, uo cement was needed to attach thc gelatine film to its support—albumen was one, at least, of various cementing materials used. I do not remember, however, to have heard the fact mentioned, that a piece of common albumenized paper is quite eflicient as a support

in the single transfer, or, indeed, in the double transfer process. All that it is necessary to observe is that the paper be placed in the water, along with the film that it is to support, for only so long a time as is needed to allow it to swell. This does not give time enough for the albumen to be washed off, and the adhesion is perfect. It is very useful for a photographer who works the carbon process only on a small scale to be able to use something that he has, as a matter of course, always with him, especially when he is so far from the place of production of carbon materials as we are here.

Amongst other things, the use of albumenized paper in the way that I have indicated is a means of making use of what I suppose all photographers have occasionally the misfortune to find left on their hands, namely, a lot of albumenized paper that is not so good as it should be for its legitimate purpose.

The salt in the paper has no effect on the carbon print, either one way or the other, and I find the surface particularly good. I use albumenized paper regularly for the production of "Lambert-types," or enamelled carbon prints. K. Ogawa.

Tokio, Japan.

[When albumenized paper is employed as a single transfer paper, it is usual to coagulate the albumen. Immersion in a bath consisting of two volumes of methylated spirit and one volume of water is one of the most convenient methods of coagulating.—Ed.]

THE QUINOL (HYDROQUINONE) DEVELOPER.

Sir,—Beneath, I give you my method of keeping quinol in solution.

As it is only soluble to the extent of about 3 per cent. in cold water, I find a 1 per cent. solution the most convenient.

A very desirable piece of apparatus for storing this solution in would be a Mohr's burette graduated to $\frac{1}{10}$ c.c., to hold, say, 100 c.c.

1 *per cent. stock solution of Quinol.*

Quinol	1 gramme
Citric acid	5 decigrammes
Sodium sulphite	4 grammes
Water, to make	100 c. c.

5 c.c. of this solution are equivalent to 1·5 grains or one decigramme of quinol. A 5 c.c. pipette may be used to deliver this quantity for a half-plate.

Newport, Mon., March 12th. A. Treyer Evans.

HELIOCHROMY.

Sir,—In reply to Mr. Bothamley (Photo. News, Feb. 15, page 98), I repeat that I cannot see much "science" in a process which calls for six negatives to do imperfectly what theoretical considerations show it to be possible to do perfectly with three. Mr. Bothamley will please observe that I have not charged Dr. Vogel with ignorance of the principles of colour vision, but I insist that there is in the procedure proposed by him absolutely nothing which indicates or suggests his knowledge of the principle of three primary colour sensations, and the useless complication of his process attests the fact that he quite failed to realise the possibility of reproducing all colour effects by means of three negatives and colours representing the three primary colour sensations.

If it were true, as Mr. Bothamley now suggests, that Ducos du Hauron's process was based upon this principle, then Dr. Vogel's could only be regarded as a step backward. But it is not true that my process differs from Hauron's only in the fact that modern progress in the science of optics has enabled me to adjust screens and select pigments with greater accuracy. The principles of colour vision which I recognize were well known when Hauron published his process, yet he neither produced negatives representing the primary colour sensations, nor even stated what should be the character of such negatives. His "perfected" process represented the red colour sensation only by negatives made on plates not sensitive to red light, and the blue colour sensation by negatives made largely—if not chiefly—by the action of invisible ultra-violet rays. He stated no principle and described no process in accordance with a true conception of the nature of light and colour vision.

If Mr. Bothamley wants a true illustration of the fact that some photographic experimenters do not give proper credit to the work of previous investigators in the same field, let me remind him of the fact that Dr. Vogel in 1884 claimed that by the discovery of his wet eosine process he had "solved a problem," when, as a matter of fact, a more complete solution of that same problem had been discovered, applied in commercial photography, and published by myself five years before.—Respectfully yours,

Fred E. Ives.

2750, *N. 11th St., Phila., February* 27, 1889.

Proceedings of Societies.

Photographic Society of Great Britain.

At the meeting of this Society held at the rooms, 5a, Pall Mall East, on Tuesday evening last, the 12th inst., the chair was taken by Mr. Jas. Glaisher, F.R.S., President.

It was announced that Capt. Mantell had been elected by the Council as Hon. Secretary, and that the vacancy thus caused in the Council had been filled by the appointment of Mr. T. M. Brownrigg.

A letter was read which had been received from the Society of Amateur Photographers of New York, offering congratulations on the occasion of the Jubilee Anniversary of Photography.

On some remarks being made by Mr. A. Mackay as to the desirability of affording the members every facility for ascertaining the names of candidates for membership before the elections take place, it was announced that in future the nomination papers would be posted on the black board on the night of election, and some time before the commencement of the meeting.

The Chairman then called upon Mr. Friese Greene to open the discussion on Mr. J. W. Swan's paper on "Hydrokinone Development," that stood adjourned from the previous meeting.

Mr. Greene said that every experiment that he had made with hydrokinone since the last meeting had been fully satisfactory. There was one point which he had noticed, that he thought had not been previously remarked: it was that if the developing solution was mixed for a quarter of an hour or more before use, the results were better than if employed immediately after mixing. In the latter case the picture was a little flat. As to keeping qualities, he found that it could be used four or five hours after mixing, and the negatives were far superior. With an under-exposed picture he let the plate soak for half an hour before development in a solution of sulphite of soda; this proceeding reduced the necessary exposure by one half.

Mr. S. G. B. Wollaston said that since Mr. Swan's paper had been read he had thought more and experimented more with hydrokinone. He had occasion to develop a large number of stripping films, and he found it very satisfactory. He thought hydrokinone distinctly superior as a developer to others.

Mr. Nowlan had used hydrokinone with washing soda, and no bromide or restrainer of any kind.

Mr. W. Cobb asked whether Mr. Wollaston had formed his favourable opinion from the appearance of the negatives merely, or from prints made from those negatives.

Mr. G. Davison enquired what were the qualities in hydrokinone developed negatives that Mr. Wollaston referred to as superior to those obtained by pyro development.

Mr. Wollaston replied that he never judged of quality without printing the negative. At the last meeting he had said that he doubted whether the prettier looking hydrokinone negatives would print better than, if as well as, the corresponding ones developed with pyro; but his own experience proved that they did so. In reply to Mr. Davison, one very marked advantage was, that he found that the exposure was diminished. Another advantage relating to stripping films was that they would strip in cooler water than when developed with pyro.

Mr. T. Sebastian Davis said that it had been mentioned as an

advantage that hydrokinone did not stain the film. By further experiments he had satisfied himself that development might be prolonged much more than with pyro, without causing any deposit upon the parts unaffected by light. This was very important, especially for transpareucies intended for the lantern. He had purposely kept a portion of a plate from the light, and developed this plate partly with hydrokinone, and partly with pyro. In the pyro-developed half, there was an effect like halation round the highest light—the sky—where it came next to the shielded portion of the plate. In the hydrokiuone-developed half, this action did not take place. Assuming that he had a plate and was unaware whether or not it had been over-exposed, he immersed the plate first in a solution of hydrate of potash and sodium sulphite, and gradually added a solution of quinol and sodium sulphite. By using the smallest amount of quinol, he found that he obtained a better result than if he used the full amount of quinol or less alkali. He showed plates which had beeu exposed for ten, and for seven and a-half seconds, treated as mentioned; also one that had been exposed for five seconds, and developed by the formula given in Mr. Swan's paper. The results in each case were very satisfactory.

Mr. W. Cobb said that Mr. Greeuc developed his pictures with marvellous rapidity; perhaps he would describe the method he employed.

Mr. Greene replied that although two or three photographers had seen him at work, he thought it better to wait until he had completely worked out his method before describing it publicly.

Mr. Wollaston did not wish it to be understood that he had compared hydrokinone development with that of pyro and ammonia, but with pyro and potash or soda. He had abandoned the use of ammonia altogether for some time past.

Mr. L. Warnerke said that he understood Mr. Davis to say that the less sulphite of soda was used, the weaker was the image. He had seen results showing exactly the opposite to this. Mr. Wollaston had stated that in developing stripping films on paper, he found a lower temperature required than after pyro development, for the strippiug process. In his (Mr. Warnerke's) process he had found that the film developed with hydrokinone was thoroughly insoluble all over, whilst with pyro the parts not developed were solublc. He endorsed what had been said in favour of hydrokinone, especially for paper and chloride images.

Mr. G. Scamell had tried hydrokinone years ago, but had abandoned it in favour of pyro and meta-bisulphite of potash. He had tried it again recently, and now showed his results—a set of three transparencies made with exposures of 15, 30, and 70 seconds, and developed with quinol; another similar set developed with pyro and soda; and a third set developed with pyro and ammonia.

Mr. A. Mackie said that one thing that Mr. Swan had said in his paper that did not agree with his own experiments, namely, that meta-bisulphite of potash could not be substituted for sulphite of soda. He believed that in the negatives shown by Mr. Swan to illustrate the failure with meta-bisulphite, the failure was only due to the acidity of the meta-bisulphite uot having been compensated by a larger addition of alkali.

Mr. W. England's experieuce differed from that of Mr. Davis. He found that a great feature of hydrokinone development was that a good picture could be brought out on an under-exposed plate. He also found that hydrokinone brought out a clear, bright picture, where forced pyro development would fog. For chloride plates it answered admirably.

Mr. J. Hubert showed some negatives taken upon commercial plates, developed that day, some with quinol and some with pyro. The time of development was the same. He thought the range of tone rather better with pyro than with quinol.

Mr. A. Cowan would like to know the cause of a yellow stain that showed itself sometimes with quinol development, especially where the plate was thickly coated.

Mr. Nowlan said there was no doubt a considerable stain in the absence of sulphite, but that the presence of that substance prevented stain.

Mr. Cowan referred to a stain that came on when sulphite was used.

Mr. W. E. Debenham enquired whether Mr. Swau had experimented with meta-bisulphite of potash supplemented by as much alkali as would leave the solution in an equally alkaline condition as that in which sulphite of soda was used; and whether in this case he found the meta-bisulphite had acted as such a powerful restrainer as would be inferred from the paper.

Mr. Swan, replying, said that no doubt in the absence of sulphite there would be a yellow stain. In the formulæ for over-exposed negatives he had given the minimum quantity of sulphite that would suffice to prevent stainiug. The time of development in his experimeuts was the same for pyro and for quinol. One of the points aimed at was to get rapidity of actiou equal to that of pyro. With caustic potash and sufficient quinol, this result was arrived at. He doubted whether so much could be claimed as stated by Mr. England, that it was better for under-exposed negatives than pyro. Mr. Warnerke had said that there was a strong tanniug action, rendering the film insoluble. The difference of his experience and that of Mr. Wollaston might be due to a difference in the films. A gelatiuo-bromide plate developed with quinol might be used to develop an image like a carbon print. He did not intend to say that a picture could not be developed with meta-bisulphite, but that it was a very dangerous thing to use; if a little too much was used, developiug power was destroyed. As to the appearance of the negatives differing from that of those developed by pyro, be thought that experienced photographers would not be deceived by it, especially those who remembered the appearance of wet collodion negatives. As to the absence of action where light had not reached the plates, pointed out by Mr. Davis as so valuable for lantern transparencies, that characteristic was still more valuable when makiug negatives for photo-mechanical work, where clear blacks were essential. With regard to methods of compensating for over and under-exposure, the formula given was the best known at present. For under-exposure use full quantity of sulphite of soda to restrain density. On the other hand, for over-exposure, use the least amount of sulphite that suffices to prevent staining. He was not able to answer Mr. Debenham's question as to whether meta-bisulphite exerted restraining action when corresponding increase in the amount of alkali was used. It was a matter of great satisfaction to him that his paper had excited so much attention.

Mr. Arnold Spiller noted the experiments of Mr. Wollaston aud Mr. Warnerke as to the solubility of the film after hydrokinone development. He had not found it rendered sufficiently insoluble for Warnerke's hot water developing process, at the same time he noticed a shrinking where the image existed.

The Chairman proposed votes of thanks to Mr. Swan and to the members who had given their experiences in the discussion.

Mr. F. W. Hindley and Miss Mildred Burrell Hayley were elected members of the Association.

It was anuounced that at the next ordinary meeting on the 9th of April, the questiou as to whether medals should be given at the next exhibitiou would be discussed, and the opinion of members taken thereon. The meeting then adjourned.

West London Photographic Society.

An ordinary meeting of this Society was held at the Addison Hall on the 8th inst., Mr. W. England (President) in the chair.

Mr. G. F. Blackmore, in describing a uew method of touing lantern slides, said it was well known that the silver image of a transparency or negative might be modified in colour by certain toning processes, and also by varying the exposure and the development. He believed, however, that the process he was about to introducc to their notice possessed novel features, and appeared to opeu a wide field of iuvestigatiou. Working by his system it was possible to make a transparency agree in colour with the nature of the subject, aud a greater variety of colour could be obtained with greater certainty than was possible with any system of developmeut. His early experiments were of a haphazard character. Observing the changes of colour which prints toned by the sulphocyanide bath underweut, the idea occurred to him that it might be possible to obtain similar effects with lautern slides. His first experiment consisted in bleaching an ordiuary bromide transparency with mercury, and afterwards placing it with some aristotype priuts in the sulphocyanide toning bath; these slides, after protracted immersion (some six hours), ultimately toned to a purple colour. On the toning bath being raised to about a tepid temperature the time was reduced to about an hour and a-half—still too long for practical purposes. The proportion of gold was then increased, with the result that the toning proceeded more rapidly. He found from three to four grains of gold to the 10-ounce solution to be about the limit; a larger proportion of gold caused a tendency to precipitation. With this strength toning took place in from ten to fifteen minutes, the colours obtained ranging from greenish blue to

deep purple. Of all the methods tried, the most promising seemed to be to soak the plate after bleaching with mercury in a weak solution of gold (one grain to the ounce of water) preliminary to placing it in the sulphocyanide bath. A great range of colour was obtainable by varying the time of immersion in the gold solution. The bleached image could be toned in the gold solution alone, but in order to secure permanency the tone in this case should be very complete. Toning in the aqueous solution of gold yielded greenish blue tones which were very suitable for moonlight effects. The colour could be modified to a steely blue by a slight subsequent immersion in the sulphocyanide bath, but to obtain this effect the preliminary gold toning must be thorough, otherwise the resulting colour would be a deep purple. Other bleaching agents were experimented with. Slides bleached with cupric chloride resisted all attempts at toning. Others bleached with iodide of mercury proved equally intractable. The borax bath was also used, but after several hours' treatment was found to have no effect upon the image. Other well-known toning baths were not tried. Thus a large field of experiment was open to those who might feel interested in the matter. In summing up, Mr. Blackmore said that to obtain an extensive range of colours by toning, it was essential, first, that the image should be bleached with bichloride of mercury prior to toning. Second, that with the sulphocyanide bath containing one to two grains of gold to the ounce of solution and used cold, a range of tones varying from steely blue to a delicate pink might be obtained ; further, that by keeping the bath above a tepid temperature, the result would be achieved in a shorter time. Third. Increasing the proportion of gold would cause the toning to be more uniform and warmer in colour. Fourth. Tones varying from greenish blue to pink and magenta could readily be obtained by giving the plate a preliminary soaking in a plain gold solution, followed by immersion in the sulphocyanide bath, the plate being washed between each operation. Fifth. Care should be taken to select slides with thin images, as considerable intensification, as well as toning, occurred. Many points remained to be cleared up, such as the results to be obtained from the bath being in an acid, alkaline, or neutral condition ; the effect of dispensing with or adding a larger proportion of hypo to the sulphocyanide bath ; also of increasing or diminishing the amount of ammonium salt. All these suggestions opened up a wide field for investigation.

The President said Mr. Blackmore's paper had disclosed a very promising method of toning slides, and he hoped members would take the matter up with a view, if possible, of further developing the process.

Mr. Hodges believed Mr. Blackmore's process to be a new departure in toning bromide transparencies, although toning collodion slides with gold and platinum was well known ; but in bleaching the image preparatory to toning with gold, Mr. Blackmore appeared to have struck out a new line. The process, however, would require careful working in order to avoid too great a deposit, and consequent blocking of the lights.

Mr. Whiting had found that by varying the exposure and modifying the development, he could get almost any desired colour on commercial plates, therefore he did not see the necessity of resorting to any toning process.

Mr. J. Desire England said warm tones could be produced easily on chloride plates, with a suitable exposure and development.

Mr. Hargreaves had found it impossible to bleach Thomas's lantern plates with bichloride of mercury, without first thoroughly soaking in water.

Mr. Blackmore, in reply, said he believed that the silver image could be bleached, no matter what condition the film was in, although at time both bleaching and toning operations were somewhat erratic. It was desirable to soak the plate in a solution of chrome alum before toning, as the prolonged treatment tended to make the film rotten. If the cold tones were desired, the toning should be proceeded with immediately after development, and before allowing the film to dry ; but if the warm tones were sought, the result would be more readily attained by first allowing the plate to dry.

The optical lantern was then put into operation under the superintendance of Mr. Hodges and Mr. March, some two hundred slides being exhibited.

Mr. Hodges handed round a negative and a transparency on Beechy plates, prepared some twelve years ago. They were produced by a friend of his (Mr. Paul) who, in turning over some old apparatus, had come across a dark slide with the unexposed plates in it. After the mildew with which they were covered had been removed they were exposed, and, as the result proved, were found to be still sensitive to the action of light.

The next meeting is to be a technical one. Members are requested to bring novelties.

Devon and Cornwall Camera Club.

A meeting of this Society took place at the Freemasons' Hall, Cornwall Street, Plymouth, on Tuesday evening, the 5th inst., Mr. Robert Murray in the chair.

The Hon. Secretary read the names of those members who exposed plates at the last meeting, when a series of tableaux were photographed by magnesium flash lights ; and called upon them to produce either the negatives or prints. A number of the members present did so, and the Hon. Secretary was directed to inform the few members absent to forward their prints to him in time for exhibition at the next meeting. The results, as a whole, were considered satisfactory and very encouraging.

Mr. Gage Tweedey then gave a demonstration on "Development without Washing." He pointed out that occasionally a photographer was so situated that it was difficult, or even impossible, to obtain a sufficient supply of fresh water for the use of the ordinary methods of development; notably, on board ship. He therefore wished to bring before them a remedy for this inconvenience. He produced two half plates—Edwards's isochromatic—which had been exposed that afternoon on a figure subject in a fairly lighted room, the one four seconds, the other six seconds, with an R.R. lens working at f_4. These he developed in a solution of pyro, two-thirds of a grain to the ounce, preserved by meta-bisulphide of potash and carbonate of potash 20 grains, a proportion of which he strongly recommended at this time of the year. When the high lights showed clearly at the back of the negative he immersed it, without washing, in the following solution, which had been previously prepared :— 2 ounces of alum were dissolved in 29 ounces of water, making what might be termed a half-saturated solution ; to this was added four ounces of hyposulphite of soda. This should be allowed to stand about two days, during which time a white precipitate would be thrown down ; the remaining clear liquid being that to be used as shown. The solution would keep good a couple of months, and probably longer. As soon as fixed the plate was removed from the dish, carefully wiped with a cloth, and put away, to be washed at a convenient time. One curious result of the process was the extreme hardness of the film ; it was difficult to scratch it with a finger nail. This hardness was, of course, a great advantage, as of course it was not so liable to damage, especially with certain brands of plates given to frilling.

The next meeting will be on the 20th inst., when Dr. Aldridge will read a paper entitled, "Picture Making, not Merely Taking Photographs."

Lewes Photographic Society.

An ordinary meeting was held at the Glee Room, Cliffe, on March 5th ; the President occupied the chair, and there was a good attendance of members.

Messrs. E. J. Baker and J. J. Holloway were elected members of the Society.

It was decided to hold an exhibition of members' work in the autumn, the details to be arranged by the committee.

The President then called on Mr. G. Foxall to read his paper on "Carbon Printing." At the close of the paper Mr. Foxall went through the process by demonstration, and passed round, for the inspection of the members, the prints which he had developed, and which had been exposed previous to the evening.

A vote of thanks to Mr. Foxall for his interesting paper was carried unanimously.

Mr. C. A. Wells showed three prints, and explained that they had been produced by himself, some years ago, when the process was not so simple in manipulation as at the present time.

Some fine prints and enlargements, kindly sent on loan by the Autotype Company, were exhibited, and a vote of thanks was accorded to them for kindly sending them.

A home-made detective camera was shown by Mr. G. S. Constable, with specimens of negatives taken with it ; also other negatives and prints, after which the meeting was brought to a close.

At the next meeting, to be held on April 2nd, Mr. J. Tunks will read a paper on "Hints to Beginners."

Photographic Society of India.

The following are the prizes awarded by Colonel Waterhouse and Mr. W. H. Jobbins, the judges nominated by the Photographic Society to decide on the merits of the different exhibits at the Exhibition recently held in Calcutta :—

Class A—Open to all Exhibitors.—No. 1—Gold medal—To Messrs. Johnston and Hoffman, for No. 33 (Portrait : "Mrs. Ian Hamilton"). We also highly commend No. 45 ("The Cane Bridge over the Teesta, Darjeeling"), and the whole series of photographs in platinum and silver by these exhibitors. No. 2—Special medal—To Lalla Deen Doyal, for No. 137 ; a series of six photographs of places, such as "The Ridge Simla, the Benares Ghauts, the Ellora Caves," &c. No. 3—Extra Silver medal—To P. Klier, of Rangoon, for No. 61 ("Patience"), and No. 65 ("Papa is Coming"). In this class we also honourably mention Messrs. Kapp and Co., for their enlargement, No. 92 ("Naval Volunteers").

Class B—Open to all Amateur Exhibitors.—No. 1—Silver medal—To Mr. E. M. Showers, for No. 226 ("Match between Honor Bright and Landshark," with a hand camera). No. 2—Silver medal—To Mr. A. Norman, for Nos. 125, 129, 130, and 131 ("At Shanklin, Isle of Wight, The Thames at Wargrave, Pangbourne, and Henley.") No. 3—Silver medal—To Mr. J. J. Meade, for his series of "Photo Micrographs." No. 4—Bronze medal—To Mr. T. Miller, for the four views contained in frame No. 110 ("Roadside Views near Calcutta").

Class C—This Silver Medal has not been awarded.

Class D—Open to Members of the Photographic Society only. No. 1—Silver medal—To Lieutenant Dick, for his series of enlargements and photos, Nos. 157 to 165 ("A Series of Views in Cashmere, and a Portrait"). No. 2—Silver medal—To H. H. The Bara Thakur of Tipperah, for the excellence of his series of photographs as artistic pictures, and as platinum prints (mostly views about "Agartala, with a group of Hillmen." No. 3—Bronze medal—To Capt. Wedderburn (A series of views in the Eden and Zoological Gardens, Belvedere ; also shipping "Elephants for the Chittagong Expedition." The judges also desire to honourably mention the photographs by Messrs. J. S. Gladstone, A. Fleming, George Ewing, and A. E. Caddy ; also Mr. J. C. White's portrait of the "Maharani of Sikkim" (No. 241).

Coventry and Midlands Photographic Society.

The usual monthly meeting of this Society was held on March 6th, when a large number of members and their friends were present to witness the lantern exhibition promoted by the lantern committee of the Society. About 250 slides, the work of members, were shown by the oxy-hydrogen light, the lantern being efficiently worked by Mr. F. W. Dew. Mr. Ambrose contributed some views and very successful copies of engravings ; Messrs. Owen and Orton some local and other views ; Mr. Sturmey about one hundred slides of cycling subjects, views, and hand camera pictures ; and Mr. Dew instantaneous studies of animals and children, views in the neighbourhood and North Wales. With a good light, plenty of slides, and an appreciative audience, the exhibition was in every way a success, and was thoroughly enjoyed by all present.

A meeting for the transaction of business was held at the close, and it was settled that at the next meeting there should be an exhibition of members' apparatus, and, time permitting, some flash light portraiture.

Shaftesbury Club.

The usual weekly meeting of the above Club was held last Friday evening, 8th inst., at 8.30, Mr. Jollett occupying the chair.

Mr. Baker read a paper entitled "Trips round London with my Camera," giving useful hints as to convenient and pretty places for amateurs to visit. Mr. Baker showed views of Windsor, Kingsbury, Boxhill, Dorking, and a group of pictures of "Volunteers at Aldershot."

Messrs. Wills, Jollett, Noel, and Samora took part in the discussion which followed.

At the previous meeting an enquiry had been taken from the question box—viz., "The Best Camera Suitable for a Lady ?"

In consequence of this Mr. Wills exhibited the "Aurora" hand camera, concealing within a space of 10 by 4 twelve quater-plates for exposure, with quarter-plate bellows camera, and weighing in all four or five pounds. This was considered to be one of the neatest, most compact, and lightest cameras that had come before the notice of the meeting.

Votes of thanks to Mr. Baker and Mr. Wills brought the interesting meeting to a close. Two new members were enrolled.

Next week, Friday, March 15th, Mr. J. P. Rintoul will give a lecture on "In and Around London," illustrated by about one hundred photographs, shown with dissolving views.

Cardiff Amateur Photographic Society.

The customary fortnightly gathering of the above Society was held at their Studio on Wednesday evening, Mr. J. Mansel Franklen in the chair.

After the ordinary business had been transacted, Mr. S. W. Allen delivered an interesting lecture on "Photography as an Art." The extensive practice of amateur photography as an aid to many pursuits pertaining to art received the full consideration of the lecturer, and with the aid of the pencil he graphically described how to make an artistic picture photographically.

An illustration was also given of the power of the new magnesium flash light in producing instantaneous portraits at night : two excellent negatives of the worthy president being secured and developed.

We understand the lecture given by Mr. Torrie recently to the members privately on his discoveries at Llantweit-Major will be repeated shortly for the benefit of the general public, and under the auspices of the Society.

On March 20th Mr. W. Windsor will demonstrate on "The Lantern and How to Work It."

Bolton Photographic Society.

The ordinary monthly meeting of the above Society was held at the Baths, Bridgman Street, on Thursday evening, March 7th ; Mr. Walter Knowles presiding.

Dr. Johnston brought to the meeting the monthly album of the Argosy Postal Club. Many of the pictures were much admired, and also another album belonging to the same club which is going the round of the members, in which the members are voting for the prints they think are the best ; and the member who gets the most votes is presented with the album.

Mr. Richard Leigh brought to the meeting some negatives taken on celluloid supports instead of glass. They were manufactured by Messrs. Allen and Rowley, of Boston, U.S. The process was much admired for its lightness as compared with glass, and Mr. Leigh stated that they were quite as easy to work as glass.

Mr. Walter Staton exhibited an album of views taken whilst on tour in North Wales, the prints all being on Obernetter paper. Mr. Staton remarked that there was a print in the album from every negative he exposed on that tour.

Mr. Thomas Parkinson showed a variety of apparatus manufactured by C. Vevers, of Leeds, and Mr. A. Harper a number of prints.

Society of Amateur Photographers of New York.

Special Lantern Slide Exhibition.

The Committee on Papers and Publications sends the following report :—One of the most enjoyable exhibitions representing the work of a single member was given at the rooms of the Society, 122, West 36th Street, on Wednesday evening, February 20th, 1889. The subject was "A trip with a detective camera through Norway and France," the negatives and slides, on dry plates, being the work of Mr. Richard H. Lawrence. He had been highly successful, having obtained with his 4 by 5 camera some remarkable views, especially in Norway. The exhibition comprised an admirable selection of 120 slides, of excellent quality and of interesting subjects. Some mid-ocean views were especially artistic, while the grand and magnificent scenery in Norway, including interesting cloud effects and high waterfalls, were perfectly portrayed. The views in France showed the peculiar chalk cliffs on the coast, included various styles of architecture, views on the Seine and other views ; also several interesting points in Paris. All of the pictures with the exception of a few interiors and some others were made instantaneously, with a Beck lens of about six inches focus, using a stop $\frac{f}{11}$, and for marine views a stop $\frac{f}{16}$ in a Scovill Detective Camera on Seed No. 26 plates, developed with pyro or hydroquinone and potash. Most of the

slides were made on dry plates (Eastman transparency), and were developed with pyro, hydroquinone, or iron. Some of his best work was on slides developed with the iron developer, and afterwards slightly intensified.

Mr. CHAMPNEY read the titles of the pictures, and in commenting on them said that Mr. Lawrence had excellent taste in his selection of points of view, and in his management of architectural subjects, which he was compelled to photograph without the aid of a swing back. The work was very creditable, and proved that Mr. Lawrence exercised that fine judgment and careful manipulation which is so seldom observed, but which is so necessary in using a detective camera, if superior results are to be obtained.

A unanimous vote of thanks was accorded him at the close of the exhibition, and it is hoped other members will follow his example, by showing the results of their labour to the Society.

Talk in the Studio.

A SCANDINAVIAN CONFERENCE.—A conference of the photographers of Scandinavia will be held at Christiana from the 11th to the 17th of June of the present year, to celebrate the fiftieth anniversary of the discovery of photography, and a photographic exhibition will be held in connection with it. The Photographic Society of Christiana organizes the meeting, and they invite inventors of instantaneous shutters of all nations to exhibit them, and each shutter must be accompanied by a collection of ten instantaneous pictures taken with it. The exhibitor must also give his name and address, as well as a description of the lens, diaphragm, plate, developer, paper employed in the production of the pictures, together with the price. His Majesty the King has placed at the Society's disposition a number of Royal Silver Medals, which will be awarded as prizes. The articles must be sent, carriage paid, addressed to H. Abel, Christiana, before the 15th of May.

A STRANGE PHOTOGRAPHIC METHOD.—*Truth* says:—"There is one point upon which I should like elucidation. I gave photographs of the *Times* letters to a photographer to be photographed on glass for a magic-lantern. My photographer is one of the most eminent in London, and he told me that from the original letters a negative had been taken; from the negative a photograph had been made; from this photograph a second negative had been taken, and from this second negative the photographs had been made which were given by the *Times* to the defence as reproductions of the original letters. This double photographing, of course, rendered microscopic investigation difficult, as the faults and inequalities of the paper of the first photographs were reproduced in the copies of copies. I am curious to know why this was done. Was it mere stupidity, or, if not, what was it?"

VARNISHES FOR PHOTOGRAPHIC USE.—From the Crane Chemical Co., New Hall Hill, Birmingham, the Editor has received samples of three sorts of varnish which this firm sells for photographic use. A very light coloured thin varnish called "Protectaline" is recommended for varnishing negatives. It gives a hard and bright film. A somewhat darker liquid called "Enameline" is recommended as a substitute for shellac varnish, and a black varnish sold as enamel oil gives a good dead black on metal or wood. They all smell strongly of fusel oil, a circumstance which many are likely to consider a disadvantage.

PHOTOGRAPHIC CLUB.—The next meeting, on March 20th, will be a "Smoking Concert."

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," should now be sent to Mr. Spiller, who is alone responsible for all which appears under that heading.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

A. A. S.—The pinholes in the collodion negative duly received are probably caused by the bath having become over-saturated with iodide of silver, the cure for which will be the addition of about one-tenth bulk of a fresh 30-grain solution of nitrate of silver.

J. TAYLOR (Toronto).—Views of the Holy Land can be procured of Mr. Bedford, 326, Camden Road, London, N.; or of Mr. F. M. Good, Hartley Wintney, Hants. Messrs. Spooner and Co., 379, Strand, London, have also two series—11 by 9 and 9 by 7—the latter preferred.

N. L. T. N. (Amsterdam).—Nelson's No. 1 gelatine is generally approved, but if you find it too soft, add a minute quantity of chrome alum to the emulsion. Heinrich's gelatine is somewhat harder. Longer boiling or increase of ammonia tends to confer greater sensitiveness. Henderson's centrifugal separator is made by Watson, Laidlow, and Co., of Glasgow. Its use is highly recommended by Messrs. Cowan, Pringle, and others. The Eastman Company supply a smaller experimental machine.

PRAVOSVET.—See Captain Abney's and Mr. W. Bedford's papers on orthochromatic photography, read last year at meetings of the Parent Society, in which the proportions of colour-sensitizers are stated. Common turpentine is the rectified oil—not crude Venetian.

POET.—We should prefer the "Improved Portrait" to the "Universal" lens for large heads. Your suggestion to start with a weak developer is good, if you are working with dry plates.

J. P. CLARKE.—There is such a person at Largs, Ayrshire.

J. I.—We have been making enquiries, but cannot hear of a case exactly such as that to which you refer. This is, however, essentially a question for strictly legal opinion. Such a proceeding as letting on hire under similar circumstances to those mentioned is not unknown, but to what extent legal custom could be established is scarcely within our province to advise.

H. S. P.—The apparatus has been inspected, and our report goes to you by post.

NIMROD.—The plates you are using would appear to be too thinly coated with emulsion for copying purposes. Try the "Slow Landscape" sort, which have thicker films and are less sensitive.

P. M. P. (Nottingham).—Answered by post.

G. SMITHSON.—All pink papers fade, sooner or later, which are stained with cosine, and we are not aware of any process by which the colour may be made absolutely fast. Roseine and the madders are more permanent to light, but not nearly so brilliant. We should recommend you to get Professor Church's little book on "Colour"; also the recently-issued Government Report "Action of Light on Water-Colours," by Dr. Russell and Captain Abney. Blue Book, price 2s. 9d.

HYPO SUBSTITUTE.—Citrate of soda would be of no use as a fixing salt, for although it would remove and wash out the free nitrate of silver, it would not dissolve the unaltered chloride or bromide. Sulpho-cyanide of ammonium has been recommended for this purpose, but the cost is too great.

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THE PHOTOGRAPHIC NEWS.

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INSTANTANEOUS PORTRAIT PHOTOGRAPHY.

WHEN the advances in the sensitiveness of gelatine plates that have taken place in late years are taken into account, it appears strange that so little has been done in the way of bringing into practical general use in the studio of the professional portrait photographer the method of photography called instantaneous. The plan of taking the photograph of a sitter with so much rapidity as not only to dispense with the use of head-rests, but to render the operator independent of slight or slow movement on the part of the subject, is one which is so captivating that it may be said to be the ideal which so many photographers have in view, whilst scarcely hoping to see it realized. Nevertheless, it is a fact that in the earlier days of the application of gelatine photography to portraiture, eight or nine years since, there were photographers who practised a good deal in this direction, not merely as matter of interesting experiment, but as a part of their daily business. If the gain in sensitiveness in the preparation of gelatine bromide plates since that period has been as great as is commonly claimed, it might reasonably be supposed that a much more wide-spread use would, before now, have been made of a method which presents such obvious advantages, and the objection to which appears to be limited to the difficulty of obtaining surfaces sufficiently sensitive for the action of light to be impressed powerfully enough during the fraction of a second that the shutter remains open.

As tending to bring the subject of this article forcibly before photographers, we notice a communication by Herr Carl Angerer in the current number of the *Photographische Correspondenz*. Herr Angerer will be known to many of our readers by repute at least. The portrait establishment bearing the name of Angerer is, indeed, one of the oldest and most highly esteemed in the Austrian capital; and some of the older members of the photographic fraternity will, doubtless, remember some very fine large groups exhibited by that firm made direct upon wet collodion some twenty-five to thirty years ago, groups that might even now serve as models in many respects for the study of those desirous to excel in this particular walk.

Herr Angerer was led, he tells us, to the consideration of the practicability of instantaneous portraiture by seeing, whilst on a visit to the Institute for Instruction and Research in Photography, presided over by Dr. Eder, in Vienna, some instantaneous photographs of Professor Lenhard, as well as his pupils, which greatly interested him. There was in them, he says, nothing of the strained position of the figures, no suggestion of uneasiness, only clear healthy nature—life itself. In illustration of his observation, Herr Angerer has supplied a supplement to the *Photographische Correspondenz*, concerning which he says: "One has only to look at the picture which I have etched from a negative kindly placed at my disposal by Dr. Eder—the negative being the work of one of the pupils of the Institute before mentioned—to agree with me." The smiling, arch expression on the face is not the result of the word of command or request from the photographer. The girl, a model, was much amused with the trouble and difficulty that one of the pupils had experienced with her, and this moment was selected by another pupil in order to fix the merry face—the owner of which was unaware of being observed—fast upon the sensitive plate.

In order to secure a pleasant expression he suggests—what has certainly been suggested before, but with what success we do not quite know—that the sitter should be requested to look at a mirror which has been arranged in a suitable position, and then rapidly to take one or two exposures. He states, as a physiological fact, that a person looking at himself carefully in a glass remains absolutely still, does not move an eyelash, and assumes the pleasantest expression possible. He adds, however, that it is necessary, in operating in this manner, to have everything arranged so as to make the exposure without delay, so as not to keep the sitter looking for long in the glass, otherwise the nerves become fatigued after a short time, and the movement of the sitter so much the more considerable. He therefore advises that the mirror be covered with a cloth up to the moment when everything is ready for the exposure, and that it be then uncovered, and the exposure made as rapidly as possible.

Of the particular mechanical or chemical means employed so as to secure a sufficient exposure on the plate, Herr Angerer does not speak. There are, however, certain general lines upon which it is necessary to work. The plate, of course, should be a highly sensitive one; the shutter, one that does not work with anything like utmost rapidity. We have known good work in the studio carried on with a shutter, the exposure with which was about the sixth of a second, and the lens must not be closely stopped down. With the introduction of gelatine plates, less care is taken in the arrangement of the figure and of the accessories to one plane—or, rather, curve—than was formerly the custom when a large aperture of lens was generally employed. When working with instantaneous portraiture in the studio, there must be the same precautions with regard to focus that were formerly adopted as a matter of course in all cases. Last, but not least, the light must be suitably arranged. There should be a large amount of open glass on roof and side, and abundant reflection to light up the shadows. This arrangement does not necessarily imply bad or inartistic lighting. We have known photographers who prefer such an arrangement on its own merits, independent of its rapidity.

THE ANNUAL PHOTOGRAPHIC CONFERENCE.

This is to take place on Monday next, Tuesday next, and on the following Wednesday, and it will be inaugurated by a smoking concert at the Camera Club Rooms, 21, Bedford Street, W.C., on Wednesday evening at 8 o'clock.

On Tuesday, March 26th, the Conference and Exhibition of Apparatus will open at the Society of Arts, 18, John Street, Adelphi, at 2 p.m. Papers to be read from 2 p.m. to 5.30 p.m. in the Theatre :—Mr. Conrad Beck, "Depth of Focus;" Mr. J. Brett, A.R.A., "The Relation of Photography to the Pictorial Art;" Mr. P. H. Emerson, B.A., M.B., "Science and Art;" Mr. Lyonel Clark, "A Comparison of Developers;" Captain W. de W. Abney, C.B., R.E., F.R.S., "The Law of Error and Photography;" Mr. T. R. Dallmeyer, "Shutters;" Mr. G. Lindsay Johnson, M.A., M.B., "A Shutter Speed Measurer." At 8 p.m. :—Exhibition of Lantern Slides in the Theatre. Slides from Paris, Vienna, American and English societies.

On Weduesday, March 27th, at 10 a.m., the Apparatus will be on view at the Society of Arts, and Exhibition of Photographs by members at the Camera Club Rooms, 21, Bedford Street. 2 p.m.—Renewal of Conference in the Theatre, Society of Arts. Papers to be read from 2 p.m. to 5.30 p.m. :—"Mr. C. H. Bothamley. "Chemical Changes from the Modern Point of View;" Mr. A. A. Common, F.R.S., "Irradiation in Astronomical Photography;" Mr. A. Dawson, "The Field of Photogravure;" Mr. W. T. Wilkinson, "Dry Plates for Photo-Litho and for Collotype;" Mr. A. Pringle, "Photo-Micrography;" Capt. A. M. Mantell, R.E., "Photography applied to Military Purposes." 7.30 p.m.—Annual Club Dinner for members and friends at the Holborn Restaurant.

All photographers are cordially invited to the Conference and Exhibitions. We are informed that all the meetings except the smoking concert will be open to ladies. Captain Abney is President of the Conference.

ORTHOCHROMATIC PHOTOGRAPHY.

BY C. H. BOTHAMLEY, F.I.C., F.C.S.

Second Series.

The chemistry of the compounds which are used as sensitisers in orthochromatic photography is not contained in any of the ordinary text-books or more readily accessible works of reference. It can, indeed, only be found in comparatively recent periodical literature, and hence it seemed desirable to bring together, in a connected form, the more important facts relating to the constitution and properties of these substances and their general chemical relationships. Many points, especially those of a purely technical character, can only be treated very briefly, but references will be given, as far as possible, to the origiual sources of information.

Quinoline Dyes.

This group includes the colouring matters derived from the base *quinoline*, C_9H_7N (Ger., chinolin); its isomeride, *iso-quinoline*, which has the same composition, but differs in some of its chemical and physical properties; and its homologue, *methyl-quinoline* ($C_{10}H_9N$), which also occurs in two isomeric modifications known respectively as *quinaldine* (chinaldin) and *lepidine*, which have the same composition, but differ somewhat in their properties.

The group is remarkable on account of the small number of colouring matters which it at present contains. Schulz and Julius mention only five, and of these two only, the *quinoline yellows*, are actually used for tinctorial purposes; two, *cyanin* and *quinoline red*, are prepared mainly on account of their use in photography; and the fifth, *quinoline green*, is not made except as a laboratory product. Probably the number will be considerably increased in the future. The chemistry of quinoline and its derivatives is as yet by no means fully worked out, and consequently, although the composition of the dyes mentioned has been determined, and their definite character is fully established, their constitution—or, in other words, their relation to one another and to other compounds—has in some cases still to be ascertained. This is more especially the case with the only two which are of much importance from our present point of view.

Cyanin.

This dye was discovered by Greville Williams in 1860 (*Chemical News*, 1861, p. 219), and is noteworthy not only on account of its photographic value, but because it was one of the very first dyes prepared artificially, and also because it has the reputation of being more sensitive to the action of light than any other dye. A comparatively very short exposure to sunlight is sufficient to bleach it completely, and hence it is rarely, if ever, used for application to fibres or fabrics.

After its discovery by Williams, cyanin was investigated by Hoffmann (*Compt. rend.*, 55, 840, *Jahresbericht-f-Chem.*, 1862, 351). It has the composition $C_{29}H_{35}N_2I$, and is obtained by the action of caustic alkalies on the product formed by the action of amyl iodide on a mixture of quinoline and lepidine in equivalent proportions. The process of preparation is complicated and difficult, and the amount of cyanin obtained is always small. The pure compound can, however, be obtained from Hopkin and Williams, Cross Street, Hatton Garden, E.C.; F. Beyrich, 114, Linienstrasse, Berlin, N.; Dr. T. Schuchardt, Görlitz, or his agents, Becker and Co., of Maiden Lane. It forms small prismatic crystals with a beautiful green metallic lustre. It is practically insoluble in cold water, but dissolves somewhat readily in hot water—apparently with partial decomposition, for the solution has the odour of free quinoline. Caustic soda added to the aqueous solution throws down a blue precipitate, which becomes brown on heating. Concentrated sulphuric acid dissolves cyanin to a colourless solution, which gives off vapours of iodine when heated; if diluted, it remains colourless. Cyanin dissolves somewhat readily in alcohol, forming a beautiful deep blue solution, which shows no fluorescence, but gives an absorption spectrum consisting of one intense dark band, which is sharp and well defined on the less refrangible side, but fades away gradually towards the blue, the point of maximum intensity being at wave length 630 (Vogel). In an aqueous solution the absorption band shows two maxima—one at λ630, and the other, much less intense, between D and E. A solution of cyanin in absolute alcohol can be kept in the dark for a considerable time without undergoing any appreciable alteration, but an aqueous solution slowly decomposes. A solution in methylated alcohol is also liable to decomposition, in consequence of the action of the impurities necessarily present in the methylated spirit. All the solutions are rapidly decolourised when exposed to light; they are also decolourised on adding acids, but the colour reappears on the addition of ammonia. According to Schonbein, cyanin is rapidly decolourised by ozone or moist oxygen, and, in some cases, the colour is restored by reducing agents, in others not. If, however, a solution which has been decolourised in this way is exposed to light for some time, a dark blue precipitate of *photo-cyanin* separates, and the prolonged action of light converts this into *photo-erythrin*, a cherry-red substance soluble in water (*A. Wurtz, Dictionnaire de Chimie*, vol. 1, 1070).

Cyanin is by far the best sensitizer for orange and orange-red that we possess, and according to Burbank it will even sensitise for the infra-red rays. Waterhouse states that it will sensitise as far as A, but gives no distinct lines beyond this limit. (See Photo. News, 1887, 549 & 550; 1888, 791; and 1889, 77.)

Quinoline Red.

This beautiful dye was discovered by Dr. Emil Jacobsen in 1882, and has been very carefully investigated by

Prof. A. W. Hoffmann (*Berichte der Deutschen Chemischen Gesellschaft*, 1887, 4; abstracts *J. Chem. Soc.*, 1887, 380; or *J. Soc. Chem. Industry*, 1887, 214). It has the composition $C_{26}H_{19}N_2Cl$, and is obtaiued by the action of benzo-trichloride on a mixture of isoquinoline and quinaldine in presence of zinc chloride. As in the case of cyanin, the yield of colouring matter is comparatively small. Quinoline red forms small, dark red-brown crystals with a brouze-like metallic lustre, and is different in appearance from cyanin or the cosin dyes. It dissolves slightly in cold water, and more readily in hot water; it also dissolves in acetic acid, but is insoluble in ether, benzene, or carbon bisulphide. Alcohol dissolves quinoline red in considerable quantity even in the cold, and the solution has a splendid crimson red colour by transmitted light, and shows a very fine yellowish-red fluorescence, different in tint from the fluorescence of the eosin dyes. Dilute acids and ammonia have no effect on solutions of quinoline red, even after several days. Concentrated sulphuric acid dissolves the solid colouring matter and forms a perfectly colourless solution, which, however, when diluted with water, acquires the colour and fluorescence characteristic of ordinary solutions of the dye.

It seems probable that this dye exists in two isomeric modifications, which, however, differ but slightly in their properties; the one (quinoline red) is obtained from ordinary quinoline; the other (isoquinoline red) from isoquinoline (*vide* Hoffmann's paper). Acccording to Vogel (same paper) the two modifications differ slightly in their absorption spectra, and the isoquinoline red has a somewhat greater sensitizing action than the other. Further experiments are, however, necessary before the existence of the two modifications can be accepted as established.

The absorption spectrum of an alcoholic solution consists of two dark bands with very nebulous edges; one in the yellowish green, which is the darker of the two, and has a maximum at wave length 540, and the other in the bluish green, with a maximum at 500.

The sensitizing action of quinoline red is inferior to that of eosin dyes so far as regards its intensity, but with proper concentration of the bath solution the position of maximum sensitizing effect lies somewhat nearer to the red end of the spectrum, and hence the results approach more nearly to true orthochromatism.

When quinoline red is treated with bromine water it yields *quinoline violet* (Vogel, *Praetische Spectral Analyse*, 1889, p. 365). It forms a purple-red solution which is not fluorescent. Its sensitisiug action, according to Vogel, is inferior in inteusity to that of quinoline red, but extends somewhat further towards the red.

Azalin.

In 1884, Vogel introduced a sensitiser, to which he gave the name "Azalin," and for which he claimed the advantage over eosin that it gave greater sensitiveness to orange and orange-red without excessive sensitiveness to green. For some time the composition of this sensitizer was kept secret; but in 1886 Mallman and Scolik made an analysis of "azalin," which led to the conclusion that it is a mixture of quinoline red with a smaller proportion of cyanin (*Photographisches Archiv*, 1886, 225). Vogel afterwards stated that this is the actual compositiou of azalin, and a mixture of quinolinc red and cyanin is recommended in the Patent Specification, No. 7963, 1886.

Mallmann and Scolik (*loc. cit.*) describe azalin as a substance which dissolves in alcohol and forms a deep carmine red solution with a brownish red fluorescence. Its absorption spectrum consists of a narrow band near the line D, and an intense broad band in the green and blue-green. In very dilute solutions the broad band splits into two, and the narrow band near D becomes almost invisible. This agrees with Vogel's description of the absorption spectrum of azalin (*Photographie farbiger Gegenstænde*, p. 100).

When the alcoholic solution is diluted with water and agitated with ether, the ether dissolves out the cyanin, which can thus be separated. The dilute alcoholic solution no longer shows the absorption band near D, has lost its purplish tinge, and the colour of the fluorescenc e has changed from brownish red to fiery yellow red; it has also lost its power of sensitizing for orange and orange-red, and in every respect behaves like a solution of quinoliue red.

In my former papers I stated that azalin was understood to be a mixture of quinoline blue (cyanin) and quinoline red (*J. Soc. Chem. Industry*, 1887, p. 424). At a recent meeting of the Photographic Society of Great Britaiu, however, Abney stated that azaline was a mixture of eosin and cyanin, whilst quite recently Mr. Spiller has stated (this vol., p. 107) that the so-called azalin tincture sold in this country by Vogel's agent is simply a solution of eosin or erythrosin in alcohol. I therefore determined to make a careful examination of the azalin tincture in my possession, and whilst this examination was in progress I received from Mr. Gotz a request to make an analysis of the tincture which he offers for sale in his capacity as Vogel's ageut. My report on this analysis has already beeu made public (this vol., 155), but since the matter is of considerable interest, not only from the point of view of orthochromatic photography, but also because of its bearing on the *bona fides* of an investigator of Dr. Vogel's rank, it seems desirable to describe in detail the observations which I have made. I hope I need not add that I am not iu any way interested in the commercial aspect of the question.

The azaline tincture used for the examination consisted of a bottle obtained about fifteen months ago through a local dealer, a bottle obtained direct from Mr. Gotz about nine months ago, and three bottles obtained from Mr. Gotz on February 16th and 19th. The contents of each bottle behaved in precisely the same way.

Since one of the chief points is the distinction between the cosiu dyes and quinoline red, it will be convenient to bring together the chief reactions and properties in which they resemble or differ from one another.

The eosin dyes come into commerce almost invariably in the form of sodium or potassium salts, and these are all fairly soluble in water. Only those in which the potassium or sodium has been completely replaced by the radicles methyl or ethyl are insoluble in water, and they dissolve readily in alcohol. Quinoline red is appreciably, though only slightly, soluble in cold water, but dissolves easily in alcohol.

Quinoline red dissolves in strong sulphuric acid, forming a perfectly colourless solution which on addition of water regaius the colour and fluorescence characteristic of the dye. Eosin dyes also dissolve in strong sulphuric acid, but at the same time undergo alteration, and when water is added the liquid has only a yellowish brown tinge. This is a very striking and characteristic difference.

Ammonia has no marked effect on either quinoliue red or the eosins, but sometimes slightly alters the colour of the fluorescence of the latter.

Dilute acids have no effect on solutions of quinoline red, but if added to aqueous solutions of the eosins they completely precipitate the dye. Alcoholic solutions of the cosins are not precipitated by dilute acids, but the fluorescence is immediately and completely destroyed.

The fluorescence of quiuoline red is a fiery reddish yellow without a green tinge, whereas the fluorescence of the eosin dyes has a green tinge which in some cases is very marked indeed, and in all cases is readily distinguished in aqueous solution, or on diluting the alcoholic solution with water. Several of the eosin dyes—for example, erythrosin and rose Bengal—are not fluorescent at all.

The absorption spectrum of quinoline red consists of a broad band in the yellow and green, which in sufficiently dilute solutions resolves itself into two bands in the green, the less refraugible of the two being the more intense.

Both bands are very nebulous at the edges, and in dilute solutions become very feeble in intensity.

The absorption spectrum of the eosin dyes likewise consists of a broad band in the yellowish green and green, and when the solution is diluted this band usually splits into two, the more refrangible being much less intense than the other. *The less refrangible band remains intense even in dilute solutions, and is sharp and well defined on the less refrangible edge*, although somewhat nebulous on the opposite side.

A careful examination of alcoholic solutions of three eosin dyes, quinoline red, and azalin was made by means of a Steinheil spectroscope with two large prisms and a reflected scale. An ordinary No. 5 gas burner was used as a source of light, and was placed at a distance of four inches from the slit. The layer of liquid examined was half-an-inch (12·5 mm.) in thickness; and the solutions examined contained one part of the dye in 2,500, 10,000, 50,000, 100,000, and 200,000 parts of alcohol respectively. The azalin tincture was examined as received, and also diluted with alcohol so that the solutions contained one part of azalin tincture in four, twenty-four, and eighty parts respectively. Only the scale readings are given, but the following readings of well-known bright lines will indicate the exact position of the bands, and also make it possible to calculate the wave lengths is desired.

Si=47; Na=100; Baα=133, Tl=153; Srα=269.

		1 : 2,500.	1 : 10,000.	1 : 50,000.	1 : 100,000.	1 : 200,000.
Methyl Eosin (Potassium Salt)... ...	1st Band	115 —	121-235	130-180	135-174	141-170
	2nd Band	—	—	192-227	194-218	†
Ethyl Eosin (Potassium Salt)	1st Band	114 —	—	130-177	133-172	137-162
	2nd Band	—	—	181-219	185-215	†
Tetrachlor-tetrabrom-fluorescein ...	1st Band	104 —	110-205	116-154	120-153	125-150
(Potassium Salt)	2nd Band	—	—	170-197	†	‡
Quinoline Red	1st Band	100 —	108 —*	120 — ?	125 — ?	Middle at
	2nd Band	—	—	—	†	178
		As received.	One-fourth.	One-twentieth.	One-fortieth.	One-eightieth.
Azalin Tincture	1st Band	100 —	109 —*	120 — ?	123 — ?	Middle at
	2nd Band	—	—	—	†	176

* Some of the violet was transmitted, but the termination of the band was too nebulous to admit of measurement.
† These bands were too faint for accurate measurement. ‡ The second band was barely visible.

The dispersive power of this spectroscope being too great for proper observation of the faint bands, the spectra of quinoline red and azalin were examined in a similar manner by means of a Desaga spectroscope with one prism and a reflected scale; Na or D=50.

		1 : 50,000.	1 : 100,000.	1 : 200,000.
Quinoline Red ...	1st Band	55-66	57-66	59-65
	2nd Band	68-77	69-75	69-74
		One-twentieth.	One-fortieth.	One-eightieth.
Azaline Tincture...	1st Band	56-66	56-66	58-65
	2nd Band	68-77	69-75	69-74

The azalin tincture showed a brilliant reddish yellow fluorescence, identical in appearance with that of quinoline red, without a green tinge even when diluted. Erythrosin and rose Bengal, *i.e.*, the sodium or potassium salts of *tetraiodo-fluorescein* and *dichloro-tetraiodo-fluorescein* respectively, are not fluorescent, and the only soluble eosin dyes which show a fluorescence at all comparable with that of azalin tincture are soluble methyl eosin, soluble ethyl eosin, and the sodium or potassium salt of tetrachlor-tetrabrom-fluorescein, which is sometimes called *Phloxin* and sometimes *Erythrosin B*. The latter especially somewhat closely resembles azaline tincture in the appearance of its fluorescence and in the absorption spectrum of *strong* solutions, and it is quite conceivable that they might be taken for one another on superficial examination. In chemical properties, however, they show well marked differences.

From the measurements given it will be seen that the absorption spectrum of azalin tincture in dilute solution is distinctly different from those of the eosin dyes, whilst it corresponds exactly with that of quinoline red, the very slight differences in the readings being due to unavoidable errors of observation in measuring absorption bands with such nebulous edges. Even with a dilution of 1 in 200,000 the less refrangible band of the eosins remains very intense; whereas, the bands of azalin, like those of quinoline red, become very faint and nebulous. This fact alone indicates that the azalin tincture contains no dye of the eosin group. I was informed that the azalin tincture contains one part of quinoline red in 2,500 parts of alcohol, and this statement is completely borne out by the observed intensity and position of the bands. The absorption bands of the azalin tincture correspond with those of quinoline red not only in position, but also in intensity, and in their extremely nebulous character. No trace of the absorption band of cyanin could be observed.

Azalin tincture is not affected by dilute acid, even after several days.

Azalin tincture, evaporated to dryness on a water bath, leaves a solid residue which dissolves appreciably in cold water, and more readily in hot water, forming a solution with the colour and fluorescence of the original tincture. *If the solid residue is treated with strong sulphuric acid it forms a perfectly colourless solution, and if this is mixed with water it re-acquires the colour and fluorescence of the original solution.*

It is evident from these observations that azalin tincture agrees in its chemical and physical properties with a solution of quinoline red, and not with solutions of the eosin dyes. It is, in fact, a solution of quinoline red in methylated alcohol.

No evidence of the presence of cyanine was obtained, but some of the tincture has been in my possession fifteen months at least, and I am informed that the whole of it was made at the same time. Now since cyanin slowly decomposes even in solution in absolute alcohol, and since methylated alcohol contains a notable proportion of substances of considerable chemical activity and reducing power, it is obvious that the fact that cyanin cannot now be found in the solution is no proof that the cyanin was not put into the solution when it was prepared.

It is important to bear in mind the unstable nature of cyanin when preparing solutions of the simple substance, or of azalin. Methylated alcohol should never be used, and only the purest absolute alcohol should be employed. This applies not only to solutions of cyanin, but to any alcoholic solutions that are employed for the preparation of orthochromatic plates. It is also advisable to make up only small quantities of cyanin solution at a time, since the solid substance is infinitely more stable than its solution. Quinoline red is much less liable to decompose, and it seems that if the solution is kept in the dark, it will remain unaltered for a very considerable length of time.

(*To be continued.*)

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

Nineteenth Article.

BY W. M. ASHMAN.

The subjects for this chapter are the reduction of negatives which are too dense, and instructions for varnishing. It sometimes happens that, either from lack of sufficient experience, or by accident, the action of the developer has been prolonged to an extent that produces too dense a deposit upon the plate, rendering the negatives very unsuitable for printing from, and the prints hard and without any detail in the lighter portions. This effect is sometimes brought about by trying to force a deposit of silver upon the darker portions of the subject by increasing the amount of alkali in the developer, and protracting the operation beyond reasonable limits. Making a trial print is the best guide as to opacity in a negative, until the student has learned to distinguish an excess of this quality at a glance. The skill to do this may be more readily acquired if the plate is examined at a suitable angle over opal glass. Our object then is to endeavour to so change this condition of excessive density, that the negative may be improved in quality, and thus made serviceable for printing from by any of the usual methods.

To reduce a negative successfully requires not only the technical knowledge necessary, but a great deal of watchfulness on the part of the photographer, and it is well that the student should commence by practising upon an intense negative of no value, with weak solutions, before he attempts to alter the density of any of greater importance. By adopting this safe plan of gradually and experimentally acquiring the necessary skill to effect the purpose in view, success will be achieved; but should the beginner attempt the reduction of a favourite negative with strong reagents he will, in all probability, carry the process too far, perhaps re-acting upon the film unequally, or destroying the picture altogether.

In the last chapter the convenience of reducing a negative by exposure to the air after fixing, was referred to; but, of course, it is only practicable at that time, while the plate is charged with the thiosulphate; moreover, the action is often too slow or inefficient when much of the opacity requires removal. Under these circumstances it is better to have recourse to stronger measures. There are several re-agents capable of reducing density, but that plan suggested by H. E. Farmer on page 135, vol. xxvii., Photographic News, is easy of application, and effective, and the risk of spoiling a negative when dilute solutions are used is very slight indeed. The principle involved is based upon the decomposition of the ferricyanides into ferrocyanides in the presence of sodium thio-sulphate (hypo), whereby ferrocyanide of silver is formed on the surface of the image, and is readily dissolved by the fixing agent. In practice, then, the negative to be treated may be soaked in water for a short time, and then transferred to a dish, and covered with sufficient of a two per cent. solution of the red prussiate of potash (potassium ferricyanide). The colour of the surface will gradually become changed, and upon looking through the film will appear less dense, because lighter in colour; then immerse the plate in a weak solution of hypo for a minute or so, and examine by transmitted light. If the reduction is insufficient, the plate can be rinsed with water and the process repeated, and it is far better to do this than to run the risk of making the image too thin by the prolonged action of the ferricyanide solution in the first instance. Farmer recommends a mixture of the agents as follows:— Potassium ferricyanide, one ounce; water, one pint. A few drops of this five per cent. solution should be added to one fluid ounce of clean hypo fixing solution, and the whole diluted with four ounces of water. In this mixed solution the plate is immersed and left until the required reduction has taken place. Increased energy can be set up by the addition of more of the ferricyanide solution, but care must be exercised in its use, and the effect upon the negative watched closely. When finished it must be well washed, as after fixing, and made ready for printing. The mixed agents decompose quickly and soon become too feeble for use, but the above stock solution of ferricyanide remains tolerably stable for some time if bottled and kept in the dark room.

Sometimes negatives so reduced turn remarkably yellow in colour, thereby rendering printing on ordinary sensitized paper as tardy as the previous density would have been. A dip in the acidified alum solution, mentioned in a previous chapter, will often discharge the colour. When this does not prove effectual, the application of dilute cyanide of potassium solution may cautiously be resorted to. Badly fixed negatives will stain in patches, hopelessly.

An intense image may also be reduced by acting upon it with potassium chromate solution, and dissolving the silver chromate formed with ammonia solution; or the following may be employed:—

Potassium dichromate ...	... 100 grains
Hydrochloric acid ...	... 100 minims
Water	... ½ pint

Soak for a few minutes in this solution. Perchloride of iron also acts favourably as a reducer. In practice we dissolve the solid ferric-chloride in methylated spirit, or dilute hydrochloric acid, until a sherry-coloured solution results. This is diluted with water, exact quantity not very material. After the negative has been treated with the iron solution and washed, it is followed by an immerson in the hypo fixing solution. The process may be repeated again and again until the desired reduction takes place, or the fer. chlor. B.P. is quite suitable with a little hydrochloric or citric acid added. Treatment with this is oftentimes sufficient, without following in the hypo fixing bath. Belitzki recommends one to ten grains of ferric oxalate (green crystals from ferrous oxalate developer) to each fluid ounce of an ordinary hypo bath. By means of the process of reducing negatives those plates which are anything but perfect through over-exposure can be made available for printing so long as enough deposit has been produced in development. The practice of this requires considerable judgment and skill, and it consists of reducing the image first until the shadows are fairly clear, and then building up the whole picture by intensification afterwards.

Negatives which have been already varnished can be reduced, provided the varnish be completely removed; and this is an easy matter, because the ordinary spirit varnishes do not penetrate the gelatine film. Place the negative in a flat dish, or by other means cover the surface with methylated alcohol which has been made distinctly alkaline by the addition of a few drops of strong ammonia solution; let it soak for a minute or two, and then aid the removal of the gum by gentle friction with a small pad of cotton wool, or a clean, soft finger; after which the plate may be flooded once or twice with fresh spirit, and well washed by soaking in two or three changes of water, film downwards. The negative will then be ready for the reducer.

All gelatine negatives ought to be gently heated for a few minutes to drive off moisture before any varnish is applied. Resins, such as the lacs—gum dammar, sandarac, and common resin—dissolved in methylated alcohol form the base of most negative varnishes. Mr. W. K. Burton has recently been testing gum juniper, and, in the *American Annual of Photography*, gives the following formula:—

Gum juniper ...	... 1 pound (by weight)
Venice turpentine	... 4 ounces (by measure)
Oil of turpentine	... 8 „ „
Alcohol (about ·825)	... 1 gallon „

Dissolve without heat. The plate, slightly warmed, is usually held level in the left hand, at the lower left

hand corner, and a pool of varnish is poured from the bottle containing it in a steady stream upon the surface near the top right-hand corner; a slight twist of the wrist outwards will then cause the pool to make its way towards the left-hand top corner; dropping the wrist will again alter the direction of the flow, this time towards the left hand; another bend of the wrist inwards will direct the liquid to the lower right-hand corner, whence it can be poured off into the bottle, the negative having been completely covered with the varnish. When pouring off the superfluity the plate should not be tilted at a very sharp angle, or the varnish may run in waves. Time also must be allowed for the liquid to draw off at the corner, so as to check the tendency to run upwards and form a double ridge. Violent rocking of the plate during draining is unnecessary; once inclining the negative to the right and once to the left with a slow even motion is quite sufficient to prevent the formation of lines or streaks. The surface of varnish is improved by heating when set, and the work is best effected in an apartment from which currents of cold air are excluded, as such are apt to chill the surface and produce dull patches. Too much methylated alcohol used for diluting the varnish is likely to produce a dead or partially matt surface, a result also sometimes of having more than ten per cent. of water in the alcohol. Varnish which contains too much body, either from error in preparation, or in consequence of evaporation of the solvent, is liable to flow in waves and set too quickly, thus producing a thick coating at the lower portion of the negative, which takes a very long time to become thoroughly hard. The remedy for varnish in this condition, obviously, is dilution with more of the solvent, methylated alcohol. Gelatine plates varnished with some samples when spotted with water, are apt to exhibit a peculiar crystalline formation with a circular outline wherever the water has been in contact, which shows distinctly in prints taken therefrom. The remedy is that of dissolving off the varnish as explained above—drying, heating, and revarnishing. Samples of varnish with a basis of orange shellac are less liable to be affected by moisture, but an imperfectly fixed or washed film so varnished will deteriorate if stored in a damp room. The addition of two per cent. of camphor, castor oil, Venice turpentine, or almost any of the resinous balsams, to a spirit varnish confers a toughening property, and thus renders it a more efficient protector to the negative. Oil varnish is not liable to become starred when in contact with water, or when damp, and for several reasons is preferable. It can be applied cold, and dried in half an hour.

The formula given by the writer on page 205 of the Photographic News Almanac for the current year answers well. The proportions are as follows:—

Japanner's gold size	...	...	...	1 part
Rectified benzole	...	...	...	1 ,,

The plate should be thoroughly dry, but not warm; drain off the excess of varnish, and allow the plate to dry during the night. As this varnish when thoroughly dry and hard is practically insoluble, its removal from a negative for the purpose of altering density is not so easy as in the case of spirit varnishes.

There are many photographers who make use of plain collodion (pyroxyline dissolved in methylated ether and alcohol) instead of resinous varnishes, two coats of which applied in the same way as described for varnishing, but without heat, form a very good protection to the film. If the first coat is thoroughly dry, and the plate reversed end for end before the second is applied, the result is better. When retouching is carried out by means of a graphite pencil, a medium is useful to work upon the gelatine; over this a first coat of collodion may be applied. Then if more pencil work is requisite, more medium can be put on, and any deficiency made good before the second coat of collodion follows. Retouching mediums can also be used in conjunction with ordinary negative varnishes. They are mostly composed of Canada balsam or other resin diluted with turps, and they are applied by smearing the surface to be worked upon with the merest trace of the liquid. When dry the pencil readily marks thereon.

The next chapter will be devoted to photography by artificial light; after which some of the printing processes in general use will be dealt with, including those with silver chloride in albumen, bromide contact and enlarging, iron printing in blue and black, platinum, carbon pigment, and others.

THE STRIPPING OF FILMS FROM GELATINE NEGATIVES FOR PHOTO-MECHANICAL PROCESSES.

BY W. K. BURTON.

The stripping of a negative film when it is in collodion is a comparatively easy matter, but, in the present state of photography, it is quite necessary for one who takes up certain photo-mechanical processes to have a ready means of stripping gelatine films. The descriptions that we have of such processes are, so far as I know, meagre. Wilkinson, for example, in his excellent little book on photo-engraving and photo-lithography, describes methods of stripping collodion negatives only. Such descriptions as I have seen are not generally wrong in principle, they are merely insufficient in detail. Any one taking them up and trying to work from them will find that he is not at once able to strip negatives and get satisfactory films from them, but that he has to work out all the details himself.

The process generally advocated is that of Plener, in which hydrofluoric acid is used to separate the film from the glass. Plener's method is so ingenious, that one is sorry to pour any cold water on it; but, apart from the use of hydrofluoric acid, which everyone will avoid who possibly can, it would appear that the etching action of the acid on the glass has nothing to do with the stripping, inasmuch as almost any other acid will act as well as hydrofluoric acid.

This is not an observation made originally by myself, but was, if my memory does not fail me, made by W. B. Bolton, some six months ago. The action, whatever it is, is really the same as the "frilling" of the plate. Although almost any acid that is strong enough, or that has a strong enough action on gelatine, will serve to strip, it is, perhaps, scarcely correct to say that any other acid will do as well as hydrofluoric acid, in as much as I have found differences in the certainty in the action of different acids. After many experiments, I have adopted sulphuric acid as the most certain in its action of any acid, hydrofluoric acid included.

The difficulties that will generally be found in stripping are as follows:—(1). The films refuse to strip at all. A process which will be quite successful with a negative freshly developed and fixed will often be found not to work at all with a negative that has been treated with alum, and is, say, a year old. (2). The stripping takes place between the new support and the film, instead of between the film and the glass. (3). The film after stripping stretches so that, not only is the negative to a larger scale than before—and with a corresponding increase of density—but probably there is likewise distortion, as it is highly improbable that a film will stretch exactly to the same extent in all directions. I saw a complaint of this stretching in one of the photographic journals only a few weeks ago. (3). The film is so hard and brittle when dry, that it cannot be handled without danger of cracking it. And (4). The film twists or curls in drying, so that it is impossible to get perfect contact between it and a flat surface such as a collotype film. It has taken me more trouble to ensure getting the film in a perfectly flat and flexible form than has anything else.

If the following directions be precisely carried out, it will be found that any negative, however old, may be

stripped with certainty and without encountering any of the difficulties just enumerated. It need scarcely be mentioned that, if the negative has been varnished, the varnish must first be removed by the application of hot methylated spirits.

The following is made up :—

Hard gelatine	2 ounces
Water	10 „

The gelatine is, of course, soaked in the water till it is soft, when heat is applied. I can recommend Coignet's "Gold Label" gelatine. The solution should be heated to not very far short of the boiling point, and should then be filtered through flannel.

A negative to be stripped is warmed,* accurately levelled, and a certain amount of the gelatine solution is poured on the surface, and is guided with a glass rod till it covers the surface evenly. It is of great importance to measure the quantity, as the ultimate thickness of the film depends on this, and it has to be borne in mind that printing has, if the film is to be used as a reversed negative, to go on through the gelatine.

A quantity of four ounces per square foot will be found suitable for average work. This gives a film, when dry, of about a hundredth part of an inch thick. This sounds very thin, but, in fact, it is a good stout film. The film of an average gelatine dry-plate, when dry, is only about one two-thousandth part of an inch thick. Still one-hundredth of an inch will not interfere with ordinary work. For very delicate work the amount of the gelatine solution may be reduced to two ounces per square foot. It is not advisable to use less than this, as otherwise the films will be too delicate for free handling. It is quite possible to flow as much as ten ounces per square foot on glass without any special arrangement for preventing it from overflowing the edges ; but a film of the thickness so got is, in my opinion, far too thick for any practical use.

If, however, such a film be wanted for anything, it will be necessary to give four times as long in each solution as is hereinafter directed, as it takes a long time for any liquid to penetrate a very thick film.

A saturated solution of chrome alum is taken, and there is added to it, drop by drop, liquid ammonia, till there is the slightest possible permanent flocculent precipitate. This is merely to neutralise any free acid that there may be, as any such free acid greatly impairs the setting powers of the alum solution.

The gelatine solution having set on the plates, the latter are placed for five minutes in the chrome alum solution. They are then removed and are washed till all the blue colour of the chrome alum has disappeared. They are then placed in a bath of methylated spirit for from half-an hour. They are taken from this, the surface is blotted with blotting paper, and they go into a bath of

Sulphuric acid	1 ounce
Water	2 pints

I use ordinary commercial sulphuric acid. I do not know the exact specific gravity of it, nor is it of much importance, as a considerable variation in the strength of the bath is permissible.

The following solution is now needed :—

Liquid ammonia	1 ounce
Glycerine	1 ounce
Water	2 pints

The films are left in the sulphuric acid bath till the greasiness caused by the alcohol disappears ; this will take about half-an-hour. At the end of that time it will be found that the corner of a film may be lifted, and that the whole will leave the glass with the greatest ease. The films go direct from the sulphuric acid bath to that of ammonia and glycerine. The object of the glycerine is to secure flexibility of the films, the object of the ammonia is to neutralize the sulphuric acid. It takes a long time to wash sulphuric acid out of a thick film, and if a long time be given in this case the film will stretch. The small amount of sulphate of ammonia produced in the film by the acid and the ammonia is quite harmless.

Glass is prepared by rubbing the surface with a solution of a few grains of bee's-wax in each ounce of benzine, and by polishing this away with powdered talc. A film is taken from the last solution as soon as it tastes of acid—no longer, probably in about five minutes ; it is placed on a piece of glass, a pad of blotting-paper is placed on the back of it, and the squeegee is applied with great vigour. The plate supporting the film is then placed in a fairly warm place, so that the latter may dry ; but I find it necessary, after a few hours have elapsed, to paste down the edges with narrow strips of paper and gum solution, otherwise they are sure to rise from the glass before the whole film is dry, and it will be found impossible to get flatness. An attempt must not be made to strip the film from the temporary glass support until they are perfectly dry. Then it is only necessary to insert the thin blade of a knife, when the film will come away in a form in which it is quite handleable, is beautifully flexible, and may be printed from either as a direct or a reversed negative.

It is to be observed that, if the film, before it goes into the sulphuric acid, be dried spontaneously in place of by the aid of alcohol, the gelatine support will probably part from the film instead of the film parting from the glass.

The acid bath may, of course, be used for a long time ; in fact, as long as it acts. The ammonia and glycerine bath may be used as long as it continues to smell distinctly of ammonia.

I tried drying the stripped films on vulcanite, but found it impossible to prevent them from leaving the surface before they were dry, with the effect that they were hopelessly far from flat.

I fear that the process as I have described it reads as if it were very complicated. It is not really so. A negative may easily be stripped and be drying within two hours of the time of beginning operations, and quite a number may be done at the same time. The drying is the thing that takes longest. With films of average thickness it takes twenty-four hours.

* I assume here that the negative is one that has been treated originally with alum. If it have not been, it is necessary before the stripping process is begun to treat the negative with alum, and allow it to dry, otherwise the hot gelatine solution will probably have the effect of destroying the negative by melting the film. It is particularly necessary to observe this in the case of negatives that have been developed with ferrous oxalate.

Reviews.

Leçons Photographiques et la Photographie en Voyage. Par le Dr. Gustave le Bon. Crown octavo ; two parts. (*Paris*, 1889: *Gauthier-Villars et Fils*, 55, *Quai des Grands-Augustins.*)

In the work before us the author demonstrates the possibility of easily determining by photography, and with very simple apparatus, the position and altitude of objects, and of plotting out maps and surveys ; and for this purpose he constructs a measuring scale which gives a graphic representation of tangents, sines, and cosines up to an angle of 45°, the movable index of this scale being a thread attached to a pin. More complicated apparatus for surveys requiring more accuracy than can be attained by the simple scale—intended mainly for explorers—is also described.

Dr. le Bon is an ethnologist and explorer of eminence, and his works on the early civilisation of the Arabs of India and of Biblical lands have done much to extend our knowledge.

The Practical Use of the Spectroscope. By J. Parry, F.C.S. Reprinted from *Industries.*

The spectroscope is an instrument which should be doubly

interesting to photographers: on the one hand, from its power of analysing light itself, the one first essential in all photographic operations; and, on the other hand, from the fact that, in its use, photography may be brought into play to record the teachings it supplies, whether as to the composition and characteristics of distant worlds not attainable in any other way, or of distinguishing the elements in an analysis of terrestrial matters.

The feeling that the instrument has not come nearly into such general use for the purpose of chemical analysis as it is destined by its capability to do, and a desire to forward such use by complete description of the details and delicacies of manipulation indispensible to exactness, permeates the introduction to this work, which, though short, is full of most useful and suggestive matter. Commencing with a discussion of the light which it is desirable to employ, all below the oxy-hydrogen blow-pipe are briefly discussed; the latter, however, giving place to the electric arc, the two chief producers of which, the battery and the dynamo, are referred to, a description of the power necessary to be employed in either case being added.

The spectroscope itself, and the method of using it, both for visual observation, and particularly for photographic record, being described, illustrations are furnished of the most suitable methods of adjusting the arc, whether for ordinary vapour, or for vacuum spectra, and the conduct of an analysis of mixed substances is then discussed. The case of iron of various kinds and degrees of purity is pretty fully described, and many spectra are engraved with their characteristic lines. These diagrams are produced from photographs, and the lines are indicated with great precision. The author says: "That the value of the permanent records obtained by photography is inestimable, it is hardly necessary to explain. The photographed spectrum of any element or compound body is as absolutely characteristic of that body as any of its more purely physical properties, and all work done by eye observations, even with the most accurate measures possible, and mapped or drawn by the best of draughtsmen, can only approximate to the absolute truth and accuracy of a good spectral photograph." Sentiments which our readers will appreciate and concur in.

The author has with his work, forwarded us some of the photographs from which the diagrams have been made, and the lines in a long spectrum are marked out with great sharpness. Some of these photographs illustrate spectra of different metals in juxtaposition, the means of producing which is described in the work, and their characteristic differences are thereby strongly emphasised. Although the work is short, it is exceedingly interesting to the scientific students of both photography and chemistry, to whom we commend it.

Notes.

The exhibition of photographs and apparatus now open at the Crystal Palace is certainly better than the previous one. In the picture and apparatus sections the exhibits are far more representative, and the general organisation is better. At the same time, an exhibition which is so really commercialist can never hold anything approaching the representative position of the annual exhibitions of the Photographic Society of Great Britain.

The arrangements for lantern exhibitions are good, and Mr. W. Brooks' slides of the interior of the Tower of London are not only excellent, but of real interest as pictorial records.

At the Crystal Palace there is no particular striving after the exhibition of anything having rather scientific or technical interest than a business interest, otherwise we should have had it announced that Mr. Muybridge would there show his wonderful photographs of animals in motion; they are to be shown this evening at the Royal Institution in Albemarle Street.

Our readers know how Mr. Muybridge produces a moving photograph. He makes a series of exposures on the moving object—these exposures being made within the limits of continuity of vision—and he reproduces the moving object on the screen, by projecting these photographs in rapid and correct sequence. Those who saw Mr. Muybridge's wonderful lantern exhibition when he was in London a few years ago will strive to see his latest advances in the use of the "Zoopraxiscope," as he terms his apparatus.

A North British correspondent, who is an active worker in the Primrose League, informs us that the storm of hisses which lately greeted the appearance of the Queen's portrait on the screen at the Bon-Accord Music Hall, Aberdeen, was certainly not intended as any indication of disrespect to her Majesty, but rather as a mark of disapproval as to the quality of the particular portrait exhibited. We would therefore suggest that a slide for this Hall should be made from Mr. Gustav Mullins' magnificent untouched negative, showing her Majesty in the Jubilee robe, and we feel sure that the exhibition of this would bring forth cheers.

Good photographic portraits of Her Majesty might well play a more prominent part in elections, and it is to be regretted that when, in the recent Kennington contest, a few persons spoke disrespectfully of the Battenburg family, Mr. Beresford Hope had not a few photographic portraits to distribute. Instead of using the photograph to demonstrate what reason we have to be proud of our Imperial family, he totally lost his temper, and suggested that his audience were rebels, and consisted of those who on a former occasion had hissed the Queen. This naturally ruffled the people, and made them respond: "We are; and we will do it again!"

Photographers are loyal, and will always give a deserved cheer. In this connection we may point out that those who habitually decline to rise when a political toast is given at Solar Club dinners, state that they do so merely as a protest against the introduction of politics in any form at such a gathering, and not in reference to their sentiments on the immediate question before the members.

Photographers in the Black Country have some odd experiences. Here is an instance which was lately related to us by the photographer to whom it happened. A pit girl brought her "chap" to be photographed. He sat himself down in the chair with a look expressive of

his determination to do and die, and all that the photographer could think of was of no avail to remove the settled desperation of his visage. At last the young lady grasped the situation, and exclaiming, "Well, I don't care if it *is* before folks," plumped herself down on the gentleman's knee, and coaxing him into a broad grin, cried, triumphantly, "There you are, Mister. Take him, now! That's what you want—isn't it?"

Astronomical photography in America is carried on in a very systematic way. A case in point was furnished at a recent meeting of the Royal Astronomical Society, when, in reference to some photographs of the corona, on the occasion of the last eclipse, sent by Professor Holden, of the Lick Observatory, it was mentioned that a comprehensive series of photographs had been taken by the Amateur Photographic Association. A number of them arranged to begin photographing the corona, the first man with an exposure of half a second, the next with an exposure of one second, the next with one second and a half, and so on, each man sticking to the same exposure throughout, and taking as many photographs as he could. The photographs, to the number of 167, taken on this plan, furnished an immense mass of material for finding out the exposure which gave the best result in each part of the corona.

It would appear that American actresses have a high opinion of their photographic value. Some time ago the London shop windows were flooded with cabinet photographs of actresses by Mr. Mora, of New York, and very beautiful some of them were. We now learn from an American paper that Mr. Mora has given up taking photographs of actresses because he finds it does not pay. Why it does not pay is not stated, and we can only imagine the reason is that the ladies insist upon a ruinous royalty.

It is occasionally a great misfortune to be like somebody else, and still worse is it when the somebody else is photographed. Owing to his resemblance to a dishonest person, a gentleman last week was put to serious inconvenience. The dishonest person in question obtained a gun under false pretences, and his photograph being in possession of the police, a constable forthwith arrested a gentleman on the strength of the likeness. Two assistants in the employ of the gunmaker took him to be the person who had secured the gun, and so also did a pawnbroker with whom the gun had been pawned, until he saw the photograph of the real thief, when he was convinced that the man in custody was not the one who had pawned the property with him.

Whether the two assistants judged from the photograph or not is not stated, but the assumption is that they did not. If so, the curious fact remains that while the policeman arrested an innocent man on the strength of a photograph, the pawnbroker judged by the photograph that he was not the man who was wanted! Photographs certainly require to be used with more intelligence than the police are at present credited with.

The French are nothing if not precise. Their programme for the Photographic Congress in connection with the Paris Exhibition would, if it could be carried out in its entirety, settle a good many vexed questions. But this is too much to be hoped for, as a list of the subjects to be discussed will at once show. The following is the list in question:—Introduction of a fixed unit of light; uniformity in the method of measuring the focal length of lenses; uniformity in the indication of the photometric effect of diaphragms; uniform and easy means of adapting different lenses to different cameras; uniformity in the measurements of plates; unity in the expression of photographic formulæ; unity in the nomenclature of photographic processes; Custom House regulations in regard to the circulation of sensitive preparations; protection of artistic copyright in photographic works; uniformity in estimating the value of luminous intensity in photographic operations; unity in the mode of determining the sensibility of photographic preparations.

Any one of these subjects would mean, in England, an adjourned debate; but perhaps they manage these things better in France, and there may be a prospect, before the Congress is over, of settling the vexed questions enumerated. Indeed, the organizers seemed to be pretty confident that there will not be too much discussion, for they state that the programme is not a fixed one, and that additional propositions may be presented if previous notice be given to the secretary of the committee fifteen days at least before the opening of the Congress, which will meet in August.

The rooms devoted to architectural subjects at the Royal Academy are invariably deserted. This fact has probably stimulated Mr. A. Koch and Mr. C. W. English to draw attention to the exhibits by the preparation of an illustrated catalogue after the fashion of the one which Mr. Blackburne has made so popular in connection with the more attractive portion of the Gallery. The thought naturally arises that if architects think it worth while to publish an illustrated catalogue, why should not the Photographic Society do the same in connection with their exhibition? But, somehow, societies rarely succeed in enterprises of this kind. It is generally left for some private individual to take the matter in hand. That such a catalogue would be highly popular we do not doubt.

PHOTOGRAPHS AS EVIDENCE IN COURTS OF JUSTICE.

BY MORRIS COOPER.*

The photograph is beginning to play an important role in judicial proceedings. It is a species of what is called secondary evidence; that is to say, it is to be resorted to in explanation and support of other evidence, or when no other evidence is available. It has been introduced in both civil and criminal trials. I shall cite a few typical cases. In the Buddensieck case, which, as you remember, was a prosecution for manslaughter caused by the falling of a building negligently constructed, a photograph of the premises showing the defective construction was used, and exerted great influence in securing a conviction. In the celebrated Ruloff murder trial, an important link in the chain of evidence against the accused was forged

* From *Anthony's Photographic Bulletin.*

by means of photographs which identified his confederates. On the trial of the Shepherd's Fold case, which was a prosecution for starving and ill treating a boy who was an inmate of the "Fold," photographs of the boy, showing the effect of the "Shepherd" shepherding, landed the shepherd in the penitentiary.

An Iowa case presents some curious features. It was an action for damages for assault and battery. On the trial, which took place nearly two years after the assault, the defendant exhibited to the jury the plaintiff's back and shoulders, which, of course, after that lapse of time since the injury, could not exhibit any very great marks thereof. But the plaintiff, not to be outdone, then triumphantly exhibited photographs of the same back and shoulders taken three days after the assault. This must have been a case of diamond cut diamond. The plaintiff, however, was the sharper diamond, and was victorious in the suit. There is also the case of a Canadian lady whose husband was lynched in Alabama by a mob. He had sent her a photograph of himself, taken shortly after his arrival in that State. She brought a suit against the county where the little "accident" occurred for damages for the loss of her husband's life, and her whole case, which I am glad to say she won, depended upon the photograph, for her husband had been a stranger in the community, and by means of the likeness he was identified. In suits growing out of defects in highways, railway accidents, forgery of commercial paper, disputed signatures, photographs have become valuable aids. But it must not be supposed that every photograph is received with open arms in a court of justice. The liability of photographers to err, to present partial, inaccurate, distorted, and even downright dishonest views, is well known to the courts, and has often been commented on. In the Tichborne case, a photographer represented a place as a grotto, which in reality was nothing else than a path about a hundred feet long, shadowed by trees, having a public way on one side, and a public towing path upon the other. The Lord Chief Justice (Cockburn), presiding at the trial, handled it without gloves. He said;—"I must add that it reflects the greatest discredit on the man who concocted that photograph." That is not with any disparagement to the art itself, for in the same case the art of photography rendered most valuable help. "The principal documents in the case," says the London *Times*, "the pocket-book of the defendant, his letters and those of Roger Tichborne, were photographed by the Stereoscopic Company, under the auspices of Mr. Nottage, their manager, and the *fac-similes* thus produced were of immense value in facilitating the comparison of handwriting, to which the Lord Chief Justice attached much importance as one of the great tests of identity." A very valuable aid which the photograph is enabled to render in court is to make copies of documents which, from their value, inaccessibility, or other peculiar features, cannot be produced in court. In several such cases the courts have directed the making of photographic copies.

It must be borne in mind, from the considerations to which we have before alluded, that photographs are very carefully scrutinized in courts of justice, and that the party desiring to use them must always be prepared fully to show all the circumstances under which they were taken, who the artist was, with what apparatus, in what light, from what point of view, at what distance, at what angle—in fact, must be prepared with all the details. He should also produce the negative, so that that also can be subjected to rigid examination. Not until a photograph is "proved," as it is termed, is it competent to be admitted in evidence.

There have been numerous applications of photography to the purposes of justice. The rogues' gallery is familiar to you all. Not in any invidious sense, of course. Some suggestions which are of value, and some which are not, have from time to time been made respecting further application of the art. One ingenious gentleman has invented an apparatus for recording deeds by photography. One has suggested that by photographing the impressions made upon the retina of the eyes of a murdered person, a possible clue might be obtained as to who the murderer was. Another proposition is to appoint a public photographer, whose duty it should be to take and preserve the likeness of all persons residing in England every five years, and also likenesses of all persons leaving the country. This is what, in politics, would be called a "fat" job. So it has been proposed that naturalized persons should have photographs of themselves attached to their papers, certified by an omniscient individual to be styled the "official photographer." Another idea is to photograph the witnesses deposing in trial, so that the pictures will be before the appellate court when it passes upon their testimony, and it could then see the witnesses both in tranquil and in excited moods. Still another proposition is to photograph riotous assemblies at various stages, and then subsequently prosecute the persons taking part. The difficulty, however, about this is, that there is a very decided danger that the photographer and his apparatus might, perhaps, perish in the riot long before he succeeded in getting a focus. The most practicable suggestion of this kind which I have met with is one to appoint a public photographer, who, in all cases of homicide, shall immediately repair to the scene of the crime and photograph it and the body. In this way very valuable evidence might be elicited. For the other suggestions and plans I do not think that any legal machinery is as yet sufficiently advanced.

Patent Intelligence.

Applications for Letters Patent.

3,790. Henry John Gray, 4, South Street, Finsbury, London, for "Improvements in and Relating to Photographic Cameras."—March 4th, 1889.

3,810. Benjamin Constant Le Moussu, 17, Coleman Street, Middlesex, for "An Improved Photo-Chromographic Process."—March 5th, 1889.

3,818. William Leach, 15, Howard Street, Bury New Road, Manchester, for "Improvements in the Stage which is Used as a Part of his Lantern Microscope, known as 'Leach's Oxy-Hydrogen Lantern Microscope.'"—March 5th, 1889.

3,863. Michael Iljinsky, 23, Southampton Buildings, Middlesex, for "An Improved Petroleum Lamp for Photographic and other purposes."—March 5th, 1889.

3,889. Frank Geere Howard and Anton Julius Obermayer, the Younger, 36, Cleveland Street, London, for "Apparatus for Opening or Closing the Shutter of a Photographic Camera by means of Electricity."—March 6th, 1889.

3,927. Edward Beauchamp, 2, Berkely Terrace, Wimbledon, for "The Patent Rakau Mounts."—March 6th, 1889.

4,047. Enrico Ferrero, 45, Southampton Buildings, London, for "Improvements in and Relating to Apparatus for Use with Photographic Cameras to Facilitate the Changing of the Films or Plates."—March 7th, 1889.

4,082. Fox Shew, 88, Newman Street, Oxford Street, London, for "An Improved Head for Photographic Camera Stands."—March 8th, 1889.

4,103. Frank Bishop, of the firm of Marion and Co., and David Allan, 53, Chancery Lane, London, for "Improved Apparatus for Washing Photographic Negatives and Prints."—March 8th, 1889.

4,131. Frank Miall, 13, Shelgate Road, Battersea Rise, Surrey, for "An Improvement in Detective or other Cameras."—March 9th, 1889.

4143. George William Shailer, and George William Fowles, 149, Stratford Road, Birmingham, for "Improvements in Photographic Changing-boxes."—March 9th, 1889.

4,188. Charles Wigzell, 54, Fleet Street, London, for "Improvements in Rocking Trays, applicable for Photographic Developments and for other purposes."—March 9th, 1889.

4,189. Edward Joshua Blackburn Scratton, 54, Fleet Street, London, for "Improvements in and connected with Tables used for Photographic Developments and for similar purposes."—March 9th, 1889.

Specifications Published.

5,536. Stephen James Holliday, of Imperial Chambers, Colmore Row, in the City of Birmingham, Architect and Surveyor, for "Improvements in Dark Roller Slides for Photographic purposes."—Dated April 14th, 1888.

The claims are in substance:—

First. Applying end pressure to the rollers or to the spool and receiving rollers of dark roller slides, by springs or their equivalents, whereby slack or loose winding, or feed, is prevented.

Secondly. Giving drag or tension to the spool and winding rollers of dark roller slides, by tension plates, consisting of flat plates pressing upon the ends of the rollers in the direction of their axes, substantially as described and set forth.

Thirdly. Adjusting the pressure of the tension plates of dark roller slides by set screws, as set forth in the specification.

Fourthly. Carrying the pivots, or the bearings of the rollers of dark roller slides upon or by means of springs or spring arms, whereby the said pivots or bearings become self-adjusting, substantially as described and set forth in the specification.

Fifthly. The combination with a receiving and winding roller of an undetachable fitting (with ratchet) as set forth.

Sixthly. Providing measuring rollers, of dark roller slides, with a measuring wheel, or lock measuring wheel, as set forth.

Seventhly. The combination with a dark roller slide of a hand pricker, whereby the division between the undeveloped pictures of an exposed superfice of sensitised paper is indicated by a puncture or by punctures.

Eighthly. A hand pricker consisting of a pusher and spike with spring, as set forth.

Ninthly. Providing one end or both ends of dark roller slide beds with swells or enlargements as set forth in the specification.

12,707. Charles Bouckaert, of Brussels, Belgium, for "Instantaneous Shutter for Photographic Apparatus."—Dated March 3rd, 1888.

A plate fixed to the camera by means of holes and on which all the mechanism is mounted. A lever working on an axis is actuated by a spiral or other spring attached eccentrically on a movable rod by which it can be rendered stronger or weaker by turning the rod to the right or to the left.

This lever carries at one end a blade spring terminated by a tappet which takes under a pivot on the shutter to act upon it when moved.

Another lever has a spring and two detents for throwing the first lever into and out of gear. A third lever is provided with a fork in which works the pivot, and which serves to move the instantaneous shutter; a small pin or tappet fixed to the first lever strikes against the third lever to cause the return of the shutter.

The movement of the first lever may be retarded by arranging a small rack actuating a pinion mounted on the same axis with a small flyer.

Correspondence.

AZALINE AND ORTHOCHROMATIC PHOTOGRAPHY.

Sir,—Allow me to make a small correction respecting the name of the chemist who made the analysis of Dr. Vogel's azaline published in your last week's issue. His correct name is not O. W. de Witt, but Dr. Otto N. Witt, the very same gentleman mentioned by Mr. J. Spiller as his friend in a previous letter, and therefore a well-known authority on such matters.—I am, sir, yours very truly,

J. R. Gotz.

19, *Buckingham Street, Strand, London, March 18th.*

Dear Sir,—In face of the concurrent testimony of Mr. Bothamley and Dr. Witt, and the specific declarations of Messrs. Gotz and Vogel, it becomes impossible to maintain my position that the azaline tincture contains eosine or erythrosine. The experiments upon which I based my conclusion cannot be repeated, for I used up the small remaining portion of my samples of last year in a critical search for silver, presumably in the form of eoside of silver, and the further supply which I procured from Mr. Gotz last week shows unmistakeably quinoline red, and no trace of cosine.

It is not worth while under these circumstances reverting to my former results, further than to state that the tincture evaporated to dryness gave me ·4 per cent. of total solids, which dissolved in warm concentrated sulphuric acid with a yellow colour, and on addition of manganic oxide gave off fumes of chlorine, and, as I thought, some bromine (or chloride of iodine?) It dyed on wool exactly like eosine, and on making a mixture of cosine and erythrosine in alcohol, the solutions showed the closest resemblance, the pink colour by transmitted light being identical, and both exhibited the same fiery fluorescence. At first it seemed probable that azaline might turn out to be the aniline red or picrate of rosaniline mentioned in Dr. Vogel's (No. 7963) specification; the name suggesting "azaleine," by which some of the rosaniline compounds were formerly known I soon found, however, that none of this was present, nor was there any safranine, naphthaline pink, or rhodamine in the tincture. On comparing it with the only sample of quinoline red I have yet succeeded in getting in this country, where it is quite unknown in commerce, the differences were greater than I had observed between it and eosine, and I therefore too hastily concluded that it was the latter substance.

Mr. Bothamley agrees with me that there is no cyanine, and Dr. Vogel says he put it in, but admits that it may have become decomposed. So this may account for my finding both chlorine (from the red) and iodine (from blue) in the dry residues of the tincture; and considering that I had but a trifle over a quarter of a grain of material in all, from the contents of two bottles purchased in 1888, I ought undoubtedly to have gone to market again for a larger supply before venturing to give so specific a version of the constituents of azaline.

There is an anomaly in Dr. Witt's pamphlet which caused a wrong translation to appear in one of the English technical journals, and for a time led me astray. I refer to the fact of quinoline red being described in the paragraph immediately *preceding*, instead of next following, the title heading "Chinolinroth," on page 11, thus reversing the usual order of description, or "putting the cart before the horse." In the recently published tables of Messrs. Schultz and Julius all this is set right, and the information brought up to date. However, for my part, as regards the analysis of azaline, I beg leave to express, both to Dr. Vogel and Mr. Gotz, my regret that I ever ventured to give an opinion that it contained eosine.

London, March 18th, 1889. John Spiller.

Dear Sir,—I note Mr. Andrew Pringle's communication in your last number, in which he pithily sums up the question by saying that "proof or apology" on the part of Mr. Spiller is what is now needed.

With regard to Mr. Pringle's reference to a suggestion of identity of interest between Mr. Edwards and Mr. Spiller, I do not think that anything that has been written should be construed to convey anything further than that Mr. Spiller, having been retained as a scientific witness, has allowed his zeal to go beyond the limits to which scientific witnesses usually confine themselves. When allowance is made for Dr. Vogel's communication being written in a language not his native one, it seems probable that nothing more than this was intended.

Mr. S. J. Woodham-Smith's reference to "Mr. Debenham's suggestion that a patent would be invalidated because Mr. Bedford or any other person failed to work the process with an impure or, possibly, adulterated sample of eosine," may be answered by the statement that I did not make such suggestion. There are many varieties of eosine differing in chemical composition, one as pure as the other. Mr. Bedford, if I mistake not, mentioned the chemical house from which he obtained what he had used, a house well-known as standing exceptionally high for the purity of its rarer chemical substances. There was no question of impurity. My suggestion was directed to the want of information in the patent as to the particular variety of eosine which Mr. Edwards considered essential to success. A good case surely ought not to require to be backed up by the perversion of the language or sense of an argument used against it.

As to the counsel's opinion quoted by Mr. Woodham-Smith, it must not be supposed that it settles the question as it is assumed to do. Indeed, it is far from uncommon

to find opinions of counsel as supplied to the two parties to a case in direct opposition, and for this reason: such opinions are necessarily founded upon the information furnished by the party interested, and in the present case it may be noted that it is qualified by "as at present advised," and by references to "questions of fact that must be decided according to the evidence that can be adduced."

March, 19th, 1889. W. E. Debenham.

HELIOCHROMY.

Dear Sir,—Mr. Ives is of the same opinion still, and will probably remain so; but that, of course, does not affect the facts, upon which anyone else is equally entitled to form an opinion. Anyone who is concerned with Mr. Ives' implied claim to be regarded as an authority on colour sensations and colour reproduction may find it worth while to refer to an article by Mr. D. Winstanley in *The Photographie World*, Feb. 1889, p. 204. It is to be regretted that one to whom so much credit is due for his own work should be so backward in his recognition of the results obtained by his fellow-workers.

Mr. Ives has very kindly provided me with more instances than he intended to do. Mr. Ives was undoubtedly the first to apply chlorophyll in commercial photography in 1879, but the valuable properties of this sensitiser, especially its power of sensitizing for red, were discovered by Becquerel in 1874 (*Comptes rendues*). Vogel's first wet process with eosin was published in 1874 (*Pogg. Annalen*).

I do not propose to occupy any more of your space with this discussion.—I am, yours truly, C. H. Bothamley.

The Yorkshire College, Leeds, March 16th.

THE PHOTOGRAPHIC CONFERENCE.

Dear Sir,—Would you kindly give a notification in this week's News that the Camera Club Conference will be on at the Society of Arts on Tuesday and Wednesday, the 26th and 27th March, and that all interested in the subjects are cordially invited to attend the meetings, including the International Lantern Exhibition, at 8 p.m. on Tuesday, 26th, at the Society of Arts. Slides have been sent to us from French, Austrian, and American Societies for this exhibition. All the meetings are open to ladies.—

Yours faithfully, G. Davison, E. G. Spiers } *Hon. Secs.*

Camera Club, 21, *Bedford Street, W.C.*

Proceedings of Societies.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 7th inst., Mr. A. Mackie in the chair.

A question was asked as to the best preservative for pyro.

Mr. A. Haddon said a preservative to be effectual should not readily yield up its oxygen to the pyro; he gave preference to sulphurous acid for this purpose, inasmuch as it absorbed oxygen, and thereby preveuted the pyro from becoming oxidised.

Another question from the box was read: "After focussing with a large stop, is it necessary to re-focus in using a smaller stop?"

The general opinion was in favour of re-focussing when a long focus lens was used, more espccially if the lens had a tendency to spherical aberration.

Mr. W. H. Harrison asked for a simple method of transferring diagrams to glass.

Mr. E. Clifton suggested laying a thin sheet of transparent gelatine over the diagram to be copied, and scratching the outline on the gelatine with a sharp-pointed instrumeut, and then rubbing a little Venetian red over the surface of the gelatine, which would fill up the tracing.

Mr. J. J. Briginshaw said a very simple plan for illustrating diagrams of this kind had been published, he believed, by the late Mr. Woodbury. A glass plate is coated with gum-dammar dissolved in benzole. When dry, the film is perfectly transparent, and will readily take blacklead pencil marks.

Mr. T. Waltenberg said he had recently tried to copy an oil painting, but was far from being satisfied with the results he obtained. Could any of the members give him any information on the subject?

Mr. A. Cowan would put the painting in a very strong light—preferably sunlight—at an angle of 45° from the direction of the light.

The Chairman said development with hydrokinone just now was creating some interest. He would like to hear the experiences of members with this developer.

Mr. E. Clifton had recently developed two negatives, one with pyro, and the other with hydrokinone. The plate developed with hydrokinone took three-quarters of an hour, but the result was very fine; pyro development only occupied two minutes.

Mr. J. J. Briginshaw thought the hydrokinone developer gave greater latitude.

Mr. F. A. Bridge said the caution to use fresh hypo for each batch of bromide prints was unnecessary. He fixed both plates and prints in the same fixing solution; in fact, on one occasion, he left a bromide print in the fixiug bath for several days. The whites of the picture were not affected in the least, the only difference being that the image was changed into a sepia colour.

Mr. W. Prestwich recommended using alum in the fixing bath—it kept the bath perfectly clear. He had used it for some time past; with alum, 2 ounces of hypo to a pint of water would be sufficient. By using a strong alum fixing bath the prints could be washed in hot water.

Mr. J. B. B. Wellington gave a formula for development with hydrokinone which he had found work well, and gave excellent results:—

Hydrokinone	2 grains
Sulphate of soda	12 „
Soda hydrate	2 „

to each ounce of water, to which is added a mere trace of bromide.

Southport Photographic Society.

The general annual meeting of this Society was held on Monday, March 11th, 1888, the President (Mr. B. Wyles) in the chair.

The following report was adopted:—In presenting the first report of this Society the Council would congratulate the members on the fair amount of success that has so far attended its efforts. No doubt most of you are aware that the Society was formed on the 17th of April, 1888, at a meeting convened for the purpose, and held in the Shaftesbury Buildings, about tweuty of those present enrolling themselves as members. Since that date the Society has met regularly every four weeks, and at the present time numbers forty-three members. The meetings have been, on the whole, well attended, and much interest has been taken in them. A number of rambles took place during the summer months.

The following papers and demonstrations have been given:—"The Best Conditions for Successful Landscape Photography," Mr. B. Wyles; "Stripping Films," Mr. J. S. Dicken; "Evening with the Lautern," Mr. W. Marsden; "Lenses," Mr. B. Wyles; "Carbon Process," Mr. D. G. Wilkinson; "Prints and Negatives of Holiday Work," by the Members; "Evening with the Lantern," Mr. H. J. Heaton; "Transparency Making," Mr. W. Marsden; "Detective and Hand Cameras," Mr. E. S. Harper; "Enlarging," Mr. J. S. Dicken; "Development iu its Relation to Exposure," Mr. P. Graham.

Two public lime-light demonstrations have been given, one in the Victoria Hall, entitled "Rambles in and about Southport in Search of the Picturesque" (slides by the members). The second one, entitled "A Holiday Tour in North Yorkshire," was given by Mr. A. W. Beer, President of the Liverpool Amateur Photographic Society.

The following officers were elected:—

President—Mr. Benjamin Boothroyd.

Vice-Presidents—Mr. W. Marsden, Mr. J. B. Walker.

Treasurer—Mr. H. J. Heaton.

Secretary (pro tem.)—Mr. Harper, Town Hall, Southport.

Council—Mr. B. Wyles, Dr. H. L. Hawksley, Mr. J. S. Dicken, Mr. D. G. Wilkinson, Mr. R. H. White.

Leicestershire Photographic Society.

The regular monthly meeting was held in the Mayor's Parlour, Old Town Hall, on Wednesday evening, March 13th, Mr. Geo. Bankart, President, in the chair, and was devoted to the exhi-

bition and award of prizes for general outdoor work by the members, it being the first local competition which has taken place since the formation of the Society.

Each member competing contributed six mounted prints in one or both of two classes, viz., Class A for prints upwards of half-plate size, and Class B for prints of half-plate and under, and though the entries were not so numerous as might have been desired, the average quality of the work was good.

Silver and bronze medals had been presented to the Society :—In Class A by Mr. W. S. Hobson (past president), and in Class B by Mr. Geo. Bankart (president), the medals having been founded specially for the use of the Society.

After an afternoon and evening devoted to the careful examination of the prints the award of prizes was made by ballot; each member present being entitled to two votes in each class, one for the silver and one for the bronze medals, the voting being for the best average of six prints, and not for individual pictures, and the result justified the expectation of the proposers of this method of deciding the winners, and corresponded almost exactly with a forecast made by two members of the Society qualified to form an opinion on the subject, except that, in consequence of nearly equal merit of the work, two winners changed places in the voting.

The voting for the silver medals took place first by general desire in order to avoid confusion as to record of votes for the bronze medals : the result proving strongly in favour of Mr. Geo. Bankart for Class A, and Mr. J. Porritt for Class B. The voting for the bronze medals ran much closer, and illustrated considerable variety of opinion, the result being finally in favour of Mr. W. T. Tucker, of Loughborough, for Class A, and Mr. A. W. Wilson for Class B, though Mr. S. S. Partridge was only one vote behind Mr. Wilson.

The system, though novel, seemed to work smoothly and to give general satisfaction, and as the names of the competitors were not stated, and the prints classed by numbers only, there can be little doubt that the awards were correctly made on the actual merit of the work.

Glasgow Photographic Association.

March 7.—Mr. William Lang, jun., F.C.S., in the chair.

The following gentlemen were admitted members of the Association :—Messrs. E. B. Clark, W. Anderson, J. W. White, J. Humphreys, A. Fitz-Conroy, W. Smith, B. Simons, J. E. Hanbridge, J. Dove, D. Dove, Councillor J. M. Primrose, and Dr. J. C. Woodburn.

Mr. Adolf Schulze read his paper on "Photomicrography." Beginning with a description of the microscope and the various lenses in use, he went over the points of his photo-micrographic apparatus. This was compactly arranged on a long table. At one end the microscope itself rested on a turntable, so that when the object to be photographed had been properly set on the stage plate, a simple movement of the turntable brought the microscope and Dallinger paraffin lamp into position in front of the camera. The focussing screen was a sheet of clear glass on which the enlarged image could be readily seen with a focussing glass. A long rod brought the fine focussing adjustment of the microscope within reach of the operator at the back of the camera. When photographing objects which could not be placed in a vertical position, the whole top of the table could be turned on end, and the focussing worked from the top of a step ladder. Mr. Schulze gave a demonstration, and produced a very good half-plate negative of the proboscis of a fly.

A large number of photo-micrographs were then thrown on the screen and explained by Mr. Schulze. The one which provoked the greatest enthusiasm was a group of one hundred and sixty diatoms.

West Kent Photographic Society.

At the ordinary fortnightly meeting of the above Society, held in the Board Room, Bexley, Friday, March 8th, Mr. Pringle presided.

The minutes of the previous meeting having been read and confirmed, two new members were proposed.

Mr. Hawkins showed two prints from negatives of highly coloured engravings. They were taken on ordinary plates, and notwithstanding this, the range of colours was well represented by an equally good range of tone in the finished print. The room in which they were taken was lighted with yellow light. It was remarked that if such good results could be obtained by such simple means, orthochromatic plates would not be required for such subjects. Mr. Hawkins also contributed a print to the album.

Mr. Sanderson brought some lantern slides for criticism, some of which were curiously marked in spots and patches. These were apparently caused by the hypo not being eliminated, or by some splashing after they were washed.

Mr. Charles Hussey then proceeded to deliver an address upon "Lantern Slide Making."

The Lecturer said that he was in the habit of using a small camera, most of his slides being printed by contact. He also found that his negatives would produce pictures of sufficient dimensions, when enlarged from, to suit the most exacting on that score. To illustrate this he handed round a three-quarter negative and three enlargements from it, the largest being about 30 by 22, the original negative being sharp and full of detail; the enlargements were perfect, the largest being equally good with the smallest. Mr. Hussey next handed round two cameras, $6\frac{1}{4}$ plate and a $3\frac{1}{4}$ square. The latter he had had made for use this season, there being such a great saving in weight and bulk, even when compared with a quarter-plate camera. The camera was made of long extension, so that lenses of varying foci could be used. At least four lenses should be carried, one being a wide angle, which, however, should only be used when absolutely compelled to do so. Here is a valuable hint as to use of camera as a view meter. Place your eye to lens hole in front of camera (having previously removed focussing screen), and rack out the camera until the subject just fills up the view; then choose a lens of corresponding focus. He next showed a few examples of negatives. Comparing the two processes—gelatine and dry collodion—the Lecturer expressed his opinion in favour of the latter, as with it one is enabled to give any tone to the transpareucy that may be desired after the development has been completed. With the gelatine process this cannot be done. A plate was then coated—using Brookes's emulsion for the purpose—dried, exposed, developed, and toned.

A vote of thanks to the Lecturer terminated the proceedings.

The next meeting will be held on the 22nd inst., on which occasion the Secretary, Mr. E. G. Adams, will give an address upon "Warm Tones on Gelatine Lantern Slides."

Ipswich Photographic Society.

The monthly meeting was held on the evening of Tuesday, the 12th of March. There was a large attendance of members, the President (Mr. J. Dixon Piper) taking the chair. Mr. P. Woods, of Stowmarket, was elected a member.

The evening was devoted to the reading of a paper on the "Chemistry of Photography," by Mr. J. C. Wiggin, who illustrated the same with numerous experiments, showing the various chemical reactions which take place in the different processes used by photographers.

Brighton Photographic Society.

This Society held their first lantern evening on March 12th, at the New Road Lecture Hall. There was a large attendance of members and their friends. The lantern was lent and manipulated by the President, the oxy-hydrogen light being used. Upwards of one hundred slides were passed through, many being of very high quality, and were warmly applauded. Mr. Hardcastle sent a dozen by Messrs. Fry and Co.; Mr. Rean showed one of the moon and others; Mr. Webling a various assortment, and one of the ill fated *Vandalia*, now a wreck off Brighton; Mr. Tate, miscellaneous views; Mr. Jago, portraits; Mr. P. Morris, local views round Lewes; and the Hon. Secretary (Mr. Corder), views in and round Canterbury, and local subjects. It was the general opinion that the members' slides were quite equal, if not superior, to the commercial slides.

It was decided that at the next meeting, on March 26th, the subject for discussion should be "Lantern Slide Making."

Photographers' Benevolent Association.

The Committee of this Association met on the 15th inst., at 181, Aldersgate Street, E.C.

The minutes of the previous meeting, having been read, were confirmed. Acting upon the resolution carried at the general meeting, steps were taken towards the settlement of the proposed Orphans' Fund, also the initial stages of a complete revision of the rules of the Association.

It was decided that an additional £100 of the funds be invested in Goschen's $2\frac{3}{4}$ Consols. The Committee then

considered an article which had appeared in *Photography* in reference to the Association. It was agreed upon that an answer to the same be sent.

Messrs. F. W. Cox, G. T. Harris, and E. A. Whittlemore were elected members of the Committee.

Shaftesbury Photographic Social.

The monthly lantern eveuing took place last Friday, at Craven Hall, Regent Street, W., at a quarter past eight, Mr. Tollett in the chair.

The ordinary preliminary business having been gone through, Mr. J. B. Rintoul was called upon to give his paper entitled, "In and Round London," illustrated with dissolviug views, shown with the oxy-hydrogen lime-light lanteru.

The lantern being under the management of Mr. Samora, some sixty slides were passed through, and both the pictures and the description given were appreciated by the meeting.

After some discussion, the usual votes of thanks were passed, and the remaiuing time was spent by a recitation from Mr. Samora.

Birmingham Photographic Society.

The ordinary meeting of the above was held in the Priory Rooms, Old Square, on Thursday, the 14th inst., when there was a large attendance of members and friends, Dr. Hill Norris, President, in the chair.

Messrs. C. Farnham King, F. P. Osborne, and J. B. Stone, J.P., were nominated for election.

A letter was read from Mr. A. Tate, of the Ulster Society, informing the hon. secretary he had sent off a selection of slides of Irish scenery, &c.

Bound copies of the annual Almanac were handed in from the Editor of the *British Journal* for the Library, and thanks were accorded for the same.

After some remarks by J. B. Stone, J.P., who spoke of his experience and visits to Norwegian scenery,

The Chairman called upou Mr. E. H. Jaques to deliver his paper ou "Holiday Trips with the Camera in Norway."

He said he had much pleasure in agaiu describing and illustrating some portion of Norway, a country alike interesting to travellers and the amateur photographer. On this occasion he proposed to deal with the district traversed by their mutual frieud (Mr. William Rooke) and himself in June and July last—viz., the Valders Route between Christiania and Bergen. The scenery of the Valders and Leavdal was unique iu its way, and if, to some extent, it lacked the magnificent waterfalls that rendered the Romsdal so attractive (and which he endeavoured to illustrate on the occasion of his first lecture) he ventured to think the absence was compensated in the ever-varying and majestic character of the scenery at almost every point. At the present time all obstacles to comfortable travelling had been overcome, good conveyance can be hired, and excelleut food and sleeping accommodation obtained, generally speaking at a moderate cost. He intended on this occasiou to treat his subject in a popular manner, and in order to make it as interesting as possible, proposed to give a representation of their actual tour, startiug from Birmingham.

The lights having been turned down, a picture of the Grand Hotel, the headquarters of the Society, was projected on the screen (16 feet), powerful dissolving lanterns being used, and was immediately followed by a view of the interior of New Street Railway Station (this was a very difficult subject for the camera). The coupling of the engine, and mimic departure of the train for Hull, proved very realistic, and was awarded well deserved applause. Representations of the train travelling at full speed, the arrival at Hull, the docks, and shipping, and the sailing of the Wilson line steamship *Angelo* for Christiauia followed, several amusing and interesting incidents on the voyage receiving due notice. Mr. Jaques spoke of the kindness and courtesy of Captain Johnson, whose name was so well-known by all Norwegian travellers. After pointing out the proposed route on two well defined maps, views of Christiansands were shown, also of the Christiania Fjords, which tourists generally miss owing to the approach being made by night. The views of Christiania include the Parliament House, the King's Palace, Karl John's Gade, the Torvets, the Harbour, &c. These set of slides were succeeded by a very fine series of views illustrating the famous Valders route, *via* Sandviken, Honefos, and Lakel Spierllu, those of Fjeldhiem, Vangsmjorsen, Smeddal Borgund, and Haeg being particularly excellent. The effect of sunrise at Leardalsoveu evoked repeated rounds of applause, as also the scenes in the Aardals Fjord, Navo Fjord, and Navo Dal. Bergen, with its quaint old buildings and busy fish market, received ample illustration, many characteristic views being depicted.

The concludiug pictures gave a good idea of the coasts from Borgen to Stavanger, and the subsequent sailing of the Wilson *Eldorado* and its arrival in the Humber (a very cleverly contrived effect) brought a most enjoyable lecture to a close; the lecturer bidding the members adieu with a slide of the Paragon Railway Station at Hull, in the midst of well-merited applause. The number of pictures shown was 156, all of which had been made by Mr. Jaques from negatives taken last year, the lantern plates used being Fry's, Mawson's, and Thomas's, and in points of technical excelleuco and artistic effect left nothing to be desired.

The paper on the 28th inst. will be on "Various Printing Processes," by W. Griffiths.

Notts Amateur Photographic Association.

A large number of the members of this Association met on Thursday evening, the 14th, at the Miland Station; the Hon. Secretary having made arrangements for a saloon carriage, the party—iucluding Mr. H. Blandy, Edinburgh, president; Messrs. G. A. Bull and S. Wells, vice-presidents; B. Sturges Dodd, hon. treasurer; and P. E. Knight, hon. secretary—journied to Derby on a return visit to the Derby Photographic Society. They were met on the Derby platform by a deputation, who conducted them to the Society's new rooms, Derwent Buildings, Derweut Street, where they were heartily received by the members of the Derby Society. A large collection of photographs was displayed upon the wall and tables, especially noticeable being the prints taken during the Photographic Convention held in Derby in 1887. The visitors were then shown about Derby (on the screen), some very fine views being exhibited, reflecting great credit on the members of the Derby Society. Refreshments having been partaken of, the President of the Notts Association proposed a vote of thanks to the Derby Society for the manner in which they had entertained them, and this was carried with acclamation. The return jonrney was made by the 10.15 p.m. train.

On Monday evening, the 18th, the usual fortnightly meeting of the Association was held at the Club-room, Cavendish Chambers, Market Street. The hon. secretary had for the inspection of members a number of novelties, embracing metal dark slides, film clips, drop shutters, vignetters, view finders, &c., kindly sent dowu by Mr. W. Tyler, of Birmingham, also metal dark slides from Messrs. Bracker and Co., Mr. Wolff's adhesivo card mounts from Messrs. Seuior and Co., of London, and the Beerneart dry plate, all of which attracted considerable atteution from the members.

Mr. G. Shepperley had some very fine enlargements from the Kodak Camera, also some splendid examples of enlarging on Messrs. Eastmau's bromide paper.

Mr. R. S. Armitage exhibited some excellent lantern slides from negatives taken in a detective camera.

The President, Mr. Henry Blandy, occupied the chair.

The Secretary haviug read the minutes of previous meeting, which were confirmed, Mr. John Merrimen, of Birchwood, Alfreton, was elected a member of the Association.

The President then called upon Mr. J. C. Laucaster for his paper on "Magic of Science, or A Night's Amusement with Photographic Chemistry."

Mr. Lancaster, who, on rising, was well received, said: "The title of my paper is, perhaps, a somewhat nuusual one, and I may say at the very outset that I do not propose to enter into the art of mystery, or even to closely define the meaning of the word magic. It may mean imposture, or acting by practising the secret operations of natural powers, or in other words, appareut deception. Again, science is defined to be knowledge grounded on demonstration, or art built on sure principles, and by inversion of terms we arrive at a scientific deception. Deception by means of scientific experiments now serves only two useful purposes: one is instruction, aud the other is amusement. In early times, however, it was otherwise, for science combined with deception served only one purpose, for does not universal history tell us how powerful an instrument it was when employed to awe the people by their rulers, and to this end prince, priest, and sage were leagued together to impose upon the masses, who at times could not be impressed unless by what they in their ignorance considered to be supernatural. The means they employed would seldom deceive people living at the present day, who are daily accustomed to some optical or

acoustical wonder, due more or less to scientific contrivance. Although, in a harmless way, one may still practise devices which throw the judgment entirely at fault, no matter how educated one may be, and I think it will not be difficult to show by the very simplest means, how the senses of vision, hearing, and touch may be readily deceived. Experiments on this were then given. When our judgment has played us false, as in the instances just given, we have been, without doubt, victims to a kind of deception which has been termed "scientific," for the simple reason that it comes within the pale of science to analyze and ascertain all that is possible to learn concerning these peculiar and singular phenomena, "Magic Photography." A few years ago, small sheets of white paper were offered for sale, which, on being covered with blotting-paper and sprinkled with water, displayed an image, as if by magic. The sheets of white paper, to all appearance a blank, were, in reality, photographs which had been bleached by immersion in a solution of chloride of mercury. In the blotting-paper sold there was hyposulphite of sodium; this was dissolved on moistening the paper, the solution penetrated to the picture, and made it visible. The magic cigar holders were then fully explained, as were indelible inks; experiments were given—as alcohol, dropped on chromic acid, immediately takes fire; fire, by dropping H_2SO_4 on chlorate of potash and lump sugar; turning iron into gold, silver, or copper, &c.

A very hearty vote of thanks was accorded to the Lecturer, who promised to give further experiments in "Shadow Photography."

Derby Photographic Society.

The usual monthly meeting of this Society was held in their rooms on March 12th, Mr. Keene presiding.

A new member was elected.

Mr. A. H. Bennett read an instructive paper on "Cycling as an Aid to Photography," for which he received the hearty thanks of those present.

On March 14th the Society entertained the members of the Notts. Photo. Association at their rooms, when about thirty availed themselves of the invitation, including President H. Blandy, Vice-presidents G. A. Bull and S. Wells, and the Hon. Sec., P. E. Knight. After a hearty welcome by Mr. Keene, an exhibition of lantern slides made by the members of the Derby Society was given, amongst the exhibitors being Messrs. Keene, Scotton, Bourdin, Cooper, Lovejoy (hon. sec.), Chadwick, and Dean. After some remarks from Mr. Blandy, it was arranged that the two societies should meet at the trip to Ashby-de-la-Zouch on April 27th. The walls were hung with a large number of photographs taken by members of the Society, and tastefully decorated. The gathering afterwards resolved itself into a smoking concert, at which some excellent songs were given by Messrs. Wood, Wesson, Scotton, Lovejoy, &c. The lantern was efficiently manipulated by Mr. Bertwin Cooper.

Camera Club.

At the lantern evening on March 14th a very large number of slides were exhibited on the screen. The photographs shown included the work of the winners in Messrs. Fry and Co.'s recent lantern-slide competition; also slides toned with gold, by Mr. G. F. Blackmore; experimental work upon rapid and slow chloride plates, Mr. J. D. England showing the range of colour obtainable; flower studies and groups, by Mr. Henry Stevens; photo-micrographs, by Mr. Charters White; interiors at Sandringham, the slides by Major Nott, from negatives of Mr. Lemere's; collodio-bromide work, by Mr. Hussey; and general landscape scenes, by Messrs. Finney, Noel-Cox, Ferrero, Seyd, Howlett, Leventhorpe, Elder, Rodgers, Laurie, Fitzpayne, Gladstone, Grimshaw, Wilkinson, and the Hon. A. W. Erskine.

On March 28th, the Thursday of Conference week, novelties in apparatus will be shown at the Club and explained by the exhibitors.

Newcastle-on-Tyne and Northern Counties Photographic Association.

This Society met on March 12, the President (Mr. A. S. Stevenson) in the chair.

The President, in thanking the members for having honoured him in electing him to the position he held, spoke of the great advancement which had taken place of late years in the photographic art. He himself lectured on the subject in the Hall of the Literary and Philosophical Society about thirty years ago, and at that time hardly anything was known of photography by the public.

It was announced that Mr. Stevenson would give a silver and bronze medal for the best and second-best series of not less than twenty-four lantern slides, open to all professional and amateur photographers in the world; and also that Mr. J. P. Gibson would give a silver and bronze medal for the best and second-best series of six lantern slides by an amateur member of the Association. The competition for these will take place in November, 1889.

Mr. H. C. Hemy read a paper upon "Lenses—Photographic and Microscopic," and numerous examples were shown.

At the next meeting, April 9, Mr. J. P. Gibson will read a paper on "The Intensification and Reduction of Negatives."

Sheffield Photographic Society.

The monthly meeting was held on Wednesday, March 6th, instead of on Shrove Tuesday. The company gave a cheering welcome to the president, Mr. Thomas Firth, he having been absent from the chair for some time owing to ill health. The Society is steadily increasing in numbers and influence. Mr. Hardy Crodces and Mr. J. A. Brookfield were elected members.

The subject of platinotype by the hot bath process will be introduced at the next meeting by Mr. Charlesworth, who will read a paper and explain the value and beauty of these pictures.

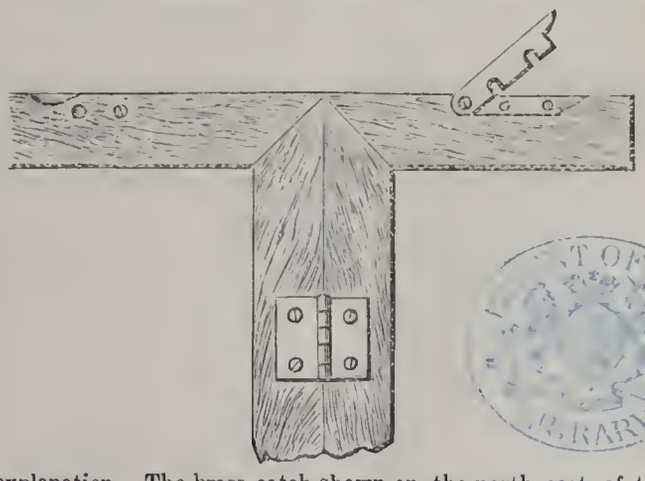
Mr. Preston exhibited an arm tap with a rose end for washing prints and negatives.

Three papers of criticism by anonymous critics on the pictures, &c., exhibited at the Society *conversazione* were read by Mr. Beck, the Secretary, and proved a source for opening out discussions, as well as maintaining agreeable and entertaining interest in the Society and its work.

An examination of the catalogues placed on the table from several of the leading photographic firms concluded the proceedings.

Talk in the Studio.

A Fastener for the Book Form of Dark Slide.—From Mr. R. L. Allan, of 1, Henry Street, Pentonville, we receive a neat arrangement for holding together the two halves of the book form of dark slide. The subjoined cut scarcely requires



explanation. The brass catch shown on the north-east of the plan folds into a recess in one of the leaves, and one of its indentations grips over the neck of the screw shown in the same leaf, and when the slide is closed the other nick of the catch engages on the neck of the screw in the opposite leaf. The advantage of the arrangement is that nothing is cut away so as to weaken the slide, and nothing projects. Mr. Allen informs us he has obtained patent protection for this arrangement.

The Crystal Palace Exhibition.—A correspondent who has worked long and hard in the work of organizing exhibitions intended to mark the progress of photography, and to foster its further advance, writes rather despondingly regarding the tendency of the exhibition now open at the Crystal Palace. "One of the most prominent exhibits," he writes, "is a high stack of packages which either contain, or are supposed to contain, commercial dry plates; and this exhibit is a type of the whole. Trade in photographs and trade in requisites is everywhere represented; but the science underlying the art of photography, and the technics of the art, scarcely appear, excepting where they are forced in by a by-path as incidental to the trade aspect."

The Manufacture of Celluloid.—Now that celluloid is going into pretty extensive use as a basis for gelatino-bromide emulsion, the following description of the mode of manipulation now adopted in Paris may be interesting. Celluloid may be regarded as a solution of pyroxyline in camphor; the camphor being softened by heat during the process of manufacture. "A roll of paper is slowly unwound, and at the same time is saturated with a mixture of five parts of sulphuric acid and two parts of nitric acid, which falls upon the paper in a fine spray. This changes the cellulose of the paper into pyroxyline (gun-cotton). The excess of the acid having been expelled by pressure, the paper is washed with plenty of water until all traces of acid have been removed. It is then reduced to a pulp, and passes on to the bleaching trough. Most of the water having been got rid of by means of a strainer, the pulp is mixed with from twenty to forty per cent. of its weight in camphor, and the mixture thoroughly triturated under millstones. The necessary colouring having been added in the form of powder, a second mixing and grinding follow. The finely-divided pulp is then spread out in thin layers on slabs, and from twenty to twenty-five of these layers are placed in a hydraulic press, separated from one another by some sheets of thick blotting-paper, and are subjected to a pressure of 150 atmospheres, until all traces of moisture have been gotten rid of. The matter is then passed between rollers heated to between 140 and 150 degrees Fahr., whence it issues in the form of elastic sheets."

The London and Provincial Photographers' Association.—A meeting was held on the 14th inst., Mr. F. W. Cox in the chair.—The Chairman drew attention to programmes of the arrangements of the forthcoming Camera Club Conference, which were distributed among the members present.—The Hon. Secretary showed a sample of bromide paper tinted rose pink, which he said was now in the market.—Mr. A. Haddon said he believed this kind of paper had been in use in France for some time.—The Chairman asked for a good formula for intensifying a negative.—The general opinion was in favour of Monckhoven's intensifier after the negative had been cleared and bleached.—The judging of the competition slides was then proceeded with. The conditions of the competition were that all the slides should be made from the same negatives, three negatives (¼-plate) being selected for the purpose and passed to each competitor in succession, who was allowed three days in which to make his transparencies; any process might be employed. For comparison, two lanterns were employed; projecting discs side by side on the same screen, the best slide remaining on the screen until another was subsequently adjudged to surpass it. The result of the judging awarded first place to Mr. J. B. B. Wellington; the second place to Messrs. H. M. Hastings and C. H. Cooke. The competition was an exceedingly close one, the vote of the members having to be taken several times during the exhibition of the slides.—Mr. J. E. Freshwater showed a series of bromide prints from negatives taken in India, including photographs of some of the Indian idols; two of these images, cast in brass, were passed round—the great god Siva, and the god Ganessa, the god of Wisdom, whose aid every pious Hindoo invokes before commencing any important business undertaking.—Some cases of moths and butterflies from the same country were also shown.—Following these a number of slides were projected on the screen by Mr. Freshwater, illustrating Indian scenery. From some of the illustrations shown it was gathered that human scalps carried on poles formed a prominent feature in a wedding procession of some of the Hill Tribes. Dancers both male and female are also included in processions of this kind, whose backs are lashed with canes until they become quite frantic, raising the lookers on to the highest state of excitement.—A hearty vote of thanks was accorded to Mr. Freshwater.—Mr. F. C. Kellow was elected a member of the Association.

Photographic Society of Great Britain.—Technical meeting Tuesday, March 26th, at the Gallery, 5A, Pall Mall East.

Photographic Club.—The subject for discussion on Mar. 27th (last lantern night of season) will be "Lantern Matters."

*** Everything relating to the Literary Department of the Photographic News, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," should now be sent to Mr. Spiller, who is alone responsible for all which appears under that heading.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs Piper & Carter, Photographic News, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

J. C. (Hanley).—In using the vignetting mask between camera and bromide paper screen, an improved result could be got by giving the cut mask a slight circular movement during exposure. Another plan would be to attach some loose fibres of cotton-wool to the notched edges of the mask, so as to modify its truly symmetrical form; but the best mode of proceeding is surely to vignette the negative itself before the light enters the camera.

Floater, having accidentally mixed some of the gold toning bath with a silver sensitising bath, is advised to filter off the precipitate, and put this into the general residues; then shake up the clear solution with kaolin, and use it again for printing bath. This may, however, require correction with dilute nitric acid just to the point of neutrality or very faint acidity. If the toning bath happened to be carbonate, it would be easy to work the silver precipitate back again into nitrate; but if acetate or borate, it had better be treated as residues, and fused with dry carbonate of soda.

G. M. (Southall).—1. Select No. 1 or 3 camera, equally suitable. 2. Lens No. 1 or 5; but it would be a convenience to have both. It is assumed that you are intending to provide for general outdoor photography, not studio work.

A. B. C.—The formula you mention is about right, or same as that in common use. Try thicker films in order to get greater density and purer whites; that is to say, diminish slightly the proportion of water, and also increase the iodide from 2 to 5 grains, the latter being Captain Abney's latest formula.

Ortho.—You are right; the bottles do not contain 1 oz. of tincture as stated in the paper of instructions, but only 25 c.c.; and the proportion of pyro directed to be employed is extraordinarily high —4½ grains per fluid ounce of developer. We cannot tell you what is meant by the statement that "ordinary commercial azaline would be quite useless," for no such substance is to be found in commerce.

King's Man.—Our copy of Hardwich's "Manual of Photographic Chemistry" is the fifth edition, dated 1859. We do not know whether this was the last published; apply to Messrs. J. and A. Churchill, New Burlington Street, W.

Copyright.—If you can prove that your registered photograph has been pirated, you can not only claim all copies, but apply to a magistrate for possession or destruction of the negative, together with penalties for infringement.

L. T. A.—M. Thiébaut's pellicle cards were to be had three years ago of Messrs. Watson and Sons; but we imagine they have now been quite superseded by the American stripping films. For particulars, see paper by Messrs. Ince and Addenbrooke in the News of Jan. 15, 1886. Enquire of Mr. J. R. Gotz.

B. C. (Wolverhampton).—Better than the process we indicated a fortnight ago, is a mode of transfer to the wood block of a print or negative on specially prepared carbon tissue (containing a minimum of gelatine), the face of the block itself having been coated with a thin size, and the transfer squeegeed down upon it in the usual manner. Apply to the Autotype Company for suitable material.

A. M.—The exhibition of Alpine and Caucasian views, by the late W. F. Donkin, is now open at the Gainsborough Gallery, 25, Old Bond Street. Tuesday next, 26th inst., will be the last day.

H. T. L. (Westport, N.Z.).—Blue-black tones on albumenized paper are easily got by using a freshly-made bath of gold and carbonate, and pushing the action much further than is customary for chocolate tones. Heat will assist in doing this. The best retouching medium for varnished dry-plate negatives is to rub the bright surface with oil of turpentine, or apply a little powdered resin or lycopodium with the finger. Cadett's adjustable lightning shutter, or Liesk's sky shutter (Marion and Co.); either would answer your purpose, as they provide for giving the foreground a longer exposure than the sky.

N. W. India.—Curriers' dubbing might be worth a trial for keeping the leather supple, but we are not sure of its preventing the attack of insects; camphor, even, is not always successful.

Several other correspondents in our next.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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PHOTOGRAMMETRY.

ONE of the purposes to which it has often been proposed to apply the photographic image, but for which, up to the present, it has not been used to anything like the extent that was by some writers anticipated, is the serving as a basis for exact measurements, so as to be useful for the drawing up of plans and elevations of various natural objects, and to supersede or dispense, to some extent, with the work of the surveyor and engineer. True it is that in astronomical work the power of photography to render maps capable of exact measurement is fully recognised, and a design is on foot for a complete mapping out of the stellar universe by the aid of the camera, but in other directions comparatively little has been done. The modern developments of photography in the direction of the production of lenses giving images without distortion, and particularly the increase in the sensitiveness of the negative process, whereby we are enabled to use such small diaphragms in our lenses as to ensure greater sharpness of the image—which, for this purpose, may be considered as equivalent to preciseness of position on the plate—have tended to remove or to ameliorate some of the difficulties which have stood in the way of earlier workers in this direction, and there is every probability of a more extensive use being made of photography as an automatic recorder of position, whose work may serve the purposes of the draughtsman for exact measurements, than at one time seemed practicable.

The interest now taken in photogrammetry, as the art of measuring and drawing by the aid of photography is called, is well evidenced by a paper on the subject recently submitted to the Photographic Society of Vienna by Herr Franz Hafferl, Engineer, from a report of whose paper, published in the *Photographische Correspondenz*, we extract the following particulars.

Photogrammetry is described as deriving from photographs of objects, their geometrical projection, elevation, and ground plan. Since a non-distorting lens will give a photographic image in true perspective, it is the task of photogrammetry to derive a geometrical projection from a perspective drawing. This latter problem was solved so far back as the year 1759 by the German mathematician Lambert. It was practically applied in the years 1791 to 1793 by the French engineer Beautemps Beaupré, who, whilst engaged in a scientific expedition, constructed a chart of a portion of the coast of Van Dieman's Land from drawings. It is evident that the result could not be exact, as it depended entirely upon the skill of the sketcher. It is only since the discovery of photography that it has been possible to obtain a picture in absolutely true perspective. The possibility of employing the photographic picture to the purposes of geometrical projection was remarked so long since as the year 1839 by Arago, and about the year 1842 Professor Laussedat, of the Polytechnic School in Paris, practically applied the suggestion. Laussedat worked at first with the ordinary camera, then with the so-called panoramic camera, but finally with an improved "photographic plane table" made under his direction by Chevalier. All these apparatus exhibited many faults, so that at the present day they are no longer employed. Nevertheless, excellent results were attained by their means, and certainly the practicability of the method was placed beyond doubt by the labours of Laussedat and his co-workers.

The founder of the present system of photogrammetry is Meydenbauer, who, without a knowledge of what was being done in France, has worked at the subject since 1858, and has brought his method to such perfection that all others are laid aside when certain results have to be accomplished.

Meydenbauer worked with a metal camera having no adjustment for focussing, which, for the end in view, when using a lens of short focus and with small diaphragms, appears a quite permissible arrangement, considering the proportion between the distances of the object and of the picture from the lens, and the size of the stop. The fixed distance of the lens from the sensitive surface ensures great stability in the apparatus and constancy in dimensions, and simplifies the construction considerably.

The literature of photogrammetry is, unfortunately, very scanty, and is dispersed in various photographic and technical journals, in consequence of which an exact and complete description of Meydenbauer's apparatus could not be found. From what has been published, however, it appears that the apparatus now to be described, which was contrived by Herr Hafferl in conjunction with Herr Maurer, is identical in principle with that of Meydenbauer, but is different in economical and other considerations. In carrying out Herr Hafferl's ideas, he and Herr Maurer were assisted in the most friendly manner by the firm of Lechner, who placed their mechanical workshop at the disposal of the investigators.

The metal camera, without adjustability for focussing, is fixed upon a theodolite head with cross levels, mounted upon a solid stand, such as is used for geodetic instruments. The lens, a Suter's aplanatic No. 3, is firmly screwed to the camera. As in all geodetic instruments, a contrivance in the nature of cross wires is adopted, which, in this case, however, is substituted by a single horizontal thread which lies in notches so arranged as to lie close to the plate during exposure, and leave thereon an indication of their presence.

In order to use the apparatus, it must be adjusted in three respects, that is to say:—1st. The pivot on which the camera turns must be vertical. 2nd. The sensitive plate must be vertical. 3rd. The horizontal thread—that is to say, the line which joins the two notches—must lie horizontally, and must intersect the optical axis of the lens.

This adjustment is effected with the aid of a levelling

instrument, which is erected about the same height as the lens, close behind the apparatus. As soon as the requirements of the first of the necessary conditions is accomplished, in the same way as with all geodetical instruments, then, with the levelling instrument, we view its own reflected image on the back of the ground glass of the camera. When the ground glass stands truly vertical the reflected image of the telescope must stand concentric with the circular field of the telescope. This adjustment is done with the assistance of a correcting-screw.

Now, with aperture-sights and with a levelling instrument, we note certain points in nature which are at the same height as the lens. The images of these points lie upon the ground glass on a horizontal line, which is intersected by the optical axis of the lens. These arrangements being made, we can bring the horizontal thread into exact position by means of correcting-screws, and thus have fulfilled the third condition.

We can now produce pictures that will serve our purpose as soon as the apparatus is set horizontal by means of the cross-levels. In order, however, to apply our picture to the construction of a drawing, we must know the point where the horizontal line cuts the line of the axis of the lens on the plane of the sensitive plate; and lastly, the length of the perpendicular or the actual distance of the picture from the optical centre of the lens.

These two constant quantities are obtained by photographic methods. We place in the field, in a straight line, a number of ranging poles, marked A_1, A_2, A_3, A_4, A_5, in the accompanying figure. Perpendicularly opposite to A_3, the apparatus is set up at the point L, and a negative is taken of these poles. On the ground itself we measure the distances of the poles equal to a_1, a_2, a_3, a_4, and the distance, $A_3\ L = d$. In the picture, H_2, H_1 (which, in general, will not be parallel to the straight line, A_1, A_5), the images of the poles, A_1,—A_5, lie at B_1, B_2, B_3, B_4, B_5, and we can measure the distances of them, b_1, b_2, b_3, b_4, as well as the distances of these last images, B_1 and B_5, from the notches, H_1 and H_2, namely, h_1, and h_2. We have now to determine the distance of the point M (the point where the perpendicular from the centre of the lens falls upon the plate), from any one of the B's, and also the actual length of the perpendicular, L M $= f$. From the distances that have been measured on the ground, the angles, $\alpha_1, \alpha_2, \alpha_3, \alpha_4$, can be calculated, but these are equal to the similarly indicated angles in the camera. We now know, therefore, the position of the five points B_1, B_2, B_3, B_4, B_5, and the measure of the angles between the ray from a sixth point L to these five points. For the determination of x and f according to the so-called Pothenot's problem, three points and the angles corresponding to them suffice. We can thus calculate from several combinations of figures, both dimensions; and

Fig. 1.

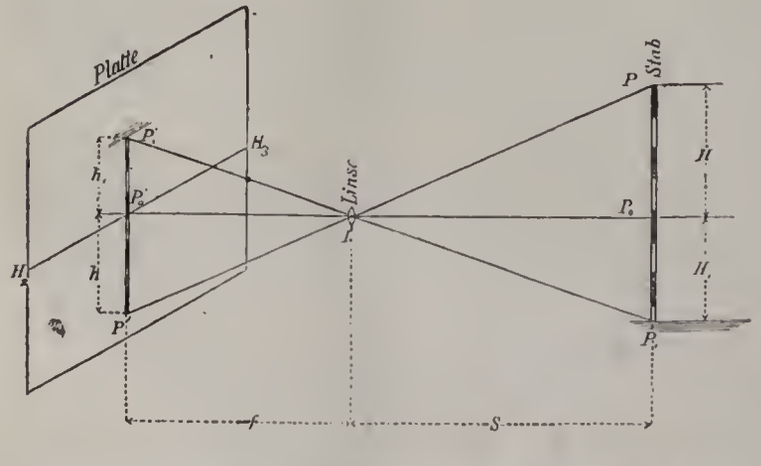
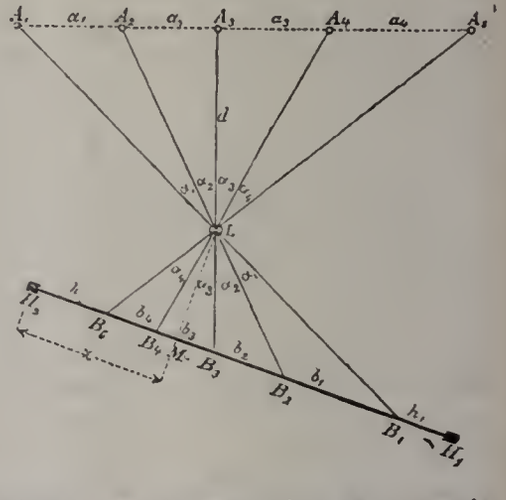


Fig. 2



thus we obtain a check, on the one hand, for the calculations, and, on the other hand, ascertain that the objective gives true delineation without distortion.

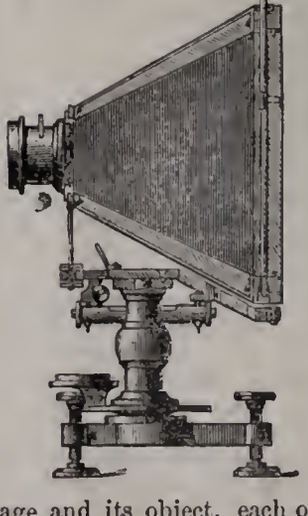
With our apparatus the position of H proved to be in the centre between H_1, and H_2, the length f was 194·65 m.m., and the determination was made after four photographs had been taken, and from each photograph two calculations were made.

The rectification as well as the establishing the constants may be attained in other ways, but the plan should be simplest that will serve for the particular apparatus.

From the pictures that have been taken we can now, as first mentioned, construct the ground plan and elevation of the objects included. As the simplest case, we will take the ground plan of the five ranging poles that have been photogrammetrically delineated. Having already taken the first photograph, we will take a second photograph from a second point L', which point, however, must appear upon the first plate.

The only measurement required to be made direct from nature is that from L to L'. In order to construct the ground plan from the two plates, it is now necessary to place them upon the drawing as they lay in nature, that is to say, the plate taken from L must so lie behind the point L that its middle point M touches a circle described about L, with a radius of f, and that a straight line drawn through an image and the point L strikes the original object of that image; at the same time care must be taken that the direction to the right or left towards which the distance M B is drawn, is not reversed. So far as

Fig. 3.



concerns an image and its object, each object A, and its image B, lie in one straight line with the centre of the lens L.

The second photograph taken from L′, we so arrange that the standpoint for the first exposure L is included in it, and we use the picture from L for marking position in the manner before indicated. The image then, the point L′, and the object, lie in one straight line, so we obtain in the drawing the image of each staff A intersecting two straight lines, of which the one passes through the first image of A and the point L, and the other through the second image and L′, that is to say that each point is fixed by means of the angles formed by the line L L′ and the rays of light where they touch the extremities of that line. From this circumstance it follows that we can draw the plan to any scale on which we have fixed for the basis.

The ground plan, then, is settled, and we can, for each point P in nature (see the perspective drawing, figure 3), establish its distance, S from L. The image P′, of the point P, lies at a distance, f from L, at the height h, above the horizontal line H_2 H_3, of the plate. The point P in nature must therefore lie in the same proportion, higher than the horizontal line, as s is greater than f. The horizon intersects the staff P P_1 at the point P_0, the image of which (P'_0) lies upon the horizontal line—H, therefore, equals $\frac{h \cdot s}{f}$, and in the same manner the portion of the staff below the horizon, $H_1 = \frac{h \cdot s}{s}$. The sum of the two distances gives the length of the whole staff. We can in the same manner find the height of each point visible, whether above or below the horizontal line, and thus obtain a complete elevation of the objects photographed. After having obtained each point upon two photographs, we can measure its height a second time, and thus obtain a means of correction as well for the elevation as for the ground plan. We have, for the sake of simplicity, supposed the work to be done direct from the negatives, which plan, however, is not to be recommended on account of the damage resulting to the plate from taking measures from it by the points of the compass. In practice, it is best to use prints upon cyanotype paper, which, in our experience, reproduces most exactly the dimensions of the negative. As will be easily understood, there is no change in principle caused by the use of positive prints.

Just in the same manner as the construction shown in the foregoing simple example, is that of the most complicated objects, provided the choice of the two standpoints is made with care, so that every point that has to appear in the construction shall be rendered upon both plates. If this has not been attended to, it is generally practicable with architectural subjects to complete the construction by the help of the rules of perspective; with natural objects in a landscape, however, this is not so. From this it results that photogrammetry of natural objects is only proper when the outlook is tolerably free. On this account it is unsuitable for an extended woody district. Almost as unsuited is a wide plain, where the necessary outlook is only to be obtained from a scaffold on which the apparatus would have to be erected. Very suitable is a hilly country without much wood. Of priceless value, however, is photogrammetry for high mountains. With this method it is practicable, as with no other, to represent exactly, and with trifling cost, places absolutely inaccessible. The apparatus is comparatively light and easy of transport, and the rugged mountain forms offer everywhere suitable points for the construction.

Architectural subjects, especially decayed unsafe buildings, are scarcely to be otherwise planned in a rational manner than by photogrammetry. As the before cited work of Baurath Meydenbauer proves, the method has been found of the most weighty advantage for architectural work. There seems no doubt that in consideration of the simplicity with which the photographic portion of the work is carried out, the method will in a short time be generally recognised and employed. It is believed that in the foregoing communication the essential points of photogrammetry have been shortly described, certainly only in outline, as mathematical discussion has been avoided, without which, however, the subject cannot be completed. Nevertheless I hope that some interest in it at least has been awakened.

THE CAMERA CLUB CONFERENCE.

The third annual conference held under the auspices of the Camera Club was opened in social style by a smoking concert on Monday evening last. The more business-like and scientific portion of the programme commenced on Tuesday afternoon in the theatre of the Society of Arts, John Street, Adelphi. Papers were read by Mr. Conrad Beck on "Depth of Focus"; Mr. J. Brett, A.R.A., on "The Relation of Photography to the Pictorial Art"; Dr. P. H. Emerson, on "Science and Art"; Mr. Lyonel Clarke, on "A Comparison of Developers"; Captain W. de W. Abney, on "The Law of Error and Photography"; Mr. T. R. Dallmeyer, on "Shutters"; and Mr. G. Lindsay Johnson, on "A Shutter Speed Measurer." With such a quantity of matter for one afternoon there was obviously no time for anything approaching an exhaustive discussion. Very little time could be devoted to any of the papers, and that by Captain Abney, indeed, did not elicit any remark, the members doubtless feeling that the subject required deeper consideration than could be given to it in the limited time at disposal. The remainder of the programme included an exhibition of slides in the evening, many having been sent for exhibition by various photographic societies, both English and foreign. The Wednesday programme included papers by Mr. C. H. Bothamley on "Chemical Changes from the Modern Point of View"; Mr. A. A. Common, F.R.S., on "Irradiation in Astronomical Photography"; Mr. A. Dawson, on "The Field of Photogravure"; Mr. W. T. Wilkinson, on "Dry Plates for Photo-Litho and Collotype"; Mr. A. Pringle, on "Photo-Micrography"; and Capt. A. M. Mantell, R.E., on "Photography applied to Military Purposes."

LANTERN SLIDE MAT CUTTERS.

BY JOSEPH P. BEACH.*

In reducing large negatives to sizes suitable for lantern slides, the resulting positives cannot often be made conformable to the standard mats which are sold by the dealers, and hence it becomes necessary to make, in many cases, mats expressly for the required slide. This usually has to be done by hand with a pen-knife or perhaps a pair of scissors. Mats thus made, even by expert hands, are rough on the edges, or at the corners, or where the lines should be clean cut and straight a crooked and ragged appearance will be shown in the enlarged picture on the screen. Then, in hand-made mats, no two are exactly alike, and the making of a dozen or more involves much more labour than many persons care to undertake.

These difficulties can now be overcome by any one of average mechanical ingenuity in a very simple manner and at very small expense.

At the retail dry goods stores, dress steels covered with cotton, $\frac{3}{8}$ to $\frac{1}{2}$ inch wide, made of thin steel, are sold for a few cents each. At the corset factories these steels of any length and width may be procured, or sheet steel in strips may be obtained at hardware stores. The average steel, however, is long enough for a lantern mat, and can be converted into a cutter by proceeding as follows :—

These steels are thin and pliable. They are easily cut with a pair of heavy scissors, and are readily made to conform to different shapes by screwing them to various forms of wood. The braided cotton covering is easily cut off by running a knife blade along its length. If a very sharp corner is to be turned, the steel may be softened at the required part by holding that part over a lighted gas jet for a few minutes, and then letting it slowly become cool. If required the steel may be re-tempered, after obtaining the required shape, by again heating it, and while

* Read before the Society of Amateur Photographers of New York, February 12th, 1889.

hot plunging into a bath of salt and water, or hy smeariug the part with grease, setting fire to the grease, and as soon as it is hurned off plunge the steel into cold water. This sufficiently restores the temper of the steel to keep a good cutting edge for quite a long while.

The cutting edge is made hy first filing one edge of the steel, using for this purpose a fine file, or a good cutting file, and lastly a finishing file to give a smooth, keen edge, or the edge can he ohtained by the slower process of a grindstone.

Having ohtained a cutting edge (which should be made all on one edge of the steel like a chisel hlade), the steel may he either drilled with holes for the insertion of small screws, or the holes can be made with a steel punch and a hammer.

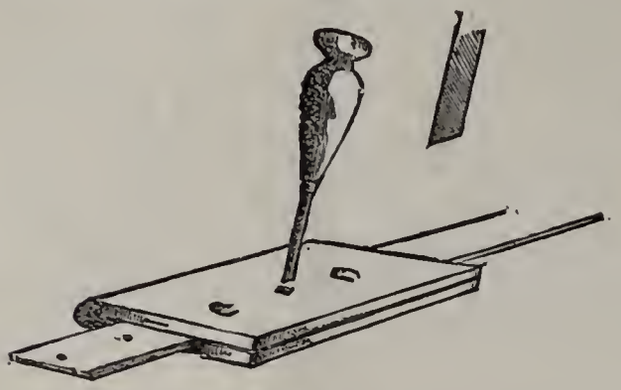


Fig. 1. The hinge closed upon the steel strip, showing the awl just entering the die. The small section above shows the angle at which the end of the awl should be ground to work best.

Fig. 1 shows the manner of punching holes through the steel. The neatest and best way to punch a hole in the steel is to obtain an old cast-iron hinge. Through hoth lips of this hinge cause a hole of the required size to be drilled. Then lay the

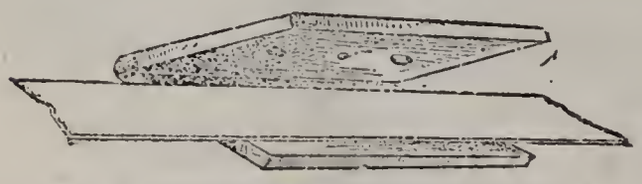


Fig 2. The steel strip inserted in the hinge prior to punching.

flat steel hetween the two lips of the hinge and close the latter upon it. This holds the steel as in a vice. Now take a shoemaker's awl, the point of which has heen ground or broken off flat. Put the awl through the hole in one of the lips of the hinge and strike it through the steel. This cuts a clean hole in the piece of steel, and as many such holes can be made as may be desired. It is well to grind a slight hevel on the cutting edge of the awl.

Being now prepared to make mat cutters, proceed as follows: Fashion out of some $\frac{3}{8}$ or $\frac{1}{2}$-inch thickness of tough wood—say ash or hlack walnut—white wood or even pine the form of the mat you require. Make it the thickness of the steel smaller than the desired mat.

Screw this "form" or piece of wood to another square piece, $\frac{1}{4}$ or $\frac{1}{2}$-inch larger all round than the "form." The object of making this piece square is for convenience in using the cutter after the paper to he cut is folded. It may be folded to cut eight to twelve or sixteen mats at one cutting.



Fig. 3.—Manner of holding block in vise, and method of bending the steel around it. The lower portion is the $\frac{1}{2}$ wood to which the form is screwed.

Through the centre of both pieces bore a hole $\frac{1}{4}$ or $\frac{1}{2}$-inch in diameter.

Now encircle the smaller (or "form" piece of wood) with the steel, fitting the steel snug to the hack or shoulder, and as it is

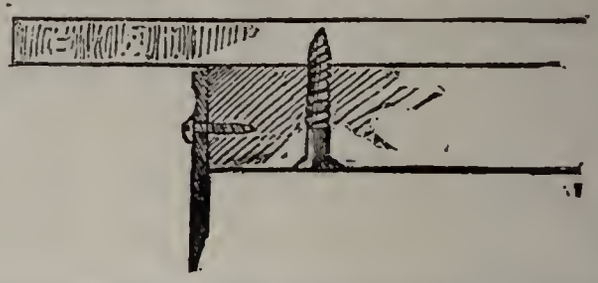


Fig. 4.—Section showing how the form block is screwed to its base, and mode of securing the steel cutter to the block.

wound around the form secure it at proper intervals by means of screws. Small round head screws are hest (say No. $2\frac{3}{4}$-inch).

The outside edge of the steel should he at least $\frac{1}{4}$-inch higher than the form, and the filed or hevel side of the steel should be placed next to the wooden form. Where the steel laps at the finish mark it and cut off the surplus. This joint may he further stiffened or strengthened hy an extra piece of steel screwed on over the joint, but cut away so as not to interfere with the cutter.

I have found it best to cut the ends on a bias or obliquely as shown in figure 5, which makes a better joint.

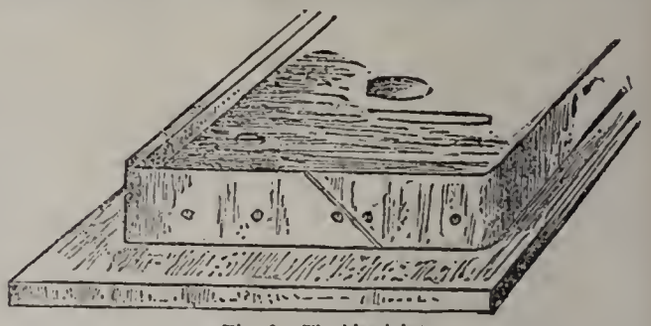


Fig. 5.—The bias joint.

In putting the steel on the form it should be fastened first to the centre of the arch on the form, then hent around each side until the euds meet as shown in figure 3. Owing to the elastic nature of the steel it is necessary to cut off the sharp corners of the form double the thickness of the steel, in order that the steel will hug the form closely after being hent in place.

The cutter is now ready for use. Fold your paper to the number of mats and size required. Lay it on a hlock of hard end wood—that is, the end of a log of suitable size; or a hlock of mahogany, cherry, or apple. One hlock a few inches square will last a long time if the precaution is taken to strengthen the sides and bottom hy cheaper and heavier stuff.

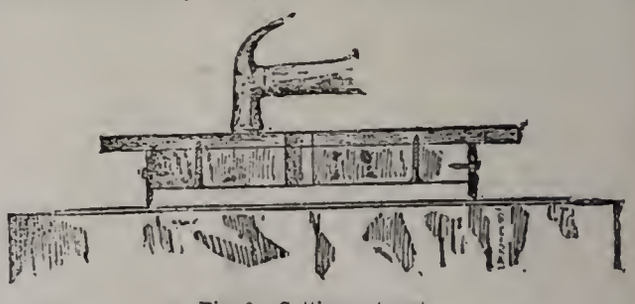


Fig. 6.—Cutting out mats.

There is no douht that mats can he cut out hy brass forms, made of printers rules, which can be hought at the type founders'; hut the sharp edges of these brass rules will very soon become useless, and besides the cutting edge is not of the proper shape to make a clean cut mat. It pushes the paper outwardly and tears where the cut should he smooth and clean. A very considerable experience in making these cutters of various materials has convinced me that neither tin, iron, brass, or German silver will do the work required as well as the thin sheet steel so readily obtained and so easily worked.

I have made good sound mat cutters out of $2\frac{1}{2}$-inch gas-pipe, which was face-hardened after filing the inside edge until the outer edge was a keen cutter. I have also made fair mat cutters out

square and round brass pipes as used for ornamenting chandeers, but none of these were satisfactory, or in the end worth he labour bestowed. I even had some iron and brass cast into he desired shapes, but they were not worth the labour as tools to ork with. My experienc teaches that the cheapest and best re those made as above described, and I have some cutters made f thin clock spring steel which have been in continuous use for veral years, and have not even required filing in that time.

The secret of cutting a good mat is care. After the laying on f the cutter, the blows of the hammer should first be light, and elivered all around the form. Then set the cutter in by a few ore well delivered harder blows. After the cut is complete, berate the cutter by lightly tapping it until it will come off of he cutting block.

I find it convenient, when a large number of mats are to be ut, and even if there are only two or three, to do the work in he following manner :—

Take a piece of thin pasteboard the size of a lantern slide. ut it the exact size of the folded paper you propose to cut into ats. With the cutter make this pasteboard into a mat, which hould be centered if the cutter is a round or an oval. Sandaper the inner edge of this pasteboard mat until the cutter may e easily placed within the opening.

Now, when it is desired to cut mats, the paper is folded to he size and this pasteboard mat laid over it. The cutter is then itted in its place, and a few whacks of the hammer completes he operation, without the trouble of finding the exact spot where the cutter should be placed on the blank paper.

The dress steels may also be utilized for making cutters for pecial purposes. A piece of the sharpened steel an inch or two ong fastened to an appropriate handle may be used as a chisel o cut a straight line. Another piece may be bent to an angle nd used to cut out corners. A very sharp angle may be made y annealing the steel and bending it in a vice before fastening o the handle. An easier way, however, is to join two straight ieces at right angles.

Fig. 7.



Fig. 8.



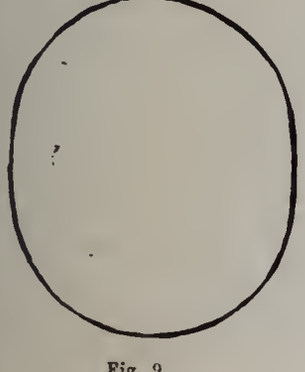


Fig. 9.

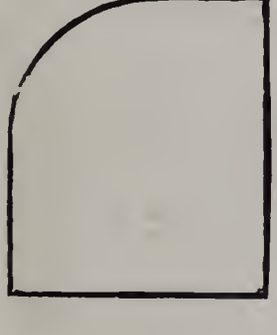


Fig. 10.

Figs. 7, 8, and 9 show some of the special shapes that can be made. Fig. 10 shows a quarter-section die constructed to make round corners. Other shapes, like gouges or semicircles, can be made, which will be found useful in making mats where only one or two are required. It is obvious that this class of mat-cutters can be utilized in cutting out suitable pasteboard mats for photographs, as well as for lantern slides, by making the cutters of desired size. In this way almost any person can have, at a very small cost, a mat-cutter that will answer every particular purpose, and, if he wishes, he can have an assortment of large and small ones to suit any slide he may have prepared or any picture he may wish to mount.

It should be understood that this manner of making cutters for mats will not make such a perfect tool as the finished articles (costing four or five dollars) made by a practical mechanic, but will answer the purpose of the average amateur.

The foregoing description, with accompanying sketches, has been written at the request of one of your members, who thought this paper might be useful to those who wish to make their own mats.

DEVELOPMENT IN TWO SOLUTIONS.

BY D. BACHRACH, J.R.*

Since writing the communication to your Society at the instance of Mr. Dulfield, I have been experimenting carefully and using the method outlined in our daily practice, and in order to answer the numerous correspondents to whom it is impossible to do justice by letter (for want of time), and in order to publish the improvements and alterations I found necessary after careful trials, I will give herewith the formula I found to work the best. In my former article I put myself down in favour of the hydroquinone developer used in two solutions (as I gave it for pyro), by first dipping in one solution, and then developing in the alkali alone. So far as portaiture is concerned I take that back, and I have again taken up the old friend, pyro. The hydroquinone negatives looked clearer, brighter, and prettier than those developed with pyro, but, alas ! like my former experience in the days of ferrous-oxalate, the promise in the negative was broken in the print. I find that the pyro negatives had a greater range of tones and retain the delicate half-tones better, while I still think that for landscape work, where more breadth and vigour are necessary, and where, on account of the volume of light, over-exposure and solarization frequently take place, the hydroquinone yields the best results, as well as in all cases where clear shadows and great density in high lights are necessary. As I find the hydroquinone keeps better if meta-bisulphite of potash is added to it my formula now reads :—

Solution No. 1.

Hydroquinone	1 ounce
Sulphite of soda	4 ounces
Meta-bisulphite of soda	30 to 40 grains
Distilled water	32 ounces

Solution No. 2.

Sal soda (crystals)	2 ounces
Sulphite of soda (crystals)	2 „
Distilled water	32 „

I have also improved the formula and secured much more clearness in the shadows, and improved keeping qualities of the pyro solution, by additions to the former formula, and also avoid the staining of fingers. In rapidity of development for large numbers of negatives at a time, as well as for uniformity of result, this method, in my opinion, is without a rival. The following is the formula as improved :—

Solution No. 1.

Pyrogallic acid	1 ounce
Sulphite of soda (crystals)	3 ounces
Oxalic acid	30 grains
Yellow prussiate of potash	1½ ounces
Meta-bisulphite of potash	120 grains
Water	20 ounces

First dissolve the sulphite of soda in the water (heated), then add the oxalic acid, the prussiate and the meta-bisulphite of potash, and finally the pyro and filter.

Solution No. 2.

Stock solution of sal soda	1 ounce
Stock solution of sulphite of soda	1 „
Water enough to make 8 ounces of developer.	

The stock solutions of the two sodas consist of one pound to a half gallon of water for each. The development by this process is so rapid that using partly old developer with it does not always restrain sufficiently, so in most cases an addition of a solution of bromide of potassium, before commencing to develop, to solution No. 2, will be an advantage. For instantaneous exposures this is, of course, not required, and this method of development is especially advantageous for that sort of work.

* Read before the Society of Amateur Photographers of New York.

If no old developer is at hand to mix with No. 2, it will be necessary to add some bromide solution, also the first plate, will come up too rapid and flat. Old developer (No. 2) is the best to mix with the new. I use one half as much of the old as I make of the new solution.

This developer is also extremely economical (though I do not look or care for that), not over one third the amount of pyro being used as in present used methods.

In summer time it may be necessary, when the solution cannot be kept cool, to add some astringent to the pyro solution to prevent softening of the gelatine and frilling. In that case I have found bichloride of mercury the best thing to use, being without any effect on the action of the developer, only hardening the film and preventing decomposition. I have used 10 grains to the 20 ounces of pyro solution given above, and a larger quantity will not hurt the solution.

PHOTOGRAPHY IN GERMANY.

BY HERMANN E. GUNTHER.

New Developers—Printing with Collodio-Chloride of Silver—Orthochromatic Photography—Treating Eoside of Silver Plates.

Three New Developers.—Recently I have made some experiments with a new developer, which had been emphatically recommended by Mr. Emilio Eckhorst, a distinguished amateur photographer, of Nice. It is a pyro-hydroxylamine developer, and I must confess, after the bad experiences I made with hydroxylamine last year, I entertained no very good opinion of Mr. Eckhorst's new developer when I first read of it, but now, having developed about a dozen plates with it, I find I had been disappointed. This new developer, which combines the delicacy which may be obtained by the use of pyro, with a beautiful transparent steel-grey tone, gives most uniform negatives of excellent printing qualities. The formula which I used is the following :—

No. 1.—Water	1,000 c.c.
Sulphite of soda	250 grammes
No. 2.—Water	1,000 c.c.
Carbonate of soda	250 grammes
No. 3.—Water	1,000 c.c.
Carbonate of potash	250 grammes

Now are mixed in a bottle :—

No. 4.—Sulphite solution 1	200 c.c.
Pyrogallic acid	10 grammes
Hydrochlorate of hydroxylamine	2 ,,

and in another bottle :—

No. 5.—Soda solution 2	100 c.c.
Potash solution 3	100 ,,

To develop a plate of 13 by 18 centimetres I mix :—

Water	100 c.c.
Pyro solution 4	10 ,,
Solution 5	20 to 60 drops

If I have to develop instantaneous pictures, I add at the very beginning 40 drops of solution 5 to the bath, but in the case of time exposures I begin with 20 drops, and, if the picture comes out slowly, I gradually add 5 drops at a time, as often as required with instantaneous exposures ; this developer gives plenty of detail, and at the same time soft and brilliant negatives, if the alkalic solution, No. 5, is correctly employed, and neither too much nor too little of it is used. Another new organic developer for gelatine plates has been discovered by Dr. Andresen, of Berlin, in the paraphenylendiamine. The "diamine developer," as it is shortly designed, is said to equally join itself as regards developing power to the existing four developers—hydroquinone, pyrogallic acid, hydroxylamine, and ferrous oxalate. The utmost energy is obtained by the addition of a small quantity of hydrate of potash. There is, however, not as much of it required as in the case of hydroxylamine, so that frilling of the film is said to be prevented. But even without the addition of hydrate of potash the pictures will come out, though a little more slowly, but then with plenty of details. The energy is materially increased by the addition of a little potassium bromide. The new developer seems to be equally well suited for developing gelatino-chloride emulsion, even largely over-exposed prints preserving beautiful whites. The diamine is best employed as a 20 per cent. solution, which may he preserved hy the addition of sodium sulphite. For the case of time exposures a 10 per cent. solution is sufficient. I think to give more detailed information as soon as I have tried the new developer. A concentrated soda developer, hy the use of which the staining of the plates is prevented, and which seldom causes frilling of the film, has been recommended by Mr. Max Wolf, of Heidelberg, in the *Mittheilungen*. It is just as concentrated as the concentrated potassium developer, but gives glass-clear negatives, and is especially suited for travelling purposes. I have tried it myself with perfect success in the following manner. Two stock solutions are made :—

A.—Water	100 c.c.
Sodium sulphite	30 grammes
Concentrated sulphuric acid ...	5 drops
Pyrogallic acid	10 grammes

It is essential that the ingredients are dissolved in the above given order, as the pyrogallic acid oxydises at once if it is placed into the water before the sodium sulphite. The solution must not be filtered.

B.—Water...	200 c.c.
Carbonate of soda (crystallised) ...	75 grammes
Sodium sulphite	40 ,,

This solution is filtered. For use, 3 c.c. of A and 4 c.c. of B are mixed with 100 c.c. of water ; but, if required, 1 to 3 c.c. of the pyro more, or 1 c.c. of it less, may be taken, as given in the above formula. The use of an alum bath after developing is not necessary ; it prevents, however, frilling and yellow stain. When placed into the fixing bath the lights of the negative will turn intensely dark. Potassium bromide acts in the same manner as in the potassium developer. Solution A may be used for the potassium developer as well as for the soda developer.

Printing with Collodio-chloride of Silver.—This well known process of producing positive prints is practised by a number of professionals in this country at the present time ; it gives vigorous prints even from thin negatives, which would prove to be perfectly useless if printed on albumen paper. Dr. Eder has recently described a modification of this process, as it has been practised during the dull winter months at the Imperial Institute for Photographic Researches, of Vienna. For making the collodion, chloride of lithium is used, as recommended by Mr. Niederstaldt, in the following manner :—1·5 gramme of chloride of lithium and 1·5 gramme of citric acid are dissolved by the aid of heat in 50 c.c. of strong alcohol, and after filtering, the solution is added to 500 c.c. of 4 per cent. plain collodion. On the other hand, 14 grammes of silver nitrate are dissolved in a large test tube by the aid of heat in 6 to 7 c.c. of water, then 150 c.c. of strong alcohol are added, and the mixture heated up to nearly boiling, in order to have no crystals of silver nitrate undissolved. Then the silver solution is poured drop by drop into the chlorised collodion with much shaking, and finally 4 to 6 grammes of glycerine are added. The collodion will keep about eight days. With it suitable paper is coated, which is held flat and stretched in a wooden frame. Dr. Eder does not recommend the use of castor oil, as the toning process is rendered rather difficult by it, red patches being produced which will, however, not arise if the above formula is used. In this case, on the contrary, toning proceeds quickly and uniformly. The tones obtainable are

about the same as with albumen paper. The toning bath consists of—

Water	...	350 c.c.
Solution of acetate of soda (1 : 50)	...	50 „
Solution of gold chloride (1 : 50)	...	6 „

It should be used a few hours after it has been prepared. The prints are thoroughly washed before toning, and fixed in a solution of hypo of 1 : 20. They should be mounted whilst still wet.

Orthochromatic Photography with Eoside of Silver Plates.—Since the late Mr. Obernetter, together with his friend Dr. H. W. Vogel, introduced eoside of silver plates in a permanent state—*i.e.*, keeping at least several weeks—thou-



Landscape taken with an ordinary gelatine plate.

sands of these plates have been successfully used by professionals as well as by amateur photographers, and especially in landscape photography the eoside of silver plate in its improved state has played an important part during the last few years. So much the more this process has come into general use as the principal difficulty and inconvenience has been removed, namely, the necessity of photographing the object through a yellow screen. These plates are eminently suitable for the reproduction of foliage and cloud effects, the negatives showing in this



The same landscape taken with an eoside of silver plate, without yellow screen.

case far more gradation and half tone than those produced on ordinary plates. Two landscape pictures taken by Mr. Emil Obernetter on eoside of silver plates of his own make, which have been reproduced some time ago in the *Mittheilungen*, are offering a striking example of the advantages of this process. The pictures in the mentioned journal were printed in Collotype. I have had them reproduced by the renowned photo-engraving institute of Heinrich Riffarth, of Berlin, to illustrate this article. It is true clouds are wanting in the original picture, but as an example of definition of the distance, and of the reproduction of the green foliage and meadows, this orthochromatic photograph is unsurpassed. Both pictures have been taken under exactly the same conditions at

seven o'clock in the morning, with three seconds' exposure, without the use of a yellow screen, and they have simultaneously been developed with pyro-soda. As to the treatment of these plates, I think it will be interesting to many to become acquainted with the method which Mr. E. Obernetter uses himself. It will already be known that Mr. Obernetter works with an emulsion containing a comparatively very small portion of gelatine, and with thinly coated plates. He does not think of bathing the plates in the colouring matter solution, as they never become uniform in this way. After half a dozen of plates have been treated, the difference already appears. Also, if the colouring matter is mixed to the emulsion, the effect is, to Mr. Obernetter's opinion, no distinct one. He therefore rinses the plate thoroughly under a rose until the whole of the plate keeps the water evenly, allows then to flow off, and then pours on the colouring solution at the four edges of the plate, the solution being afterwards always poured off. The coated plate is then placed on blotting-paper in a drying box and allowed to stand during the night. As colouring matter, erythroside of silver solution may be used. The following formula is a good one:—

Distilled water	500 c.c.
Erythrosine solution (1 : 1,000) ...	50 ,,
Nitrate of silver solution (1 : 1,000) ...	50 ,,
Ammonia	3 ,,

The time of exposure without the use of a yellow screen is equal to that with the undyed emulsion, but it must be doubled if the screen is used. This is, of course, governed by the tint of the screen. Development is carried on in the dark room in deep red light, in a dish provided with a cover. As developer, a diluted solution of either hydroquinone or pyrogallic acid with soda and sodium sulphite in water may be used; in some cases one to two drops of a potassium bromide solution of 1 : 10 may be added to prevent fogging. The method of making the plates permanent is the only secret of the process.

Notes.

The striking exhibition of Mr. Muybridge's photographs of animals in motion has called forth articles in many of the newspapers in which some account is given of Mr. Muybridge's labours. Our readers have had full accounts of the methods of working, and reproductions of the results; but all comes very new to the general newspaper reader.

Mr. Muybridge's photographs are, perhaps, rather of indirect importance to the artist, as showing him what actually takes place, than as a direct means of assisting him to represent what the eye sees. The eye certainly does not see an instantaneous phase, such as is shown by one of Mr. Muybridge's photographs, but it sees a resultant of many motions, and it is this resultant which the artist generally aims at reproducing.

The *Globe* sums up the case as follows:—"Scientifically the inquiry is most interesting, but though Mr. Muybridge's labour has been watched with much attention by men like Mr. Sturgess, for instance, we doubt whether the contribution to art will be of much importance. Art for the purpose of representation does not require to give to the eye more than the eye can see; and when Mr. Sturgess gives us a picture of a close finish for the Gold Cup, we do not want Mr. Muybridge to tell us that no horses ever strode in the fashion shown in the picture. It may indeed be fairly contended that the incorrect position (according to science) is the correct position (according to art). Nor is this a paradox; for only extremists contend that art must discard every other consideration in an endeavour to represent merely the True."

Photography has been called effectively into use to draw attention to the wholesale way in which the trees have been cut down in Epping Forest. The *Evening Post* having taken up the subject, sent down its special commissioner, accompanied by a photographer, who took a number of pictures to show how the trees had been hacked down in various parts, and drawings from these photographs have been published. In the course of his investigations the commissioner interviewed the manager who is superintending the cutting down; and without disclosing his identity, obtained some information which otherwise the manager would not have been so ready to give. After the interview the manager spied the camera and the photographer in the act of taking a picture of a heap of bare trunks lying in a marshy patch of ground. To use the language of the commissioner, "One moment he stood like the stag in Sir Walter Scott's poem, sniffing the air, and eyeing the reporter and the camera. Then he took the situation in at a glance. He had been pumped, and he went off at a steady four-mile gait."

This experience no doubt shadows forth what the reporter of the future will be. In addition to his note-book he will have to have his camera. But, like the note-book, the production of which sends a cold shiver through the bodies of nervous persons who are interviewed, the camera can only be bodly produced when the occasion is favourable. A secret camera is a *sine qua non*. Indeed, without it, effects at photography would in certain cases be not only futile, but productive of injury to the reporter himself. A burglar, or garroter, or even a policeman under peculiar circumstances, would certainly resent any attempt to obtain evidence which cannot lie.

The Eiffel Tower is not to be used for pleasure only, if toiling up to the top of the edifice can be called a pleasure. It is well adapted, so the designer thinks, for meteorological observations, for warlike purposes (as a look-out), and for the study of physics as exemplified by the dropping of a stone from the top. Astronomers will be able to use it for the examination of the telluric rays of the sun for photography, and for the spectroscopic examination of rays of light from the stars, which can be made under conditions not heretofore attainable, because the summit of the tower will be raised completely above the vapours arising from the earth. We might also suggest that a photographic studio should be erected on the top. Photographs taken so many hundred feet above the earth would be certain to be exhibited with much pride, and possibly, if the owner be of jocular tendencies, as examples of high art.

An ingenious swindler in France has been turning photography to good account. He first inserted a matri-

monial advertisement, purporting to be from a young lady, and in reply to the correspondent sent, as acting for the advertiser, a photograph and a demand for money for his expenses as agent. The photograph, we need not say, held out visions of surpassing loveliness in the original, and the victims were easily induced to accede to his request, the deposit money in one case being as high as £40. It was only when the affair did not seem to progress that they found out they had been cheated. This dislike of people to admit they have been fools enabled the rogue to carry on the profitable game for a long time with impunity.

The board of directors of a public trading company were the other day sadly disappointed. They had had several photographs taken of the works, the principal objects in the pictures being themselves, while the members of the working staff were put modestly in the background. The idea was to show the shareholders these photographs, and they were laid on the table for this purpose at the annual meeting. Some unpleasant shareholder, however, raised a very awkward discussion, not only about the unsatisfactory year's trading, but also about the directors' fees, which, he showed, were altogether out of proportion to the value received. In a word, the directors were so severely heckled that they judged it prudent not to exhibit the photographs, which were hurriedly huddled up by the secretary, and hidden away under the minute book.

The Society of Amateur Photographers of New York has secured space at the Paris Exhibition, and will have a show of amateur work. The Society has recently elected among its honorary members Mr. Carey Lea, of Philadelphia, and Dr. J. M. Eder, of Vienna.

An exhibition will be held in Chicago during May next, most likely at the Art Institute; but this latter point had not been absolutely determined when our information was forwarded.

The exhibition is to include classes for genre pictures, amateurs' landscape and marine photography, flash-light photography, detective camera work, instantaneous photographs, animals, kodak, transparencies for window, lantern slides, photo-micrography, negatives on celluloid films, platinum prints, prints on linen, silk, or any fabric, bromide enlargement, bromide prints contact, photo zinc etching, photography pertaining to the profession of the law, celestial photography, exhibits pertaining to medico-photography, exhibits of prison and police photography, exhibits of photo-mechanical printing process, exhibits of orthochromatic photography.

The secretary is Mr. C. Gentile, of 134, Van Buren Street, Chicago, and notice of exhibits should be sent to him at once. Foreign exhibitors pay no fees.

LANTERN SLIDE COMPETITIONS.

BY C. H. COOKE.

I WISH to make a few remarks with respect to the lantern competition that took place here last Thursday. Now I consider that such a competition is a very good thing indeed, because it stimulates the competitor to do the very best within his power. Indeed, I wish that competitions such as the one in question or others of a similar character were more frequent, as I strongly believe they would urge amateurs and others to do much better work. I know that I took pains to produce the best slides that I could, but I may mention that I was dissatisfied with my results before they were judged; in fact, I never do anything but what I think that I ought to have done better, and always end with a determination to try and beat all previous efforts. Now I heard one or two of the members demur at the introduction of clouds, but you must remember that the competitors were authorised to do whatever they liked with the negatives in order to produce the most pleasing results, so long as they removed all traces of dodging, &c. I certainly think this is as it should be, and that it would be quite wrong to place any restriction upon a competitor possessing the good taste to introduce satisfactory clouds or to do anything else he might think proper to create a pleasing and harmonious picture. Speaking for myself, I should like to see clouds in every slide worthy of the name; and, further, I am strongly of opinion that no landscape slide should be accepted for any competition without a cloud. Just imagine the absurdity of an exhibition of paintings without clouds. A painting without clouds is not, and never has been, considered complete; then why should a cloudless photograph be accepted as finished any more than a painting? I feel assured that the time will come when no landscape photograph will be accepted at any of our exhibitions unless it is a finished production in this respect. It is not by any means an uncommon thing to see a good landscape picture utterly ruined by the white space where the clouds ought to be, and we know that it is often the practice of photographers to take the greatest care to stop out the sky when, perhaps, if they left it alone they would get a certain amount of tone, which would be much better than the crude white paper. I have often seen it stated that the clouds should be secured at the same time that the landscape is taken. I am not altogether of this opinion. It is sometimes impossible to get clouds for days together. No, I certainly think well-chosen clouds may be introduced into any picture without the keenest expert being able to tell whether they were taken simultaneously with the landscape, or a year or two after. Unfortunately we often see clouds introduced into photographs where they could not be expected to appear; for instance, such as cumulus clouds, which are generally boldly defined but comparatively flat near the horizon. Clouds of this kind are often placed too low in the picture, but such mistakes might easily be avoided if the observer were to make notes of the clouds when taking the landscape, assuming there were any at the time. Artists make endless studies of skies accompanied with notes, and I consider this quite as important for the photographer as for the artist. Then, again, skies are frequently printed too dark, which give spectators a notion that the photographer must take most of his views in stormy weather. I know it is very easy to talk about these things, but not so easy to carry them out, and I do not think much of the man who is continually telling you what you may or may not do; I have greater confidence in the executant who does the work and produces his results. Advice from such a person is generally worth listening to. Therefore, I believe if we continue these competitions, we shall find ourselves making greater progress every time. I very much feared my able friend, Mr. Wellington, and, as I expected, he was the successful competitor; but I may tell him that if these competitions are repeated I will strive very hard to beat him, and very proud I should be to do so, for I admit he wants some beating. With reference to mounting the slide, some people will mount most of their slides in a circular mask, ignoring entirely the composition. It is but few pictures that the style of mounting is suitable for beyond portraits. I have a preference for the rectangular-shaped mount for nearly all pictures, and I do not even see why the corners should not be square instead of the present practice of rounding them. I love pictures and take the greatest delight in trying to produce them, and I only wish that our photographic monochrome was more perfect; but perhaps improvements in this direction are not far distant. The object of my observations is with a view of inducing the members to continue these competitions from time to time, and if they do so I believe that those who may compete will find themselves trying their very hardest to produce work of the highest class, as I think there is nothing so conducive to put a man on his mettle as a trial of skill.

THE CHEMISTRY OF PHOTOGRAPHY.

BY J. C. WIGGIN.*

The subject our secretary has induced me to bring forward this evening is one covering a very wide area, and to attempt to investigate the chemical changes involved in every photographic operation which has yet been performed would occupy a very considerable time. I shall merely endeavour, therefore, to explain the part which chemical action plays in the working of photography as most generally practised at the present day. I think you will admit that the gelatino-bromide dry plate is now the article we should be least able to do without in our own photographic work—indeed, it is not unlikely that, without the dry plate, there would be no Ipswich Photographic Society; this had taken the place of the Daguerreotype, the calotype, and the collodion processes, which, at different periods, have been those generally employed. In the Daguerreotype, the sensitive plate was prepared by exposing a silvered tablet to the action of iodine vapour, which combines with metallic silver to form silver iodide—

$$Ag_2 + I_2 = 2AgI$$

Subsequently, bromine vapour was employed with iodine. By a short exposure in the camera, a latent image was produced, which appeared when subjected to the vapour of mercury. Hyposulphite of sodium was used as the fixing agent, as now, though I believe that at the time Daguerre introduced the process no perfect method of fixation was known.

The calotype or Talbotype process, so called from the name of its inventor, Fox Talbot, seems next to have held the field. It seems likely that paper negatives are once again to become popular; though, in the calotype, the image was formed in the body of the paper, now it is in the sensitive film on the surface.

This paper was prepared by floating it on a solution of iodide of silver in iodide of potassium, and washing slightly; the paper prepared was of a primrose colour, and would keep for years. Previous to exposure in the camera it was excited by gallic acid and aceto-nitrate of silver being brushed over it, and afterwards developed by the same chemicals.

This process was superseded by the collodion process of Scott Archer, which is still used to a considerable extent. The glass plates, previously coated with collodion (a solution of gun-cotton in ether and spirit), mixed with a solution of an iodide (generally cadmium), were sensitized by immersion in a bath of nitrate of silver, thus forming silver iodide—

$$AgNO_3 + CdI = AgI + CdNO_3.$$

The latent image produced by exposure in the camera was then developed by pyrogallic acid with either acetic or citric acids; the free nitrate of silver in the film playing an important part in the operation. The negatives were finally fixed by means of cyanide of potassium or hyposulphite of sodium.

I have now come to a matter with which most of us are better acquainted—the gelatino-bromide dry plate—though I daresay but few of us have ever actually prepared one, and their manufacture on a small scale is scarcely to be recommended; their superior sensitiveness and great convenience soon led to the displacement of the collodion process, though this has still some staunch adherents, who maintain its superiority; and I believe that for some purposes, as transparencies, it is admitted to be unexcelled. In this gelatine, the vehicle is allowed to soak in water in which bromide of ammonium has been dissolved, and then the mixture is liquefied by heat. To this a solution of nitrate of silver in distilled water is added gradually, well stirring, and the emulsion, as it is called, is heated for some time (this and subsequent operations must, of course, be performed in a non-actinic light); bromide of silver is thus formed—

$$AgNO_3 + (NH_4)\,Br = AgBr + (NH_4)\,NO_3.$$

Some more gelatine is then added to the emulsion, which is then allowed to set to a jelly; the next operation is to get rid of the ammonium nitrate, which is done by cutting the jelly up into small pieces, and allowing the soluble salt to be washed out with water. After being heated and strained, the emulsion is now ready for coating plates.

The next point to be considered is, What change occurs on the film by exposure to light on the camera, so that we can eventually obtain a negative by development? We have bromide of silver in a minute state of division, suspended in gelatine. We know that most silver compounds, when in contact with organic matter, become decomposed by light; we have only to place a drop of solution of nitrate of silver on our hands to ascertain this; and other silver salts are much more sensitive. There are several theories afloat as to the composition of the "latent image," and the question can hardly be considered as finally settled.

The solution that is apparently regarded as the correct one in Hardwich and Taylor's "Photographic Chemistry," is that the change is molecular, *i.e.*, that the molecules of silver salts, where acted upon by light, are altered, and rendered in such a condition that they are peculiarly susceptible to the action of the developing agent. A molecule, I may say, is, as the atomic theory has it—the theory which is universally accepted by chemists as affording the most rational explanation of the constitution of chemical compounds—the smallest particle of matter which can exist in an uncombined state; a molecule of silver bromide would consist of one atom of silver, represented by the formula (Ag), and one atom of bromine (Br.).

A molecule must consist of two atoms at the least, and thus we have a molecule of silver represented by Ag_2; the symbols, in addition to being shorthand for the name of the element or compound, also represent the combining weight and the volume.

The theory which till recently has met with general acceptance, and which Captain Abney favours in his work, is that the silver bromide is reduced by light to sub-bromide (Ag_2Br); the formation of this sub-bromide of course depending on the intensity of the actiuic rays of light upon the various parts of the object; this matter is necessarily involved in great obscurity, and no change can be detected by any means in the film before and after exposure, but we know that there is a so-called latent image which becomes perceptible by the action of developing agents; possibly some day we may have a process in which these will be unnecessary, as we may have a direct image formed in the camera.

Another theory, having some supporters, is that electricity is sufficient to account for the formation of the latent image, but I do not think that the evidence is very strong.

Mr. Carey Lea has recently been investigating what he calls the photo-salts of silver which he has prepared, and which he states are producible from the haloid salts of silver, *i.e.*, the chloride, bromide, and iodide, by the action of light as well as by purely chemical means. His photo-bromide, consisting of silver sub-bromide in combination with silver bromide (Ag_2Br, AgBr), the sub-bromide forming but a small proportion of the whole. This photo-bromide is insoluble in strong nitric acid, whilst the sub-bromide itself is very soluble in it; and as this theory receives strong confirmation in other ways, it appears to be the one most probably correct.

We now come to consider the action of developing agents, which are all powerfully reducing bodies, greedy of oxygen. I take pyrogallic acid first as the developer in general use; this is more correctly termed pyrogallol, as it is not an acid at all, but a phenol, though it is formed by heating gallic acid when it sublimes; its chemical name is trihydroxybenzene, and like many other names of organic chemical compounds, not remarkable for brevity, though expressing its chemical constitution as a benzene derivative; we have a series thus:—

Benzene, C_6H_6.
Phenol.
(Monoxybenzene, or carbolic acid), C_6H_5OH.
Paradihydroxybenzene, $C_6H_4\,(OH)_2$.
Pyrogallol, (trihydroxybenzene) $C_6H_3\,(OH)_3$.

As I have said, pyrogallol is an energetic absorber of oxygen, and it is used with potash in gas analysis as a means of estimating the quantity of oxygen present.

Pyrogallol is only active in an alkaline medium. Its action on silver sub-bromide with ammonia shows that it reduces the silver to the metallic state, ammonium bromide being formed—

$$C_6H_4(OH)_3 + 2AgBr2 + 2(NH_4)OH = 2NH_4Br + 2Ag_2 + H_2O + (C_6H_4OH_3 + O).$$

The action of the ammonium bromide which, in addition to pyro and ammonia, is used in this developer, appears to consist in diminishing the amount of silver sub-bromide capable of being dissolved by the ammonia. But, if much be employed, the effect produced by light is in a great measure cancelled, owing to the formation of a compound with the sub-bromide, which is as little acted upon by the developer as the bromide itself; hence the amount of bromide admissible is limited.

By using stronger ammonia more silver bromide is dissolved. If amount be in excess of that necessary to supply a gradual aggregation of silver on those parts on which the deposit has

* A communication to the Ipswich Photographic Society.

already taken place, a veil must result over the whole surface.

By using a stronger pyro. solution a more rapid reduction of the bromide will be effected ; hence a too strong solution would cause fog.

In place of pyrogallol, a new developer (hydroquinone) or to give it its proper medical name, paradihydroxybenzene, is meeting with much favour. Its formula is $C_6H_4(OH)_2$. As will be seen, it is a near relative of pyro. ; in development it becomes oxidised to quinone—

$$C_6H_4(OH)_2+O=C_6H_4O_2+H_2O$$

which is a light yellow body, and consequently this developer is free from the unpleasant staining properties of pyro. With hydroquinone, ammonia appears unsuitable, and consequently the carbonates or hydrates of the fixed alkalies are used.

Hydroxylamine hydrochlorate (NH_2OH HCl) has also been used, but during development nitrous oxide gas (N_2O) becomes formed, which is said to cause injury to the film.

The ferrous oxalate developer needs a word. This is a solution of ferrous oxalate in excess of potassic oxalate ; ferrous sulphate mixed with potassic oxalate forming ferrous oxalate and potassic sulphate, the former being dissolved by the excess of potassic oxalate present—

$$K_2C_2O_4+FeSO_4 = FeC_2O_4+K_2SO_4.$$

This is also a powerful reducing agent, becoming oxidized to ferric salt—

$$6FeC_2O_4+6Ag_2Br = 6Ag_2+Fe_2Br_6+2Fe_2(C_2O_4)_3.$$

The difference in the state of the iron, before and after development is readily shown by the action of reagents.

Sulphites of sodium and potassium are often used to preserve pyro in solution, and also to prevent the film becoming stained during development ; they appear to act as oxygen absorbers—

$$Na_2SO_3+O = Na_2SO_4;$$

though I prefer to use pyro dry, as the presence of sodium sulphate - a great restrainer—can hardly be considered desirable in a developing solution.

The use of alum subsequent to development appears to have a toughening effect on the film, preventing frilling, and tending to remove pyro stain. It is impossible to represent this action by a chemical equation, though gelatine and alum have probably the property of entering into some kind of chemical combination.

In addition to the various reducing agents employed as developers, the alkalies—ammonia, potash, and soda, and their carbonates—are variously used as accelerators ; ammonia appearing to act most energetically. When the fixed alkalies—potash and soda—are used, the films do not appear to be so much stained with the developer as with ammonia.

(*To be continued.*)

Patent Intelligence.

Applications for Letters Patent.

4,226. Robert Lambert Allan, 1, Henry Street, Pentonville, for "An Improved form of Fastener for Photographic Double Dark Slides."—March 11th, 1889.

4,261. Thomas Rudolp Dallmeyer and Francis Beauchamp, 115, Cannon Street, London, for "Improvements in Photographic Lens Shutters."—March 11th, 1889.

4,268. Arthur Rayment, 34, Southampton Buildings, London, for "A Combined Apparatus and Improved Appliances for Developing, Washing, and Drying Photographic Negatives, and for Washing Photographic Prints."—March 11th, 1889.

4,324. George Corpe Whitfield, The Woodbury, Kent Gardens, Ealing, for "An Improvement in Film Photography."—March 12th, 1889.

4,649. Thomas Wright Greenall and Frank Bishop, 53, Chancery Lane, London, for "Improvements in Shutters for Photographic Cameras."—March 16th, 1889.

Specifications Published.

3,782. Frederick Taylor, of 14A, St. Petersgate, Stockport, in the County of Cheshire, Photographer, for "Improvements in Stands or Tables for Holding Photographic Cameras, also Applicable for Holding Music, Newspapers, or similar Objects."—Dated March 12th, 1888.

Details next week.

5,827. Samuel Roger Williams, of 3, All Saints Street, Birmingham, in the county of Warwick, Jeweller, for "Improvements in Holders for Photographs, Small Mirrors, China, and other like Articles."—Dated 19th April, 1888.

The Patentee says :—

The object of this invention is to provide convenient holders for photographs, small mirrors, china, and other like articles ; such holders being easily attached and detached, and suitable to serve either as stands or suspenders for the articles held.

Each holder made according to my invention consists essentially of a X shaped cross, with clip ends to each limb, and a back spring which serves either as a standing leg or a suspending loop, as required.

The two bars which form the X are not rigidly connected to each other, but are pivoted at the point of intersection, as are scissors.

At each end of each bar is a clip or hook.

The back spring is U or V shaped, and the ends engage in lugs or rings formed on, or attached to, the bars of the X.

The pressure of this spring causes the X shaped holder to firmly clip the article to be held, and, for this purpose, the spring may be set to exert either an inward or an outward pressure, according to the shape of the article to be held. As the legs of the spring have a free hinged connection to the X shaped holder, the said spring can be set out to act like back leg of an easel, or be turned upwards and used as a suspending loop.

12,474. Louis Houssard, 5, Wilmington Square, Clerkenwell, W.C., Photographic Instrument Maker, for "An Improved Photographic Shutter."—Dated August 30th, 1888.

Details next week.

Correspondence.

INFANTS' FOOD AND PHOTOGRAPHY.

Dear Sir,—In your issue of March 15th you have a note on the prizes recently awarded by a patent food manufacturer for the best photographs of infants reared on his particular preparation.

It would indeed, as you observe, be an interesting discovery if the judges had found that they could tell from a photograph of an infant what the said infant had been fed on.

In fairness to the committee of experts who acted as judges, allow me to observe that they have no pretensions to such a monstrous discovery as the Editor of the Photographic News would thrust upon them ; their business was simply to select the best specimens from the photographs of children, it having been previously ascertained that all those submitted to the committee were eligible for the competition.

The judges did not seek to satisfy themselves from the photograph that the infants had been nourished on the diet specified, but in each case the photograph was only admitted to the competition after the certificates and evidence that the child had been fed on the particular food had been examined, found reliable, and judged sufficient.

After your comments I trust you will find space for this explanation in your next issue.—Yours faithfully,

G. Mellin,

Marlboro' Works, Stafford Street, Peckham, S.E., March 21.

AZALINE AND ORTHOCHROMATIC PHOTOGRAPHY.

Dear Sir,—Mr. Spiller's withdrawal of his former statement that Dr. Vogel's azaline solution consists of eosine or erythrosine, instead of being essentially quinoline red, as professed, might reasonably conclude the matter, if it were not for the inference that might be drawn from another part of Mr. Spiller's letter, that the difference in his analysis may be due to the azaline solution now issued not being the same in composition as that supplied last December.

With regard to the first portion analysed by Mr. Spiller, he said that it had been stated to contain quinoline red, but that he could find nothing in it but eosine and erythrosine. The analytical reasons he gives for having stated that the solution contained eosine, so far from affording "every indication of eosine," are singularly inconclusive. The tint communicated to wool by the dye is scarcely worth consideration when several possible dyes or combinations of them may be in solution. The difference between Mr. Spiller's two analyses is not, however, confined to the absence of eosine, but to the presence of quinolin red, which he finds in the later sample, but did not discover in the former one. As Mr. Spiller gives no reason for not discovering quinoline in his first analysis, and indeed does not refer to that part of the question ; and as he speaks of indications of "fiery fluorescence," &c., which he considered conclusive of eosine therein, and does not say whether they occur also in his second analysis, the door is left open for the inference that the manufacture has been changed in the meantime.

Against such an inference we have Mr. Gotz's statement that the solution sold was identical, made, I think, years ago ; and Mr. Bothamley, in your last issue, states that samples which he had obtained nine months ago, and during the past month, behaved in precisely the same way. Any such inference as that to which I have referred may be cleared up if Mr. Spiller will definitely state whether he considers that the indications which he stated in February to be those of eosin, are equally applicable to quinoline red, or to such a mixture as Dr. Vogel's azaline professed to be. W. E. Debenham.

P.S.—To revert to the original matter of the discussion, what is azaline? I note that Mr. Spiller states to a correspondent in your last, that no such substance is to be found in commerce as ordinary commercial azaline. I believe there is no question that what would be supplied by a chemical house as azaline is the magenta red dye, acetate of rosaniline, in accordance, indeed, with Mr. Spiller's letter of the 15th February.

Dear Sir,—Be so kind as to insert correction of an error which occurs in my letter of last week. For ·4 per cent. (in line 3 of second paragraph) read ·04 per cent. This is the quantity I found, which agrees precisely with Mr. Bothamley's statement at foot of page 180, and with the proportional part of an English grain stated later on in my own letter. John Spiller.

March 26th.

Sir,—No man is infallible ; but next best to infallibility is, perhaps, the capability of making a handsome apology. Mr. J. Spiller has in the most straightforward way, and with most creditable candour, tendered an explanation of his former statements regarding the azaline of Dr. Vogel and Mr Götz ; and as I pretty strongly expressed my opinion before, so I now, with equal warmth, wish to say that Mr. Spiller has acted like the gentleman I understand him to be. Andrew Pringle.

Proceedings of Societies.

Photographic Society of Great Britain.

The mouthly technical meeting of this Society was held last Tuesday evening, the 25th iust., at the Rooms, 5a, Pall Mall East, Mr. Leon Warnerke in the chair.

The Assistant-Secretary handed round a photograph covered with white spots, aud asked for the opinions of the members as to the cause of the same. The print had ouly been made about three weeks previously, and the photographer who sent it had had several such cases, and been unable to trace the source.

Ouc or two members put forth the suggestion that the spots might be due to bronze powder, but Mr. E. Clifton thought the indications pointed rather to defective paper.

Mr. W. E. Debenham had some time previously seen such spots occur—sometimes even during fixing or the subsequent washing—and thought that they were traceable to small particles of plaster from the wall to which the water pipe was affixed having begun to crumble iuto the dishes.

Mr. W. Bedford had seen similar spots caused by the dust from a coke fire.

Mr. Friese Greene then read a short paper on "The Electrical Energy of the Different Developers," in the course of which he said that his experiments with quinol as a developer had so far been very satisfactory ; that he considered it far the best developer in general use ; that it certainly was very difficult to give up the developer which oue had been accustomed to, and the various little dodges connected with which had been learned, the developer that one was used to being much easier to work ; but that if the photographer always kept to the old one whilst another better one was available, he would be left in the background, and that whilst he had been doubting, others would have been working, and the ground thus lost was never regained. If there was the least importance in anything, it ought to be tried ; it was the little things that told. Mr. Swan, in his paper on "Quinol Development," had said that oue of the most valuable properties of a developer was its energy ; he, Mr. Greene, believing that electrical action entered into the subject, therefore thought that he would try the electrical energy of various developers. To test this he had mixed the solutions in a glass dish in which were placed copper wires connected with a galvanometer. He had poured pyro solution in this dish, and then added ammonia, ou which the needle of the galvanometer was deflected 10° to the left. With soda added to the pyro the deflection was 30° ; with soda and quinol the deflection was 25°, but there was more oscillation. With Thomas's formula slightly altered, as follows—

A.—Quinol	... ...	... 160 grains
Sulphite of soda	... ...	... 960 „
Citric acid	... ...	... 60 „
Potass bromide	... ...	... 20 „
Water	... ...	... 20 ounces
B.—Caustic soda	... .	... 160 grains
Water	... ...	... 20 ounces

Mix equal parts for use—

which formed the best developer he knew, the deflection of the ueedle was more than 60°. Mr. Greene then proceeded to repeat his experiments in the presence of the members, commeucing with the pyro solution, and pouriug the ammonia into the dish, upon which a deflectiou of the needle took place.

Mr. W. H. Harrison attributed the current to the alkali acting upon the copper wire.

Mr. W. E. Debenham enquired whether Mr. Greene had tried platinum wire ; and receiving a reply in the negative, suggested that ammonia should be poured into the opposite side of the dish to that on which Mr. Greene had poured it ; on doing which the needle was seeu to be deflected to the right instead of to the left.

Mr. Chapman Jones remarked that sulphite of soda increased the conductivity of the solution, and the large quantity of that substance used with Mr. Greene's quiuol solution, compared with that in the pyro, might account for the difference in the deflection of the galvanometer needle.

Mr. Arnold Spiller enquired what was the object of these experiments. There was an electrical reading during the mixture of these solutions, but none when the mixture was complete, during the actual development.

Mr. A. Cowan said that the same effect might be obtained by merely mixing acid and alkali in the dish without any developing agent such as pyro or quinol ; he attributed the difference in Mr. Greene's results to different proportions of the alkali used in them, and not to electrical energy in the developers.

Mr. A. Spiller said that if there was any interest in Mr. Greene's experiments it was clearly outside photography. The experiments should be made with platinum electrodes instead of copper ones, and the solutions should be poured simultaneously into two compartments divided by a porous septum. He would then be working under moderately scientific conditions.

Mr. Cowan observed that Mr. Swan had stated that all developers possessed the same energy if the action was continued to the uttermost.

Mr. Greene said that his experiments led him to a conclusion different from that.

Mr. Chapman Jones said that until Mr. Greene replaced his copper wire by platinum, his experiments were of no value; after doing that it would remain to be seen whether there was any photographic value in them.

Mr. Greene would try the suggestions that had been put forward.

Mr. Sebastian Davies proposed that one or two of the members should repeat the experiments, and report upon them at the next technical meeting.

Captain Mantill said the conductivity of the solution and the electro-motive force produced by mixing them ought to be tested.

Mr. W. England showed some flash light photographs taken with the lamp described in the Photographic News of the 15th inst., of groups of members of photographic societies at their meetings. They were considered very successful.

Some photographs sent by Herr Julius Meyer, of Breslau, taken by Schirm's magnesium flash light, were passed round. There was nothing in their appearance to indicate that the result had been obtained otherwise than by daylight.

Mr. England said that the chief difficulty in flash light photography was that of securing sufficiently rapid combustion.

Mr. Shew said that if the ball were squeezed hard, the combustion was quicker. He found that he succeeded best with a high flame burning steadily to a point.

The Chairman had never found combustion too slow. He used a spirit lamp with an asbestos wick one-eighth of an inch high, and of the diameter of a penny. There was a small tube inside, into which a small quantity of magnesium powder was poured.

Mr. John Spiller then showed some early specimens of photography; some of these relics, he said, were as old as the year 1844. Amongst them were calotypes and chloride of silver prints upon plain paper, which had not been toned, and were therefore of red colour, but in very fair preservation. The pictures had been the property of Mr. Robert Hunt and included, as might be expected, several specimens of the process he called chromotypes, made with chromate of potash and a salt of mercury. It was characteristic of this process that the print was equally visible on both sides of the paper. Some of them were examples of the states of obliteration and restoration of which this process was capable. There was one of which he could find no published mention, and which was written upon, "Energiatype."

Mr. E. Clifton said that that process was described in Bingham's photogenic manipulation.

Mr. Spiller continued; there was a photograph of certain words . . . . and initialled T. G. He thought those initials referred to Thomas Gaffield, who had observed that glass of some kinds changed colour considerably, turning purple when exposed to light. The description of one print was that it had been made in about one minute from a glass that had been exposed to light, except where covered by the letters seen in the print, for two or three years.

Mr. Shew then showed a changing back for a dozen plates adapted to a detective camera. The back was exceedingly small and light, and was stated to be perfectly light-light and satisfactory in working.

Mr. Debenham enquired whether the same plan would answer for plates of larger size.

Mr. Shew replied that the largest that had been made was for plates 7 by 5. If larger sizes than that were in question, he would advise that the number of plates be limited to six.

Mr. Cowan then said that Mr. Welliugton had showed a back having exactly the same motion, but that in his arrangement the plates were contained each in a metal holder.

Votes of thanks having been accorded to Messrs. Friese Greene, Julius Meyer, W. England, John Spiller, and J. F. Shew, the meeting was adjourned.

Society of Amateur Photographers of New York.

Regular Lantern Slide Exhibition.

From the Committee on Papers and Publications we have received the following report:—

On the evening of Friday, March 1st, 1889, the first regular spring lantern slide exhibition of the Society was held at the rooms, 122, West 36th Street, and comprised fifty slides contributed to the lantern slide interchange by the St. Louis Camera Club, and seventy by the members of the Society. In the St. Louis collection were several original group studies by Robert E. M. Bain, interesting views by William M. Butler, and excellent animal and landscape pictures by Rev. C. M. Charroppin. Altogether the series was considerably better than the contribution last year. In the New York collection were several foreign views by Messrs. J. E. Plimpton and Sydney Bishop, of superior merit. A steamer leaving port by Mr. Plimpton was particularly artistic and animated. A charming and attractive landscape by Mr. J. T. Bussing was especially admired, while his views of "Plymouth Rock," "Plymouth Monument," and "Miles Standish's House," were excellent slides, and full of historical interest. Mr. J. Wells Champney had very picturesque country road slides, and one of "Sheep," that was much admired. A capital picture of a white horse jumping about, called "His Sunday Out," was taken by Mr. E. F. Hill with a Kodak camera. Other interesting slides were contributed by Mr. F. Vilmar, Miss E. Slade, Mrs. Arnold, Secretary C. S. McKune, William M. Murray, and Major George H. Shorkley. John T. Nagles had some clever marine views caught with the detective camera. "Surf at Sea Bright," and a few other attractive landscapes by Mr. J. H. Stebbins, junr., were especially liked and applauded. His skill in obtaining clear slides with the hydroxylamine and pyro developer certainly shows marked improvement. Among Mr. A. L. Simpson's slides was an exceedingly picturesque view of the ruins of a fire covered with ice. He had excellent views of "Central Park Elephants," steamer *Mexico*, and "Boat House," in central park. The exhibition concluded with a few slides contributed by Mr. C. H. Hull, of children dressed and posed in queer night costumes. The lantern was operated by Mr. A. L. and Mr. Charles Simpson. President Canfield read the titles, and Mr. Beach attended to the seating of the large audience that completely filled the hall. The interest shown in lantern slide making is very encouraging to the committee. From present indications there will be no difficulty in obtaining a fine collection of slides to represent picturesque New York.

West Kent Photographic Society.

At the ordinary fortnightly meeting of above Society, Friday, March 22nd, Mr. Dresser presided.

The minutes of previous meeting having been read and confirmed, Dr. Hamilton and Mr. Edgar were duly elected members of the Society.

Mr. Dresser exhibited a new pattern box for holding lantern slides. It was fitted with wood grooves to hold twenty-four slides, and neatly covered in dark cloth. It was brought out by Messrs. Fry and Co. for the small sum of 8d. It was considered that it would entirely supersede the metal boxes at present in use.

The Secretary then distributed copies of the programme of the Camera Club Conference amongst the members present.

Mr. Hawkins showed negatives of himself taken by himself with the flash-light process, and prints from the same. They were pronounced excellent examples of the process. The disagreeable shadows so often visible by this process were in these cases entirely obviated by the use of reflectors. He also showed negative and two prints, one developed with iron, the other with quinol. The decision was in favour of the latter, but it was pointed out that the negative was unsuitable for bromide printing, being too dense.

Mr. Pickel then showed negatives which had had varying exposures. He had heard that quinol was a better developer than pyro, and did not fog an over-exposed plate in the same way. He had thought to test this with these three negatives, so had put them all at the same time in one large dish, and had taken them all out together. He was then surprised to find the negative which had been over-exposed so much thinner than the others. It was stated that that would be the natural result. He should either have modified his developer for each plate, or have left the longer exposed negatives a longer time in the developer. He had previously stated that the plates were old. It was advised to obtain new plates and try again with the above modifications.

Mr. Dresser gave it as his opinion that quinol was not a suitable developer for negatives, pyro being better. With quinol too much clear glass was obtained, and however desirable this might be in a transparency, it was out of place in a negative.

Mr. Rushton contributed prints to album.

The Secretary then gave the members a short address upon "Warm Tones on Gelatine Lantern Slides." He said he was aware that some held the opinion that it was impossible to obtain warm tones on gelatine, while others, not going quite so far, maintained it was very difficult, and the results were always uncertain. Speaking of the negative, he advocated a full exposure for the purpose of securing all available detail, and advised that development should not be carried too far. After describing the qualities of the plates he was in the habit of using, the lecturer proceeded to give a demonstration of the process, which was acknowledged to be at once simple and efficient, the resulting tone being all that could be desired.

A vote of thanks terminated the proceedings. Next meeting is Friday, April 5th, on which occasion Mr. Rushton will deliver an address upon "Enlarging."

Shaftesbury Photographic Social.

On Friday evening, March 22nd, the above Club had a show of apparatus from the members, the chair being occupied by Mr. Stuart.

The Secretary was called upon to read the minutes of last meeting, which were confirmed in the usual way.

Amongst the different apparatus were half-plate long and short focus, a whole plate camera, some being made by amateurs; besides these, discussions arose on other subjects connected with photography.

Mr. Wills introduced a preparation of electrical insulation of paper as a good material for making stops.

Mr. Baker introduced an idea of a vignetter made of cardboard with tissue paper in centre, so attached to the ordinary frame as to be able to move over any part of the plate where viguetting may be required.

Mr. Tollett brought forward a view finder which, when closed, would be 3 by 2 inches, and as thick as an ordinary dry plate.

Messrs. Stuart, Rintoul, and Samora, took part in the discussions.

The Secretary then reminded the members of the coming Smoking Concert to be held on April the 3rd, and also of the new half-year which will commence on the first Friday in April.

West London Photographic Society.

A technical meeting was held on Friday, 22nd inst., at the Addison Hall, Mr. William England (the President) occupying the chair.

After the disposal of the formal business, Mr. Broughton exhibited a camera with a revolving turn-table, the legs of which folded down flat for packing, thus economising space; the shutters of the dark slides were fitted with a new form of spring-clip, so arranged as to entirely prevent any chance of leakage of light. He also exhibited a detective camera of the ordinary type, fitted with a Kershaw shutter.

Mr. Miles showed a detective camera for 5 by 4 plates, made according to his own ideas, and arranged to hold six *d d* slides. The outer case was fitted with a finder and also with a spirit level, which he considered to be an indispensable adjunct to a detective camera. He used a Ross portable symmetrical of five seconds' focus, the diaphragm of which had been opened out to 11 feet. Working in this way he found he got very fine results as regards definition.

Mr. Hodges said he generally used 5-inch portable symmetrical for instantaneous work. In a good light he preferred it to any form of lens, on account of the covering power and fine definition which he obtained. He, however, worked with the lens aperture as issued by the manufacturer, which he believed was about 16 feet, and he got fully exposed negatives.

Mr. Miles also exhibited Shew's eclipse hand camera, which another member (Mr. Wyndham Rickford) had used with great success.

Mr. Gale showed his patent cyclone camera, the compact nature of which was commented upon by the members.

Mr. Blackmore explained a device whereby several lenses might be used on a camera without adapters. The cross-front was made sufficiently long to take three lenses, a wide angle, a medium angle, and a narrow angle, by simply sliding the front along and clamping, other lenses might be brought to bear on the focussing glass. He also exhibited for Mr. March an ingenious mode of using small slides in a large camera; his camera was a half-plate, and when he wanted to make quarter-plates he used a frame with grooves to take the quarter-plates into the runners for the half-plate slides.

Mr. J. D. England said he had used the same device for several years, working quarter-plates in a 7½ by 5 camera.

The President exhibited a light travelling tent, in shape like a triangular bag, and constructed to hang under an ordinary tripod. He had used it for many years when travelling abroad; it was very light and portable, and folded up into very small compass. The President then took a flash-light photograph of the meeting by the aid of a lamp constructed by himself at a very trifling cost.

The next meeting will be held on April 12th, when Mr. Charles Whiting will read a paper on "Lantern Slide Making," and a fine series of transparencies, by Mr. King, from his own negatives, of Windsor Castle and Buckingham Palace, will be exhibited. Visitors are invited.

Photographic Society of Philadelphia.

At a meeting held Wednesday evening, March 6th, 1889, with the President, Mr. Frederick Graff, in the chair,

The Executive Committee presented a report proposing a plan for the selection annually, by vote of the members, of four "Honour Pictures." The pictures submitted for this purpose to be exhibited in the room of the Society during the month of December in each year, and to be from negatives made within eighteen months of the date of this exhibition. Each member to have one vote for four pictures, without restriction as to the number to be selected from the work of any one exhibitor. The report was accepted, and the proposed plan adopted.

Dr. Reed showed a film carrier, designed for use with Carbutt films, which had been brought to the meeting by Dr. Hollingsworth, a visitor, who had designed it.

Mr. Earle showed a flash light devised by Mr. Edward M. Pim, a member of the Society. The flame was produced by a coil of wick about two inches in diameter, which was saturated with alcohol. Tubes of glass about two inches long, corked at each end, were loaded with about ten grains of powered magnesium. A tube of magnesium could readily be inserted in a brass tube beneath the wick, the corks being removed as it was inserted. Pressure on a rubber bulb, with tube connection, forced the magnesium powder through a slit in the centre of the wick, producing a very brilliant light, which, by means of a cardboard reflector attached to the lamp, could be directed as desired.

Dr. Trueman showed an attachment for use with the Scovill Detective Camera by means of which the shutter could be readily operated, either for time or instantaneous exposures.

A device for setting the shutter of a Scovill detective camera, obviating the use of the usual string provided for the purpose, was described by Mr. Pettit.

Mr. Graff showed a portrait transparency made in 1845, by Mr. Langenheim, of Philadelphia. The precise process used was not shown, though, at that time, the paper prints known as Talbotypes were in vogue. The transparency was in a most excellent state of preservation, though, apparently, some detail in the whites was lacking. It had a peculiar, warm purplish brown tone, which, so far as known, was the original colour.

North London Photographic Society.

March 19,—Mr. J. Traill Taylor (President) in the chair.

Mr. W. T. Coventon exhibited some stereoscopic slides made by the albumen process.

Mr. J. G. Hilton showed an album by Marcus Ward; the leaves were fastened in with small catches, and were readily detached.

Mr. A. C. Cossor asked for a good method of preparing bright brass for photographing, to avoid patches of light.

The Chairman replied that a good method was to bring it from a cold into a warm atmosphere, and so cause moisture to deposit on it; a bright silver vase had been successfully photographed by placing ice inside.

Mr. Coventon said that this method had been used to photograph cups.

The Chairman described how a stereoscopic slide could be viewed stereoscopically by holding it up perpendicularly, an eye

being opposite to each half of the slide, and looking away to infinity. He also stated that in a binocular camera it is not necessary to bring the dividing partition right to the front of the camera; if it extends a short distance in front of the plate it is generally sufficient. Referring to telescopic photography, he said that the best results in celestial bodies were obtained without an eyepiece, but the image was of course smaller. A telescope could advantageously be used for terrestrial photography for obtaining photographs of very distant objects, a camera being fitted on to the eyepiece.

Mr. W. Bishop said that for this purpose it would be better to take out the erector, as the image being reversed would not matter, and a great deal of light would be gained.

The Chairman said that if it were necessary to keep paper for silver printing a long time, it could be sensitised in the usual way, and instead of printing, rinsed in distilled water to remove the free nitrate of silver. In printing, a pad of blotting-paper fumed with ammonia should be placed at the back of the paper, when it would print with great vigour.

Mr. J. G. Hilton asked if lantern plates could be prepared to print out and tone like sensitised paper, the glass being first albumenised and sensitised like paper.

The Chairman answered in the affirmative.

The next meeting will be on Tuesday, April 2, when the Hon. Secretary will give a demonstration on "Platinotype."

Camera Club.

On Thursday, March 21st, Mr. H. C. Bond, M.A., read a paper on "Photographic Exposure," Sir G. R. Prescott in the chair.

The Lecturer enumerated and treated of five considerations upon which variations in exposure should depend, and proceeded to a careful analysis of several of the published tables of exposure, their use and reliability.

A very animated discussion followed, in which "Cap *versus* Shutter as a Means of Exposing," "Methods of Counting Seconds," "Timing Shutters," "Continuing Action of Light on the Exposed Plate," and other points came in for attention, remarks being made by Messrs. Noel-Cox, Davison, Balfour, Stroh, Patterson, Webber, Ferrero, Nott, Sturmey, Rodgers, and Clark.

The subject on Thursday, 4th April, will be "Universal Formulæ for Enlarging and Reducing," when Sir David Salomons will read a paper.

Devon and Cornwall Camera Club.

At a meeting held at the Freemasons' Hall, Cornwall Street, Plymouth, Mr. J. Pode in the chair, Dr. F. Woore, R.N., and Mr. Arthur Browse were elected members. In the absence of Dr. Aldridge, the Hon. Secretary read the paper which had been prepared by that gentleman, and which was entitled "Picture Making, Not Merely Taking Photographs." The subject of photography was treated throughout in relation to art, frequent references being made to the works of great painters, and the general rules of composition. It was shown how a picture might, although true to the facts, be most inartistic; whilst another, taken from a point only a short distance from the first, might be in every respect the reverse. How that the varying effects of light and shade, landscape, sea, and sky, should carefully be studied. That a figure, boat, rock, or tree, suitably placed, might make, instead of mar the picture. The paper was especially valuable in that it called attention to many rules known to artists (and Dr. Aldridge's paintings are well known in Plymouth), but frequently ignored to their cost by photographers.

Regrets were expressed at Dr. Aldridge's absence, and a vote of thanks was passed for his paper. The next meeting will be on April 3, when Major Barrington Baker will make a few remarks upon "Field Cameras."

London and Provincial Photographic Association.

The usual weekly meeting was held on the 21st inst., Mr. A. Cowan in the chair.

A question from the box was read:—"It having been stated here that the best lantern condenser for the oil light is not the best condenser for the lime light, will some member explain the why and wherefore by diagram on the black-board?"

Mr. T. E. Freshwater said, for oil illumination the condensers required to be of a larger focus, the luminant being larger with oil than with the lime light.

Mr. J. J. Briginshaw remarked, in using long focus condensers a great loss of light was inevitable, unless the combination usually employed—two plano-convex lenses—were supplemented with a third, preferably a meniscus, used close to the radiant.

Mr. W. H. Harrison said at Trinity House a two-wick paraffin lamp was used, giving the light of fifty candles; the burner was on the argand principle, the two wicks being concentric.

Another question was asked:—"Is the use of a combined toning and fixing bath to be recommended?"

Mr. W. Bedford considered that one great objection was the acid condition of the bath. By keeping the two operations distinct, both baths could be used in a neutral condition. However, he was aware that prints toned and fixed many years ago by one operation were still in existence, as good as ever. Still, it would not be denied that the reverse, in perhaps the majority of instances, had taken place.

A question was asked:—"What is the best form of shutter which can be used as well for time as for instantaneous exposures?"

Mr. H. M. Hastings preferred the Guery shutter.

Mr. J. J. Briginshaw thought the Optimus shutter fulfilled the conditions named in the question.

In the course of the discussion that followed, it being understood that it was the principle, and not any special form of shutter used in the market,

Mr. Bedford recommended a double drop shutter that had been shown at one of the meetings by Mr. A. Cowan.

Mr. C. H. Cooke then read a paper on "Lantern Competitions."

Arising out of the discussion that ensued, a sub-committee was formed to carry out the suggestions embodied in Mr. Cook's paper—Messrs. J. B. B. Wellington, C. H. Cooke, and F. W. Cox being elected on the sub-committee.

Mr. W. H. Harrison remarked upon the difficulty of getting negatives of clouds in towns, the buildings admitting of only those clouds almost immediately overhead to be taken.

Mr. J. B. B. Wellington said the cloud negatives usually sold were nearly all taken against the sun, in order to get proper contrast; therefore they were not available for printing with a great many pictures.

A question was asked, "What is the balance of advantage in using a large tripod head for a tourist camera?"

Mr. F. A. Bridge said the great advantage was the steadiness secured by using a tripod head of this kind.

Mr. J. R. Gotz was elected a member of the Association.

Talk in the Studio.

Making Use of Customers' Photographs.—*The American Stationer* says:—"A rather curious branch of the photographic industry, which has sprung up of late years, is that of producing photographs in miniature. Almost everyone will recall having seen in the newspapers, advertisements of various concerns which offer, upon receipt of a photograph and a certain small sum of money, to furnish fifty or one hundred reduced likenesses of the picture, mounted on cardboard. Owing to the exceeding cheapness of the offer, a great many persons have complied with the terms of the "ad," and have received, a short time after the application, the miniatures precisely as advertised. But, although most of the firms engaged in this traffic are doubtless thoroughly trustworthy and honourable, it has recently transpired that one concern has made this the cover for a most infamous piece of knavery. The likenesses of pretty young women thus obtained have been attached to the bodies of burlesque actresses in very scant attire, and then circulated as the advertisement of a certain new brand of cigarettes. The moral of this is that a young woman cannot be too careful as to how she lets her photograph go out of her possession. Many similar cases will be recalled as occurring a few years ago, when advertising cards were so much used. It is well known that the photographs of pretty children, not unfrequently of wealthy parentage, were stolen or purchased from popular photographers. These faces afterward appeared on advertising cards, represented as bursting through a sheet of paper or attached to the body of a light-winged angel or cupid."

Mr. Fletcher's Small Argand-Bunsen Burner.—We receive for notice one of these convenient laboratory burners, which certainly present several points of advantage over the older form of the Bunsen burner. Among other points may be mentioned the reduced height (2¼-inches over all), and the fact that without any adjustment of the air one can get a full roaring flame, or a small ring burning only about half-a-foot per hour. When the burner is turned down a little below this point it becomes sensitive to sound, and can be extinguished by a sudden noise. The burner in question does credit to the joint labours of Mr. Fletcher, Professor Bunsen, and Mr. Argand.

The Donkin Exhibition.—The collection of Mr. Donkin's magnificent Alpine photographs at the Gainsborough Gallery was visited by numerous persons, many of whom had no previous idea that such fine representations of Alpine scenery were within the power of the camera. The *Pall Mall Budget* of March 21st gives an article on the exhibition, illustrated with seven cuts, six being engravings made after the best known of Mr. Donkin's photographs.

An Improvement in the Tripod Head.—Messrs. Perken, Son, and Rayment have shown us an improved tripod head which may do a good deal to make the much esteemed "turntable" arrangement a thing of the past, as it combines the advantage of this with the convenience of allowing the tripod to be set up before the camera is handled. It consists of a light plate of brass, surfaced and cloth-covered where it comes in contact with the camera, and bearing the usual six "lugs" into which the studs on the tripod legs engage. In the camera bottom is a screw with a fly head, and although this can be screwed inwards or outwards, it cannot be altogether removed from the camera. A scolloped-out part of the tripod head leads to a slot, just the width of the screw stem, this slot finishing in the centre of the tripod head. The camera can thus be certainly and rapidly put into position, and a slight tightening up of the screw brings a boss under the fly-head into a corresponding recess in the lower surface of the tripod head, and we virtually have the turntable arrangement; a final turn of the screw fixing everything immovably.

The Crystal Palace Exhibition.—The following are the awards in the picture section:—A gold medal to Mr. E. D. Laveuder for his specially excellent exhibit; while the following gentlemen have been honoured by a silver medal a-piece: Mr. J. P. Cembrano, Mr. W. W. Winter, Mr. H. P. Robinson, Mr. F. A. Harvey. A bronze medal has been given to each of the following: Messrs. Green Bros., Mr. H. W. Gridley, Mr. R. Keene, Mr. H. Symonds, Mr. Lyddell Sawyer, Mr. W. J. Byrne, Mr. W. Taviner, Mr. G. W. Wilson, Messrs. Webster Bros., Mr. J. B. B. Wellington, Mr. W. Gillard, Mr. F. H. Evans, Mr. F. W. Edwards, Mr. G. Bolton, Stereoscopic Company, Mr. T. J. Hirst, the Eastman Company, Messrs. Morgan and Kidd.

Photographic Club.—The subject for discussion on April 3rd will be "Salted Papers."

*** Everything relating to the Literary Department of the Photographic News, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," should now be sent to Mr. Spiller, who is alone responsible for all which appears under that heading.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs Piper & Carter, Photographic News, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

C. H. B. (Leeds).—Thanks for your letter; ·4 per cent. should have been ·04 per cent., as the context shows; see erratum in present number. The quantity found agrees exactly with your statement.

L. A. (Wandsworth).—Willesden paper ought to answer your purpose; but a very good waterproof substitute is made by treating brown paper with soap dissolved in warm water, partially drying, and then brushing over with a cold saturated solution of common alum.

C. F. B. (Lynton).—For the majority of subjects backing is quite unnecessary; but it is well to carry one or two backed plates, in a marked or numbered slide, to provide for such exposures as are likely to cause halation. The ordinary process is smudging with a paste of burnt sienna and water, which is easily removed by a sponge before developing. Other operators prefer to mix collodion with the pigment, and so hasten the drying; but the best method is, perhaps, to use a piece of black carbon tissue, cut a little short of the size, slightly moistened with water and dilute glycerine, and applied like a sticking plaster to the back of the plate. The same square of black tissue can be made to serve for several exposures, provided it be not perforated by the spring attachment inside the carrier.

S. E. (Bootle).—The employment of citric acid to secure the permanence of your sensitized paper would undoubtedly tend to upset the toning bath, unless the acid is very carefully washed out of the prints before immersion in the gold bath. Give longer washing, or even finish off with a trace of ammonia. Is not your practice of blotting the paper rather wasteful of the silver, and a temptation to use over again the dirty silvered pads?

G. M. (Southall).—Of the two lenses, No. 1 is that with which we have worked for years, and for out-door work must be regarded as in every respect satisfactory. No. 5B is said to be more rapid with equal apertures, and has of late been very highly reported upon. Make your own choice; you cannot go wrong either way.

C. W. G.—The so-called "Magic Photographs" were merely silver prints bleached by immersion in a weak bichloride of mercury solution to the point of becoming invisible. The latent picture was developed or reproduced by washing with a solution of hypo-sulphite of soda.

Dundee.—The "iris" diaphragm could be adapted to any of your existing lenses. See advertisement in Year-Book, p. xci.

J. M. (Southport).—The fetid smelling albumenised paper was at first objected to, but its continued employment without disastrous results would seem to indicate that there is no real disadvantage in its use.

O. V.—You could have your silver residues assayed, but in ordinary cases such a course is rarely resorted to, unless the quantity be considerable. Gold and silver residues should be kept as far as possible separate. Burn up your filters and paper cuttings, and send only the ashes.

Photo-Chemistry.—Professor Meldola's lectures are not yet published, but are said to be in the press, and may appear next week.

J. Cross.—There is no better process than mercury intensification for strengthening the negatives for photo-lithography, using weak ammonia to blacken the image.

Dark-Room.—The Gaedicke lamp was described in the News of 13th July last. Its efficacy depends upon the production of a monochromatic sodium flame, formed by introducing a tuft or wick of asbestos soaked in common salt into an ordinary Bunsen gas burner, the coating being occasionally renewed to compensate for loss by volatilisation. There is an outer yellow glass cylinder for further protection from actinic rays.

Field Work.—The spirit levels would be an inconvenient adjunct to a camera, and very liable to breakage. If you cannot trust your eye to get the level, use a cord with bullet at each end passed over the camera, and hanging down like a pair of plummets. This will soon show you any notable divergence from the true perpendicular. The slipping of the camera legs in moist earth or sand is best guarded against by a set of "shoes," or flat pieces of metal perforated to receive the points of the tripod.

J. L. E.—Compare the glasses you propose to use in the roof and sashes of your studio by laying them down together on a sheet of sensitised paper, and exposing for a few moments to daylight. Any appreciable difference of actinic value will make itself apparent by this rough test, but we cannot give you any ready means of judging of the permanent quality of the glass; some kinds assume a purple tinge by long exposure to sunlight, evidence of which is seen occasionally in old glazed windows.

"205" and other correspondents next week.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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PLATE BACKING AND FILM STAINING.

OF all the shortcomings to which the work of the photographer is liable, there is probably none which it is so useful to point out again and again, as that due to what is known as halation. From a careful consideration of the photographs seen at exhibitions—we are not now speaking of purely portrait photographs—we think it may be confidently stated that the greater part of the pictures shown indicate more or less strongly the presence of the disturbing influence of that false light which is due to reflection from the back of the glass upon which the negative was taken, and are defective to an extent proportioned to the amount of halation present. It seems strange that after such a long period, during which the cause of the evil has been pointed out, and remedies for it proposed, and by some adopted, there should still be room for so much reproach to be brought against the work of the photographer on this score.

Probably it is the want of full recognition both of the extent and the cause of the evils due to halation that has induced photographers, in so many cases, to put up with it, rather than to adopt the necessary means for its prevention. If, indeed, the damaging effect of halation were more universally recognised, we should not expect to see its presence so often evidenced, as we do, in the weakening of the outlines of trees and other objects against the sky. The beautiful bright contrasts that exist in nature give a great charm to a good painting, and to those photographs in the production of which the necessary precautions to ensure absence of halation have been taken. In sea scenes, how often do we see the topmasts and cordage, that should stand out bright and beautiful in clearness against the sky, dimmed by halation to such an extent that they appear clouded as by a fog! If the photographer who has not adopted special means for the prevention of halation, and who wishes to recognise the failings as well as the beauties of his work, will conscientiously examine it with the special point in view of seeing whether the dark outlines in juxtaposition with bright spaces have suffered from the evil in question, he will be exceptional indeed if he do not find so much evidence of what might have been better with the proper precautions, as to make him feel regret, and, it is to be hoped, a determination no longer to tolerate such a preventible failing.

The remedies which have been adopted for the prevention of halation, besides the one of spreading the film upon paper or coloured glass, depend either upon making the film itself impervious to the photographically active rays of light, or upon causing these rays of light to be absorbed by a backing applied to the hinder surface of the glass which supports the sensitive film. Under the former head comes the plan of coating the plate more thickly, a plan which of course involves extra cost, and which is certainly not commonly adopted. It may be said of this, as of most remedial measures, that its efficacy will depend to a great extent upon the amount of strain to which it is subjected: that is to say, that a coating which would be sufficient for one class of photography, would allow light to pass that would cause very perceptible halation in another class, for which a coating of emulsion even of twice the usual thickness might prove insufficient as a remedy.

A possible objection to the use of a very thick coating of emulsion is, that all the processes—washing, fixing, &c.—take much longer, and are less likely, therefore, to be thoroughly performed, and that any tendency to fog in the emulsion will show more strongly in a thick film than in a thin one. These drawbacks might doubtless be minimised by the use of an emulsion rich in silver, rather than a large quantity of an emulsion of the more ordinary kind.

The other method of making the film itself impervious to light is that of staining it with some colouring matter. We described some experiments in this direction some two years since.* The plan, however, most generally adopted for the prevention of halation is that of backing the plate with a light absorptive medium. Here, again, there are varieties in the method of applying such a medium. The original plan of using a paint or varnish at the back of the plate is very effective when properly performed, the objections to it being, first, the necessity for some drying-room or cupboard in which the plate must remain until the moisture has evaporated from the light absorptive mixture; and, secondly, the necessity for removing this mixture before development. The first drawback is probably the only serious one, but it applies equally to the plate-staining system, and it is well worthy of consideration whether it is not worth while to establish some drying-room or other suitable contrivance for the sake of the undoubted advantage that may be gained.

Those, however, who do not care to adopt the method of applying a liquid backing can use the plan introduced some eight years since by Dr. Hermann Fol.† He employed the waste tissue stripped from the back of prints during the development of carbon prints. This he immersed for twenty-four hours in glycerine, after which it is squeegeed on to the back of the plate. It is not necessary to wait for waste tissue. Squares may be cut of suitable size—about an eighth of an inch shorter and narrower than the plate is convenient—and, after soaking in water until swelled, may be treated with glycerine as described. Black surface paper, such as is obtainable of any fancy stationer, may be substituted for the carbon tissue, and in this case the preliminary soaking in water may be dispensed with. The plan of using paper backing

* Halation and Film Staining.—PHOTOGRAPHIC NEWS, 1887, p. 257.
† PHOTOGRAPHIC NEWS, 1881, p. 162.

is very clean and convenient, particularly in the ease with which it may be removed before development, and the sheets may then be stored for future use again; but there is the drawback that it is exceedingly likely that some air spaces will be left, where, consequently, there is no optical contact.

The necessity for using every precaution against halation was forcibly brought to our notice a short time since, when we desired to make a photograph of a room including the windows and some very dark objects to the unlighted sides of which the camera was directed. Here we should not think of using an unbacked plate, but the coat of blacking on the plate first exposed was not very thickly spread, and the attempt yielded so much halation round the window that we determined for the next exposure to use more complete precautions. A plate was therefore first treated with the staining solution of saffron which we described in the former article already referred to, and, after drying, was thickly backed with a mixture of ivory black and gum water. An exposure with this plate gave a picture in which the lace of the window blinds was distinct, at the same time that the dark objects were sufficiently illuminated. The subject is no doubt a trying one. The exposure given was three hours, and with the lens and plate in use probably one second would have sufficed for the sky and the outlook from the windows. The time therefore during which this powerful light was acting, and would with less thorough precaution have been creating a destructive amount of halation, was very great. The result proved, however, that the extra precautions taken were well worth the while.

In using a backing solution, it is necessary that there should be a sufficiency of something of a gummy character to produce thorough adhesion to the glass. If lamp-black or burnt sienna—the basis of two of the most usual backings—be used with water only, the adhesion will be so imperfect that a great deal will not be in optical contact with the glass, and consequently a considerable amount of reflection and halation will result. The mixture should be applied with a soft brush, and should be sufficieutly even not to show streaks such as ensue from the use of a sponge. Black varnish may be used in the same way, and this may be removed with benzole or turpentine, or by scraping before development; but scraps are apt to get on to the front, and to stick to the film sufficiently to cause spots in developing.

In order to examine the amouut of light reflected when various kinds of backing were used, we adopted the following plan. A spectacle leus, of moderately short focus, was coated at one eud with the backing to be tested, and then examined from the other side. The image of a gas flame was then observed. There are two images reflected, ouc from the front and one from the back of the glass. On a piece of plain ordiuary glass these two images overlap each other, aud are so close together that we cannot isolate the image from the back, which is the one we want to examiuc. With a spectacle lens, however, the two images can be separated by tilting the glass, and the reflection from the back may be kuown by its being very much reduced in brightness when it comes from the end of the glass covered by backing, whilst the image from the front surface is bright from whatever part it is reflected. This manner of examining the amount of light reflected is easiest when black pigments are used; and indeed there seems no reason for using any other. Tested iu this way the ivory black and gum mixture that we employed gave a very satisfactory result, the image from the back being very faint, and that of a brownish colour. To compare two kinds of backing, patches are applied side by side at one end of the lens, and the image of the frame made to run across them.

With ordinary portraiture, although the photographer sometimes finds halation obstrusively injurious, yet it is so often not strongly evident, that he is generally content to put up with an occasional bad case, and a much more common slight and perhaps unrecognised shortcoming, rather than undertake the trouble of backing, or film staining. It is, however, noteworthy that even in copying, where from the blacks not being themselves in shadow the contrasts are less strong than in other cases, an evident improvement has beeu observed upon the backed half of a plate. For outdoor subjects, and especially for interiors, where a window is introduced, the advantage of prevention of halation is very obvious. In fact, there are few subjects in which the use of backing will not be an improvement, more or less according to the amount of contrast included, and in which the trouble involved in its application and use will not be more than repaid to the photographer auxious to secure the best attainable result.

AMYL ACETATE COLLODION.

BY LIEUT.-COLONEL J. WATERHOUSE, B.SC., ASSISTANT SURVEYOR-GENERAL OF INDIA.

I NOTE in the photographic journals just received a short paper read at a meeting of the Birmingham Photographic Society by Mr. W. Griffiths, on his experience with kristalliue varnish. From the description given it seems probable that this varnish is a solution of pyroxyline in acetate of amyl, and it is curious that—so far, at least, as I can recollect—the photographic journals and text books make no mention of this solutiou, which, for certain purposes, has important advantages over ordinary collodion, and might be useful in many photographic operations. I tried the acetate of amyl as a solvent for some pyroxyline we had in the office, which was almost insoluble in ether and alcohol, and found it dissolved it perfectly either with or without the addition of ether and alcohol. Collodion so prepared with only a small proportion of ether and alcohol was not found suitable for wet collodion negatives. It was, however, very structureless and tough, and I found it useful for making films for yellow screens in orthochromatic photography. It might also be useful in enamelling, and as a varnish for gelatine dry plates. A film of it spread on glass and dried comes away at once from the glass ou being plunged into water. It might, therefore, be a ready way of preparing transpareut films to be coated with gelatine emulsion.

I find that the collodion keeps well, and does not give an opaque powdery film, as does ordinary collodion after long keeping in this country.

Nitrate of silver is quite iusoluble in acetate of amyl, and does not appear to be reduced or decomposed by it wheu pure.

In England the cost of acetate, even in its impure form of oil of pear, is high, and would militate against its use. It is made much more cheaply in Germauy. The smell is also liable to be unpleasant, though I do not know if it is actually injurious.

I hoped to have been able to make further observations on this new collodion, but as I am not likely to be able to do so at present, it seems advisable to draw attention to it in the hope that it may prove of use, and its capabilities further tested and made known. As a varnish and lacquer it is, I think, largely used in America, if not in England.

Acetate of amyl has been recommended for use in lamps, and especially for photometry, as a substitute for the ordinary standard candle. It burns like spirits of wine, but has a yellowish-white flame like a candle.

Calcutta, March 13th.

A METHOD OF RAPIDLY ELIMINATING HYPO FROM SILVER PRINTS, AND OTHER NOTES ON SILVER PRINTING.

BY W. K. BURTON.

THE thorough elimination of hypo from silver prints is a thing that has always been a troublesome matter in connection with the commou priutiug method, and, even if it

e granted that insufficient washing is not so entirely to lame for the want of permanency of prints on albumen-ed paper as has sometimes been thought, any method of acilitating the operation of getting rid of the objectionable alt will be welcomed by photographers. "Hypo-liminators" seem to be looked upon with more or less uspicion, rightly or wrongly I will not venture to say. Against washing machines I have nothing to say, but they re generally somewhat expensive, and often cumbersome, specially for large prints. I have found the following nethod of hand washing thoroughly efficient for moderate atches of prints, say two or three dozen 12 by 10 prints, r double as many cabinets. For large numbers the rocess would be tedious. For such numbers as I mention, he whole thing may be done in half-an-hour.

The prints are fixed as usual, but, instead of removing hem from the dish of hypo, the hypo is poured off, and he mass of prints is drained till the solution only drops rom it. The dish is then filled up with warm water, and he prints are, one at a time, removed by hand from it to a second dish full of cold water; the cold water is poured off and is replaced by warm water; they are then removed o a third dish of cold water, this is poured off, warm water is added, the prints go back to the second dish, again filled with cold water, the cold water is drained off, and warm water is added for the third and last time. The prints are now removed one at a time to a large tub full of cold water. They will float for about five minutes on the surface of this, but at about the end of that time the prints will sink singly and very slowly to the bottom of the tub. By the time that the last has sunk the prints may be taken out of the tub and be dried. The most deli-cate test will fail to detect any trace of hypo in them.

Advantage is taken throughout this method, by the alternate use of hot and cold water, of getting rid of the hypo by virtue of the tendency to diffusion that there is between miscible fluids of different temperatures. As to the heat of the "warm" water to be used, so far as the efficiency of the elimination is concerned, the hotter it is the better. Water even nearly boiling does no harm to silver prints on either plain or albumenized paper, but, besides the natural difficulty of handling prints in very hot water, it will be found that the paper is rendered so soft that it is almost impossible to avoid tearing the paper, especially in the case of large prints. I have not taken the exact temperature of the water that I use, but I imagine that it is between 100° and 120° Fahr.

I have printed in another place a method of reducing prints on albuminized paper from the crumpled up form that they assume on drying to a handleable form, but probably few of my present readers have seen the little book in which the method is given. I may therefore, perhaps, be forgiven for repeating it here. As to the plan of drawing the print under the blunt edge of a paper knife, I know that it works well enough in the hands of some, but I equally well know that it will not work in my own hands at all, except in the case of very small prints, and that there are many who have quite as much difficulty with the method as I have. As a rule, if I attempt to flatten prints in this way, I tear a most uncon-scionably large per centage of them, and do not get the rest flat after all.

Here is the plan that I recommend. The prints on coming from the washing water are blotted off with blotting-paper, and are laid face downwards on clean cloth, or on any clean surface to which there is no danger that they will stick. A wooden roller, about an inch thick and three or four inches longer than the width of the prints, is needed. When the prints are all but dry, one is taken and is wrapped tightly round the roller with the albumenised side outwards, the end of the next print is caught for half an inch or so under that of the first, and so on, the roll being twisted up as tightly as possible after each print has been added. At the end, a piece of common paper is caught in by the end of the last print, it is rolled round the whole, and is secured by a little gum. The roll is laid by for a day or longer, and at the end of that time may be opened, when it will be found that the prints have a fine surface, and no longer show that irritating tendency to curl towards the albumenised side that they did at first.

Last, a hint communicated to me by Mr. F. W. Strange, which will, I think, be found of use to those who produce enamel prints, either by the use of the gelatino-citro-chloride paper now so popular, or on ordinary albumenised paper by the aid of gelatine or collodion, or both. All those who have produced such prints know that one of the greatest troubles is to mount them without spoiling the surface. It is necessary to attach the mount itself, or at least a tolerably thick piece of cardboard, to the back of the print, whilst this latter is still attached to the glass that is used to give the enamel glaze. In either case there is some trouble. If the cardboard is thick, the time taken for drying is excessive, and, moreover, the print is apt to be torn from the glass when it is still only half dry by the warping of the board, in which case it is ruined. If the cardboard is too thin, the water of the mountant used to attach it afterwards to a thicker board is liable to penetrate and destroy the glaze. There is a common quality of paper that is purchaseable from all stationers. It is thin, and has one side covered with a black glazed pigment that is quite insoluble in water. This paper is just so nearly impervious to water that if it is pasted on the back of a print drying on glass it will not prevent the drying, but will permit of the print being afterwards mounted with an ordinary mountant, without sufficient water penetrating to damage the glazed surface. The prints mounted on the glass, and ready for stripping when dry, are allowed to get nearly dry, a piece of the glazed paper of the size of the print is affixed to the back with any mountant in which water is the solvent, the white and unglazed side of the paper being, by preference, pasted to the print. The drying of the print is very little impeded, it will strip just as if no paper were attached to it, and it may afterwards be mounted in the ordinary way with thick glue. There is, of course, no advantage in the black colour of the glazed surface of the paper that intervenes between the print and the mount, but there is certainly no disadvantage in it, and I do not remember to have seen paper of the kind that I refer to of any colour but black.

Patent Intelligence.

Applications for Letters Patent.

4,693. John Green, 18, Fulbrook Road, Tufnell Park, London, for "A New Combination Lecturer's Reading Desk and Photographer's Tripod Stand."—March 18th, 1889.

4,716. James Yate Johnson, 46, Lincoln's Inn Fields, Middlesex, for "Improvements in Photographic Cameras." (*Henri Pusset*, France.)—March 18th, 1889.

4,818. Henry Dean, 20, High Holborn, London, for "Improvements in the Heads of Tripod Stands for Photographic Cameras, applicable also for other purposes."—March 19th, 1889.

4,890. Alfred Hudson, 1, Queen Victoria Street, London, for "An Improved Photographic Camera."—March 20th, 1889.

4,926. Thomas Henry Powell, 116, Denmark Hill, London, for "Improvements in the Development of Photographic Dry Plates and Bromide Papers."—March 21st, 1889.

5,013. Newnham Browne, 73, Cheapside, London, for "Improvements in Apparatus for Hot-rolling Photographs." (*Hugo Engler*, Germany.)—March 22nd, 1889.

5,067. John Methven, 6, Bream's Buildings, London, for "Improvements in Photometric Apparatus."—March 23rd, 1889.

Specifications Published.

1,461. William John Wilson, of 1, Chapel Road, Ealing, in the County of Middlesex, Chemist, for "Improvements in Photographic Transparencies."—Dated January 26th, 1889.

The Patentee says :—

When photographic transparencies upon clear glass are mounted for decorative purposes it is usual to place behind the picture a piece of translucent, but not transparent, material such as ground, or imitation ground, glass or opal glass, to form a background for the picture, which will permit the passage of sufficient light to render the details of the picture clearly visible whilst preventing the effect of the picture being marred by objects situated behind the picture being visible through it. Such photographic transparencies have also been prepared directly upon ground or opal glass, which itself furnishes both the support for the picture as well as the necessary translucent, but non-transparent, background. Such ground or opal plates have, however, heretofore always been uniform over their whole surface, so that the margin (if any) beyond the edges of the picture has been perfectly plain.

The object of my invention is to provide such transparencies produced direct upon a ground glass, opal glass, or similar support and background, as last referred to, with an ornamental border or margin integral with the glass support, so that the transparency when "priuted out," or printed and developed thereon, is set-off and heightened in effect in a way not heretofore practised.

In carrying out my invention, the glass plate, instead of being uniformly ground or plain opal glass, has the desired margin or border already produced upon it in any of the ways hereafter referred to, that is to say, I use a piece of glass larger than the picture intended to be printed thereon, a portion of the surface of this glass at least as large as the picture being ground or otherwise rendered uniformly translucent, but non-transparent, whilst the remaining portion of the surface is not uniform, but is occupied by an ornamental border or design, lettering, marginal lines, or other variation of the surface produced by alternations of translucent and transparent glass, or of coloured and uncoloured portions, or of designs in relief, &c. For example, by etching, embossing, grinding, sand-blasting, or similar process, or by the application of a matt varnish, the surface of the glass may be reudered translucent in some places and transparent in others. Or, a piece of flashed opal may have its opal surface etched off in places, leaving a clear marginal design or border. Again, a piece of white glass flashed with colour may have part of its coloured surface etched off, and then ground for reception of the picture, the remaining portion being either left uniformly coloured, or etched in a clear design upon the coloured surface. In this way many variations of the general idea may be made.

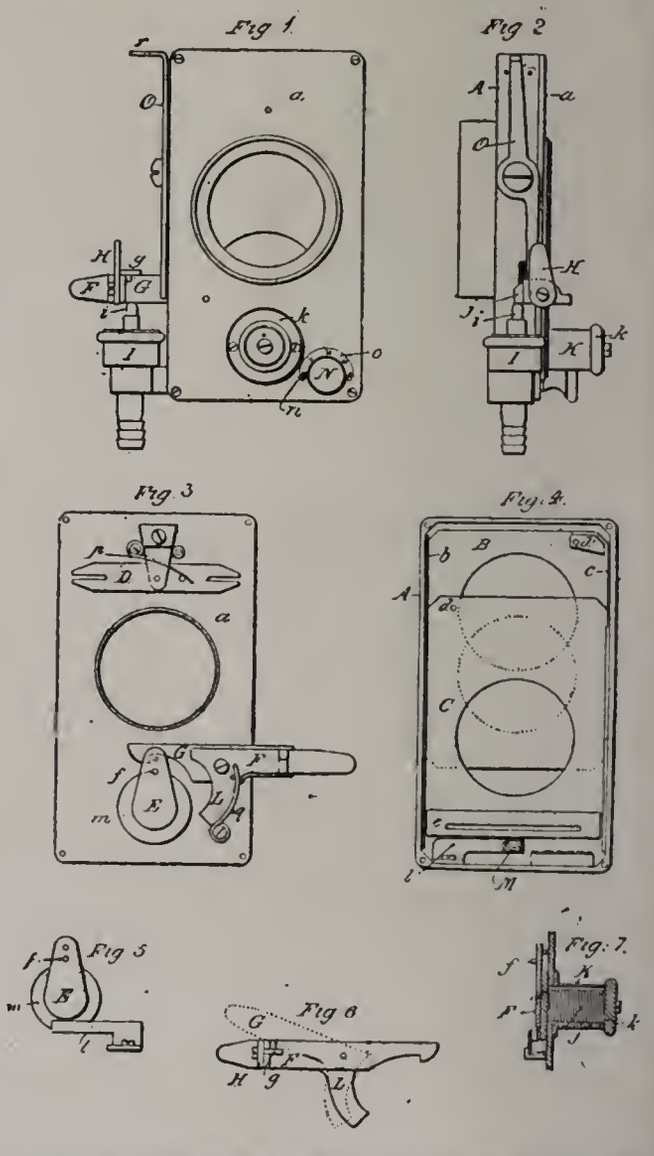
I coat the sheet of glass, previously ornamented in any of the ways above referred to, with a sensitive gelatine emulsion, the emulsion being applied over the whole surface of the glass or only over that portion intended to receive the picture, and upon this coated surface the picture is produced by printing out or by printing and development. The picture is then fixed in the usual way by dissolving out such portions of the sensitive salt or salts in the emulsion as have not been acted on by light, thus leaving the picture complete, with a translucent back and an ornamental margin or border.

1,474. Louis Houssard, 5, Wilmington Square, Clerkenwell, W.C., Photographic Instrument Maker, for "An Improved Photographic Shutter."—Dated August 30th, 1888.

The Patentee says :—

In order that my invention may be the better understood I have appended the accompanying sheet of drawings in which figs. 1 and 2 are respectively front and side elevational views of the improved shutter according to my invention. Fig. 3 is an internal elevational view of the cover of the containing case showing the parts of the mechanism attached thereto ; fig. 4 is a similar view of the enclosing case ; fig. 5 is a detached view of the friction damper. Fig. 6 is a detached view of the releasing levers ; and fig. 7 is a sectional view of the spring box and spring for actuating the shutter mechanism.

The device or appliance according to my invention comprises an enclosing case A provided with a cover *a*, which is secured to said enclosing case A by screws or equivalent means. The enclosing case A and cover *a* are provided with apertures through which the rays of light pass. Within the enclosing case are two sliding plates B C, free to move vertically within suitable guides *b c*, and are provided with round, elliptic, square, or other shaped apertures to allow of the rays of light, when said apertures are coincident with the apertures in the enclosing case A and cover *a*, to pass therethrough. At the upper part of the cover *a* is supported in suitable bearings a narrow plate D, fig. 3, pivoted in the centre and slotted at each end, into which slots take the pins *d d*^{1}, fixed to opposite corners in the upper parts of the sliding plates B C. Upon the lower part of the plate C is secured a thin plate *e*, having formed therein a horizontal slot into which takes a pin *f*, secured to a cam E, figs. 3 and 5, whereby the sliding plates B C are moved simultaneously in opposite directions. Beneath the aperture in the cover *a* are disposed two releasing levers F G, which may be caused to act conjointly with or independently of each other according to the required degree of exposure, a suitable handle H and pin *g* serving to secure said two releasing levers together. The releasing levers F G, which are retained in the normal position by a spring *g*, are actuated by means of a pneumatic air-tight piston I, which, upon air being forced thereiuto, shoots out a pin *i* against a small projection *j*, formed upon the lever F, which latter it raises, thus releasing the mechanism. To the cam E is adapted a spiral



spring J, fig. 7, enclosed in a small box K, secured to the exterior of the cover *a* of the enclosing case, the free end of the spring taking into a small perforation form in the milled cap *k*, which latter is secured to the cam E by a screw *l* or equivalent means. Now, in actuating the apparatus built up in the manner above described, the cap *k* is turned half a revolution against the tension of the spring J, when the pin *f* in the cam E is caught and held by the curved arms L of the releasing levers F G. In this act of winding the spring J, the cam E performs a semi-revolution, the pin therein in its travel raising the plate C a distance determined by the distance of said pin *f* from the axis of the cam E. When the pin *f* is in a plane horizontal to the axis of the cam, the sliding plate C will be in its lowest position, and when it reaches a point vertical with the axis of the cam, said sliding plate C will be at its highest point, and the apertures in the

enclosing case A and cover *a* will be uncovered. On the cam E containing its semi-revolution, the pin *f* thereiu carries the sliding plate C down again to its normal position. It follows, therefore, that, inasmuch as the two plates are connected together by means of the pins *d* *d*¹ and slotted arm D, the motion imparted to the sliding plate C is transmitted to the sliding plate B, giving to the latter a movement in a direction opposite to that of the sliding plate C, by which means each semi-revolution of the cam E causes the apertures in the two plates B C to be brought coincident with each other for such length of time as may be desired, irregularity in the movements of said plates, through the variation in the tension of the spring J, being compensated for by a light spring *p* bearing against a pin secured to the slotted plate D.

The speed of the motion of the sliding plates, and consequent duration of the exposure of the sensitive plate in the camera, is governed and regulated by means of a damper M, fig. 4, of any suitable material—such, for instance, as cork—mounted upon a fine spring *l* secured within the case A, which damper is caused to approach and press against a disc *m* rigidly secured to the cam E by a screw and thumb nut N, fig. 1, the degree of pressure of the damper upon the disc *m* being denoted by means of an index pointer *n* and graduated scale *o*, or, if desired, the thumb nut N may have graduated marks formed thereon.

In order to allow of the focussing of the lenses of the camera, I provide a focussing lever O (figs. 1 and 2) pivoted to that side of the enclosing case A from which extend the levers F G in such a manner as to press against the lever G when released by the blow of the pin *i*. Thus, having turned the cap K and cam E against the tension of the spring J to set the mechanism, the handle *r* of the focussing lever O is pressed forward, and when the levers F G are forced upwards by the pin *i*, said levers are held by the focussing lever O aforesaid, keeping the apertures in the sliding plates B C coincident. When the focussing has been properly effected, the levers F G are released by drawing back the handle *r* of the focussing lever O, when the apparatus will be ready for use.

1,591. Robert Edward Mather Bain, of 417, Olive Street, in the City of St. Louis, and State of Missouri, United States of America, Gentleman, for "Improved Apparatus for Operating the Shutters of Photographic Cameras."—Dated 29th January, 1889.

A double wing shutter in which each shutter is formed with a curved slot, through which passes the pivot pin of the other shutter, and with a short straight slot. Through the last named combined slots of the shutters, and through vertical slots formed through the front and back of the casing, passes a pin, the whole operating so that on the full vertical movement of the pin in either direction the shutters are opened and closed to the camera tube.

This invention has for its object to vary the speed of the shutters when opening and closing the camera tube for instantaneous exposure, and consists in two or more springs having different and alterable tension or force, and applied separately or collectively to the actuating pin of the shutters, whereby the speed of the latter when opening and closing the camera tube for instantaneous exposure may be varied at pleasure, combined with devices for holding and releasing the shutters, and for checking their movement when at half-stroke or with the camera tube fully open.

3,782. Frederick Taylor, of 14a, St. Petersgate, Stockport, in the County of Cheshire, Photographer, for "Improvements in Stands or Tables for Holding Photographic Cameras, also Applicable for Holding Music, Newspapers, or similar Objects."—Dated March 12th, 1888.

The following abstract of the specification describes the invention :—

Fig. 1 is a side view ; I form the lower portion or base of the stand with three legs *a*, which are cast on or fixed to a central boss *b*.

The free end of these legs *a* are suitably curved and provided with suitable castors *c* to facilitate an easy moving about or lateral adjustment of the stand.

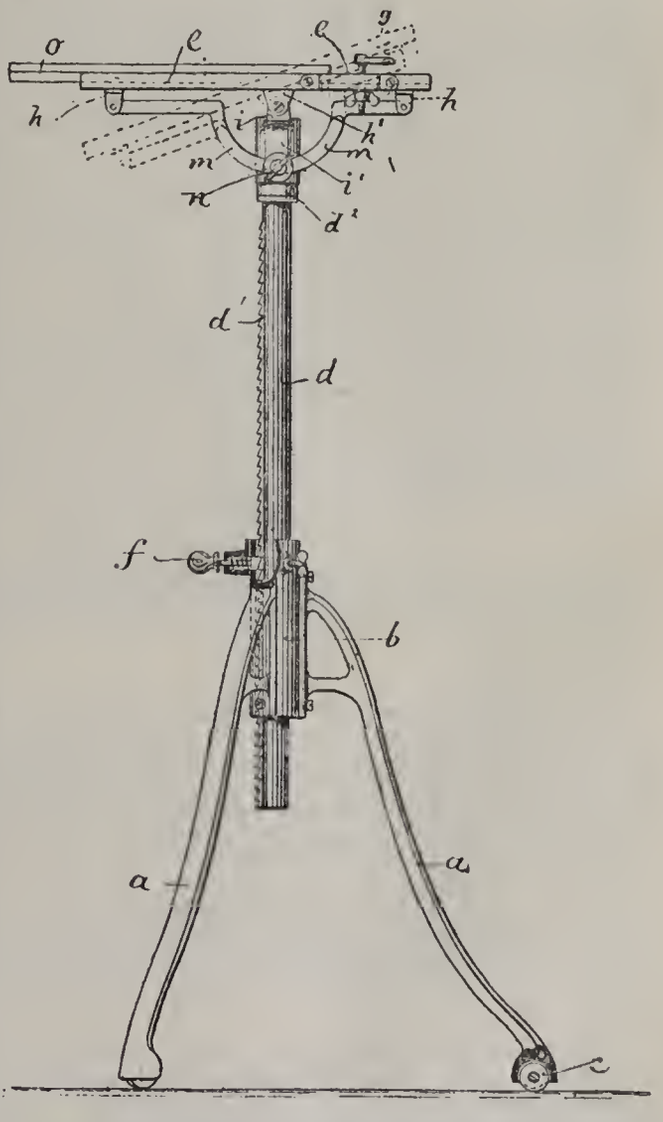
The aforesaid boss *b* receives a shank *d*, which at its upper end is provided with a table *e*, and is arranged vertically adjustable in the said boss *b*, so as to be retained in any desired position by means of a spring bolt *f*, or lever contained in the boss *b* of the base, which spring bolt *f* enters teeth *d*¹ or a rack formed on or secured to the said shank *b*, the latter being of such a section as to allow only of a vertical adjustment.

I may here remark that the camera table *e* may also be vertically adjusted and retained in any desired position by means of a pinion and rack gearing, and a handle.

To facilitate a ready securing of the camera to the table *e* of the stand, I form the table *e* near its edge with a slot, or provide the same with a slotted bracket *e*¹ to receive a bolt *g* or clamp, the upper end of which I form with a head projecting only on one side, and the lower end being provided with a thumb-nut.

The said table *e* I form of wood or with a metal frame, with or without a wood top suitably secured thereto, the underside of the table being provided or formed near the middle and near the edges with lugs *h* and *h*¹.

This table *e* is suitably pivoted, preferably by means of the lugs *h*¹, to a bracket *i* having a boss *i*¹ fitting onto and being secured to the top of the aforesaid shank *d*, by means of a thumb-screw *k*, fitting into an annular recess *l* formed in the said shank *d*, or equivalent which will permit the table *e* to be fixed in position, or when released will be capable of swivelling on the shoulder *d*² of the said shank.



To the underside of this table *e* are suitably attached by means of the lugs *h* either one or two segmental arms *m*, the ends of which are made to pass respectively through one or two slots *m*¹ formed in the boss *i*¹ of the bracket *i* to which the camera table *e* is fixed, by means of which and a thumb-screw *n* any desired inclination can be given to the table *e*, see dotted lines fig. 1.

For some purposes, as for instance, for copying photographs, I employ a supplementary table *o* capable of sliding on the aforesaid table only in a lateral direction, which facilitates the camera being brought more accurately nearer to the object to be copied, than the moving of the base of the stand would allow.

By suitably modifying the top or table *e* of this stand it will serve equally well as a music or reading stand.

My invention relates in the second place to camera stands which are collapsible and commonly known as "tripod stands,"

and has also for its object to make the table e on which the camera is fixed, circularly adjustable, as well as to provide means whereby the same can be made larger or smaller in diameter, and the stand can be adjusted with accuracy at any required height.

To this end, I form the tripod head with a circular groove or grooves or with a stud o^1 for the table c to revolve in or on, respectively, and with three radial arms either hinged thereto or sliding therein in grooves.

The upper part of the legs a of the stand I connect to the tripod head p by placing the lugs p^3 cast on or the latter itself, *i.e.* the arms p^1, into slots a^1 formed respectively in a socket a^2 secured on the top of the upper part of each leg a, and binding the same together by means of thumb or other screws q, springs, or india-rubber band, one side of the said slot a^1 being hinged at a^3.

To facilitate the vertical adjustment of the stand, I mark inside the upper part of each leg a, a scale, the corresponding lower parts a^2 sliding on it, thus indicating the height of the stand.

The inner side of each of the top parts a of the legs are hollowed out for the purpose of receiving the lower parts a^2 of the legs, the two being connected together by a band r attached to the top of the lower legs a^2, by means of a pin passing through a slot formed in the said band or two lugs a^1 formed on the top of the lower leg a^2, and a band fixed to the lower extremities of the upper leg parts a.

The tops of each of the lower parts a^2 of the legs I form with a nose s, cam-like, so that on being turned one way it draws the said band r tight against the upper part a of the leg, and on being turned back it releases the legs and permits of vertical adjustment of the camera, thus forming a simple and secure lock for the upper and lower parts a and a^2 of the legs.

In order to facilitate the tripod stand being used out-door as well as in-door, I suitably provide the lower extremities of the lower parts of the legs a, each with a changable foot or end t.

The foot or end t is so formed as to present either a spike t^1, or end with an india-rubber ball or other soft covering t^2, as may be required for different uses of tripods.

On the side of the foot or end t an eye t^3 is formed by means of which it can be fixed onto the end of the leg a, either spike t^1, or india-rubber covering t^2, downwards as may be required.

7,044. Richard Norris, of No. 3, Birchfield Road, Aston, near Birmingham, in the County of Warwick, Doctor of Medicine, for "Improvements in the Production of Collodion Photographic Films or Surfaces of Exalted Sensitiveness.—Dated May 11th, 1888.

The Patentee says:—

The photographic process commonly called the collodion process has of late fallen largely into disuse in consequence of the higher degree of sensitiveness possessed by the dry gelatine plates or films now commouly used in the practice of photography. Collodion possesses some advantages over gelatine as a photographic vehicle, which advantages have hitherto been more than counterbalanced by its inferior sensitiveness.

The object of my invention is to increase the sensitiveness of collodion, photographic films, or surfaces, and consists in the methods hereinafter described of preparing the said films or surfaces, whereby they are made equal to or superior to dry gelatine plates in their sensitiveness to light. These methods may be designated the alkaline and acid bath and emulsion processes.

I will describe first the alkaline bath process. In this process I add the silver salt to the collodion instead of impregnating the collodion as is usual with a soluble iodide or bromide or other haloid salt or salts, because by this method of procedure a greater range in the selection of the haloid salt or salts to be used as a bath is secured, for many of these salts are insoluble in a mixture of ether and alcohol, which is the menstruum in which gun-cotton (pyroxyline) is dissolved to make collodion. To make one ounce of such a collodion I dissolve seven grains of pyroxyline made at a temperature of about 200° Fah. in a mixture of two drachms of ether and one of alcohol. I then take twenty-six grains of very finely powdered silver nitrate, and mix it in a test tube of suitable capacity with eighty drops of glycerine, and stir it continuously with a glass rod till most or all of the silver nitrate is dissolved. I then add gradually to this solution five drachms of absolute alcohol, and finally add by degrees the whole of this to the solution of pyroxyline. By the use of glycerine instead of alcohol for dissolving the silver salt the said salt is most conveniently introduced into the collodion. Alcohol may, however, be used for that purpose.

Glass plates, paper, or other surfaces may be coated with the prepared collodion described, and then submerged in or floated upon a solution of the soluble haloid salt or salts to form a film containing iodide, bromide, or chloride of silver, or mixtures of these.

I will describe my process in connection with a photographic film on a glass plate.

Having coated the plate with collodion charged with a salt of silver, nitrate of silver for example (which collodion may be called "argentised collodion"), I submerge the coated plate in a bath of iodide, bromide, chloride, or other compound haloid salt of potassium, sodium, ammonium, or the like for a period varying from five to forty-five minutes. Films produced in such baths are much more sensitive after the bath has become charged with ether and alcohol, hence in preparing the said films I add ether and alcohol to the bath of haloid salts.

A bath of the following composition answers well in practice.

Potassium bromide from thirty-five to seveny grains; distilled water half-an-ounce; methylated alcohol of specific gravity ·830 half-an-ounce; methylated ether of specific gravity ·717, thirty-six minims. The longer the plate or film remains in such a bath (within the limits I have given, namely from five to forty-five minutes) the more transparent and sensitive it will become. It will also undergo those well-known molecular changes which modify the tint of the silver haloid salt to transmitted light from ruby to blue and green. The temperature of the bath should be about 76° Fahrenheit. The plate having remained a suitable time in the bath (according to the sensitiveness desired) it is withdrawn and washed with water and submitted to the action of a dilute alkaline solution, such as a solution of potash soda ammonia or the alkaline salts of these and allied bases. The method I usually adopt is to dissolve 240 grains of caustic potash (hydrate) in eight ounces of distilled water as a stock solution; of this I take forty minims, and add it to eight ounces of water to make the alkaline bath. The plate is allowed to remain in this bath from ten to fifteen minutes, and is then transferred to a solution of gelatine containing preferably forty grains of dry gelatine to a pint of water, in which it may remain from fifteen to forty-five minutes. It is next passed into a dilute solution of a soluble iodide or bromide such as iodide or bromide of potassium, ammonium sodium, or the like, in which it may remain from ten to fifteen minutes. The iodide bath which is preferable may be thus prepared:—iodide of potassium, eight grains; water, eight ounces; half a drachm of this solution is added to eight ounces of water to make the bath.

The object of this last described treatment is to convert the silver bromide, chloride, or chloro-bromide into corresponding compounds of iodo-bromide, iodo-chloride, and iodo-bromo-chloride of silver. These iodine compounds can only be successfully produced by this method of displacement, for if a soluble iodide is added to the bath, re-sensitizing with silver nitrate becomes necessary. The employment of the iodide, on the other hand, confers great advantages both as to sensitiveness, freedom from fog, and susceptibility of development. The plate, after the treatment described, may be washed in water. Having at this stage acquired its full sensitiveness, it may either be used at once as a wet plate, or be saturated with any of the well-known preservatives, such as gum, gelatine, dextrine, sugar, or analogous substances, and either be dried spontaneously, or by the suitable application of heat. The preservation does not either exalt or diminish the sensitiveness.

It is scarcely necessary to remark that all the processes described, as well as those hereinafter described, excepting the preparation of the collodion and solutions, must be conducted in a low non-actinic light.

In another of my improvements which I have referred to as the acid bath process, I make collodion after the customary method, that is, I charge it with iodides, bromides, or chlorides, or mixtures of these salts soluble in alcohol and ether. I submerge the plate or surface coated with such prepared collodion for periods varying from five to forty-five minutes in a nitrate of silver bath charged with salts which are compounds of haloid silver salts with silver nitrate; that is, iodo-nitrate of silver, bromo-nitrate of silver, chloro-nitrate of silver, or compounds of these, such as iodo-bromo-nitrate of silver, iodo-chloro-nitrate of silver, and iodo-bromo-chloro-nitrate of silver. I form these salts in their crystalline state, and add them in quantities sufficient to saturate the silver solution used as a bath,

The full sensitiveness conferred hy haths of the kind last described is only obtained hy the use of unusual proportions of nitric acid. From 40 to 100 minims of dilute nitric acid of specific gravity 1·101 to each ounce of bath solution. A larger proportion confers higher sensitiveness, hut it produces rottenness pf the film. A bath of the kind referred to may havc the composition and may he prepared as follows:—

Silver nitrate	... 560 grains
Dilute nitric acid	... 640 minims
Distilled water	... 8 ounces

Add the acid to the water and dissolve in it the silver nitrate; lastly add iodo-bromo-silver-nitrate or allied compound silver salts to saturation.

These compound salts of silver haloid and silver nitrate are prepared by adding silver iodide, bromide, or chloride, or silver iodo-bromide, or silver iodo-bromo-chloride, to concentrated hot solutions of silver nitrate to saturation. When the solutions become quite cold the compound salts will he deposited, and may be collected and transferred to the silver solution prepared for the hath. This solution should then be kept in a warm place for several days and shaken or stirred at intervals to ensure saturation. The film or plate on removal from the hath is washed with distilled water, and, as in the former process, passed through the gelatine and iodide haths, after which it may be washed in water and used as a wet plate, or preserved as in the manner hereinhefore described, dried, and used as a dry plate. In this process the alkaline bath is omitted.

The ultimate sensitiveness of the photographic surface obtained will he related hoth to the length of time the film is in the bath, and to the temperature of the latter which may be used from 84° to 150° Fahrenheit. These films progressively undergo the well-known molecular changes from ruhy to hlue hy transmitted light while in the silver hath.

My invention further consists in the preparation of photographic plates or films by means of collodion emulsion, inasmuch as these emulsions, whether prepared with the soluble bromide or the silver nitrate in excess, may have exalted sensitiveness conferred upon them by the methods described in the foregoing bath processes. In an emulsion with soluhle bromide in excess the emulsion or film is treated after washing with the alkaline bath or wash, and suhsequently with the solutions of gelatine and alkaline iodide, and finally preserved and dried as in the previously described processes.

In the case of an emulsion in which the silver nitrate is to remain in excess, the emulsion must he prepared in the first instance with a solution of silver nitrate saturated as in the acid hatb process with iodo-nitrate of silver; iodo-bromide or chloride of silver, or mixtures or compounds of these salts.

After washing the emulsion the film must be treated with solutions of gelatine and iodide, and washed, dried, and preserved, as in the preceding cases.

In the preparation of an alkaline emulsion, that is one with the soluhle bromide in excess, the greatest sensitiveness is obtained by the use of the bromides of the alkalies rather than those of the earths and heavy metals.

Plates or films prepared by any of the processes hereinbefore described are equal, if not superior, to gelatine plates in their sensitiveness to light. They may he readily developed with the ordinary chemical developers, such as ferrous oxalate of potash, or alkaline pyrogallic acid, or hydroquinone, and fixed either with solutions of hyposulphite of soda or cyanide of potassium.

The exposing of plates treated according to my invention in the camera obscura, their development, fixing, and drying, and complete praparation for printing from, may be effected in about a quarter of an hour.

In the description of my invention hereinbefore given I have indicated the particular materials which I prefer to employ, and the proportions which I have found to answer well in practice. I have also described the best methods with which I am acquainted of conducting the processes iuvolved in the practice of my invention. But I wish it to be understood that I do not limit myself to the use of any particular materials, as materials chemically analogous to those I have described may be employed, neither do I limit myself to the strengths indicated of the solutions employed, nor to the precise order of their application, nor to the temperatures at which the processes are conducted.

Having now particularly described and ascertained the nature of my invention, and the manner in which the same is to he performed, I declare that I claim as my invention of "Improvements in the Production of Collodion Photographic Films or Surfaces of Exalted Sensitiveness:"—

First. The method herein described of producing a silvered or agentised collodion containing such an amount of silver nitrate as will form, when treated with an aqueous solution of iodide, bromide, or other analogous salts of potassium, sodium, or ammonium, or other hase, a film or surface of sufficient thickness and density to give intense images and insure freedom from halation substantially as described.

Second. The improvement of the sensitiveness of such films or surfaces hy the addition of alcohol and ether to the before-mentioned aqueous solutions of iodide, hromide, or other analogous salts of potassium, sodium, or ammonium, or other base, substantially as described.

Third. The use of alkalies, alkaline carbonates, or allied salts as sensitisers of films or surfaces or emulsions which have been produced in an excess of soluble haloids, substantially as described.

Fourth. The usc of a weak solution of gelatine, not as a vehicle, or preservative, hut as a direct sensitiser of the haloid silver salts, substantially as described.

Fifth. Treating the film or surface with very dilute solutions of iodides and bromides to convert the bromides or chlorides of silver in the film or surface or in the emulsion into compound salts of iodo-bromide or iodo-chloride or iodo-bromo-chloride of silver possessing more exalted sensitiveness, and finishing the film or surface, suhstantially as described.

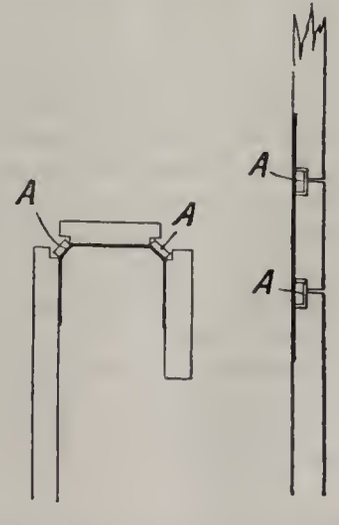
Sixth. The employment of collodion charged in the usual way with haloid salts of potassium, sodium, ammonium, and the like, and treating the film or surface obtained hy the use of the said collodion with a solutiou of silver nitrate charged preferably to saturation with iodo- or hromo-nitrate of silver or compounds of these and other analogous salts or salts of silver, and containing free nitric acid, suhstantially as described.

Seventh. The employment of the materials and processes referred to in the preceding claims to the production of emulsions for the formation of photographic films or surfaces, substantially as described.

14,696. William Watson, 22a, Church Street, Islington, London, Photographic Camera Manufacturer, for "Improvement in the Hinge of Shutters used in Dark Slides for Photographic Purpose."—Dated 12th October, 1888.

The Patentee says:—

I construct the joint with a rebate about alike in size on the abutting portions of the shutter. I place these together in such



a manuer as they form together a continuous groove (and not after the manner in which they are ordinarily put together, so that the projection of the one part fits into the recess of the other part). Into this groove I fit a continuous piece of any suitable material, such as hard wood or vulcanite fihre, or such like material; the joints are then covered with Jane, or similar material, after the ordinary manner.

In order tbat my improvements may be more fully understood, I will now proceed to describe the figures on the sheet of drawings which were lodged, with my application for a Provisional Protection, on the 12th day of October, 1888, in which I havo illustrated my said improvements by two drawings respectively showing the hinge open and shut, in which the piece marked A

is the piece hereinbefore referred to as being placed in the rebated portion of the abutting edges of the shutter.

As my improvements are capable of some modifications without departing from the principle thereof, I do not restrict myself to materials, dimensions, or the precise placement of the piece marked A, or of the rebates to receive the same.

Notes.

In order to put before our readers a press of exceptionally interesting matter, it is intended next week to issue a double number of the Photographic News.

It has for some time been the fashion to suggest that the one person a photograph does not resemble is the individual whose likeness it purports to be. Nothing is easier to make, indeed, than this very cheap kind of journalistic fun, it being too generally held that as long as a smart paragraph is written, it matters little whether or not it is closely associated with truth. The Executive Council of the great French International Exhibition have lately taken a step, however, which cannot very well fail to rehabilitate the character of the lately much discredited carte-de-visite. For what the authorities in question have done is to require each applicant for a season ticket to send them two of his own photographs, one of which, having been duly stamped and *viséd*, &c., is returned to its sender in order that it may be used as his or her season ticket during the time the Exhibition is open. Clearly, then, the French Exhibition people have no doubt of the value of a photographic portrait as a means of identifying the individual whose likeness it is. Otherwise they would scarcely adopt the photographic method of checking unauthorised admissions, or depend so completely on what, if smart paragraphists are to be believed, is an utterly unreliable test of personal identity.

At the same time we are quite ready to admit that the wide-spread use of the photograph season tickets can scarcely be expected to in all cases furnish an infallible mode of identification. Persons often change appreciably in appearance from day to day, and what with varying health, changing hirsute development, and altered sartorial accessories, it is certain that the season-ticket holder will sometimes bear little apparent resemblance to their season ticket. On the whole, however, the plan adopted may be expected to work satisfactorily, and the exceptions will only serve to prove the indubitable rule that photographic portraits are not so misleading as it has been of late the custom to make them out to be.

Religious persons of the old-fashioned school must be puzzled at the anxiety of the leaders of the High Church movement to see how they look in full canonicals. The fashion was set many years ago by the late Father Maconochie, who was one of the first to be photographed in all the glory of cope and chasuble. Since then most of the prominent men have yielded to the pardonable desire of seeing themselves as others see them, and no one has done so more extensively than the Bishop of Lincoln. It is, however, scarcely correct to say, as the *Globe* says, that the prosecution has brought his photographs into notoriety as the reverse is rather the case. The photographs of the Bishop in costume have been exhibited for so long, and such numbers have been distributed broadcast throughout his diocese, that the chances are the Low Church party have been exasperated by them into urging on the prosecution.

Anyway, there is a very large demand for what may be called ecclesiastical photographs. According to the *Banner*, an episcopal portrait which is selling well is that of the Bishop of Truro, seated in an "ecclesiastical chair," accompanied by a young chaplain, his son, holding his pastoral staff. The Bishop of Truro, however, has taken care not to offend the susceptibilities of any one, and he is without the mitre and cope, which are looked upon with such horror in certain quarters. Extremes certainly meet when we find in shop windows portraits of the ladies of the ballet elbowing those of dignitaries of the Church. But there is no harm in it. If the public derive pleasure from gazing at the features of their favourite, whether of the Church or the stage, why should it not be gratified?

We should not be surprised to hear that a good deal of heart-burning has been caused by the photographic prizes offered by the proprietor of an infants' food, and referred to last week. Imagine the distress of a mamma who, after carefully rearing her baby on Stodge's Food, and quite sure of a prize, finds that the child insists upon moving when photographed, and refuses to "come out" well. In despair she selects the photograph that has the least number of eyes and the nearest approach to a nose, and forwards it for competition, with the consequence which may be easily guessed. She gets no prize, and puts the blame on the photographer. Or we may suppose another case. Papa, who is an amateur, may try to do the job himself. No prize is awarded, not because the photograph is bad, but because the baby is not "characterised by the greatest beauty and best form." This, however, mamma will never believe, and "poor Pa" is made to feel sorry that he ever undertook to "do the baby." On the whole, this competition is a very instructive and entertaining one, and we should like to have more information about it.

Our review of Dr. Emmerson's "Naturalistic Photography" is postponed for a week or so, because we find the need of looking far more carefully into the book than we have been able to do during the fortnight which has elapsed since its receipt.

Dr. Emmerson is an innovator, and he is doing what innovators generally do. He is putting into clear expression ideas which have been rising now and then, but somewhat vaguely in men's minds. He seeks to make photography an exponent of that which the man himself sees, rather than of that which man and telescope may see. Indeed, he seeks to fill the aim of the best type of pictorial artist. The book (published at five shillings by Messrs. Sampson, Low, and Co., of Fetter Lane) is well worth

reading by any photographer who cares to make an effort to think while reading; but those who read so superficially as never to take the mind beyond the words of the author, had better not read it.

Youthful monarchs of the present day have a bitter experience from which their forefathers were free: they have to submit to be photographed not once, as is the case with ordinary children, but many times. A child has no objection, as a rule, to the operation when it is a novelty, but the repetition of the process is a great trial of its patience, especially when it has discovered the artifices of the photographer, and has got tired of looking at the box from which the promised doll or horse never emerges. The infant King of Spain is said to have suffered a good deal at the hands of phohographers, the more so as he is rather a pretty child with a laughing face, and fair hair falling down over his shoulders. As the *Court Journal* remarks, "No wonder the wily photographer is the plague of the King of Spain's young life."

An awkward *contretemps* happened the other day in connection with an illustrated paper. It had to give a couple of portraits, both of bearded men; and the artist, omitting to return the photographs from which the portraits were drawn, and on which the names were written, the sub-editor was in the position of having to choose for himself which was which. He had once seen one of the originals, but not the other, and, accordingly, he selected the portrait most like the man he had seen. Unfortunately, the portrait he chose was that of the other man; but he was certainly justified in his choice, for a local paper, looking after the interests of the district in which one of the originals resided, spoke of the portrait as being an excellent likeness of Mr. Smith. Mr. Smith, however, did not think so, and was very indignant. It turned out that Mr. Smith himself was not wholly free from blame, for he had committed the very common fault of sending a photograph taken fifteen or twenty years ago. Naturally the sub-editor failed to recognize in the unwrinkled face, carefully combed hair and beard of the photo., the elderly man with the slightly bald head and grey beard whom he had seen. Hence he gave the young-looking portrait to Mr. Jones, and put the elderly portrait to Mr. Smith. Mr. Jones, being the best off, did not complain; but poor Mr. Smith—well, his mental agony was extreme; nor did he find consolation in the comment of the local paper, that the portrait was an excellent one.

Mr. Bell, in a letter which appears in another place, raises an issue concerning which much may be said, the reasonableness of an assistant in expecting some sort of a reference, even if a bad one, from a late employer.

Amateur photographers have a good deal to put up with. Their sitters are so dreadfully candid, and not infrequently look upon the photographer's productions as subjects for "chaff." It is not always that an amateur gets a lady so polite and considerate as one did the other day. After making half-a-dozen different attempts, each one worse than the last, he said, in a voice tinged with despair, "I'm afraid I hav'nt quite caught your expression." "Well, not exactly," she was beginning, when, seeing the look of disappointment on his face, she quickly added, "but it's all right, because you know, as the portrait is to be a surprise for my husband, perhaps it will be just as well if he does not recognise it at the first glance!"

In no way have the two envoys of King Matabele shown their discretion to more advantage than in their determination to secure photographs of all the more wonderful things which have been shown them, so taken as to include their own figures in close juxtaposition to the marvels represented on the negatives. They contend, with unanswerable force, that were they to return to their own land unprovided with such optical evidence of the reality of their reports, their monarch and their fellow chiefs would laugh their more astounding statements to scorn. But when, having detailed, let us say, the wonderful attributes of the "Woolwich Infant," they are actually able to produce a photograph of that monster gun, with their dusky forms serving—to use a heraldic term—as its "supporters," the production of this ocular proof cannot well fail to impress their dusky sovereign much more than any amount of verbal reiteration. The joint notion of the two envoys Umshete and Bobajane is, in fact, such an excellent one, that we earnestly commend it to all future "globe trotters" who may intend to give to the public an account of their adventures. The more wonderful the latter may be, the more is the accompanying photograph to be desired.

And what a pity it is that our travellers in the past did not hit upon this method of proving their veracity. Mr. Paul du Chaillu might have saved himself no end of unpleasantness had he only supplemented his sensational account of the gorilla which used its dilated chest as a big drum, with a negative of the brute performing its instrumental solo, and of M. Chaillu himself listening with a kind of fascinating dread. How many a bitter controversy at the Royal Geographical Society meeting might have been saved, too, had all the more astounding statements of Stanley, and other explorers, been backed up by photographic evidence. Had travellers only taken a long shot now and then with the camera, they need never have been accused of taking them with the long bow.

Let would-be explorers be assured that a simple photograph is often worth a whole chapter of the most elaborate notes. That seeing is believing is a trite saying which is as current in this country as it is in Matabele's land; and now that cameras are so diminutive, and dry plates so closely packed, travellers will have only themselves to blame if they do not found all their more sensational statements on the sound basis of photographic fact.

"LONDON LIFE."

As Seen by an Artist.

by wide angle.

Mr. A. Ludovici, whose sketches are now being exhibited at Messrs. Dowdeswell's, has missed doing a good thing. There is an opening for an artist to study London people,

as Mr. Herbert Marshall has studied London streets, but Mr. Ludovici has not availed himself of the opportunity. To say the truth, his trainiug, as evidenced by his exhibited pictures, has not fitted him for the task, nor can it be said that Whistler imitated is the style in which "London Life" can be best represented. To take Mr. Ludovici's notion of a cab shelter, for instance. As a "Note" *a la* Whistler, in whatever scheme of colour one may please to call it, this curious cab shelter might pass, because the more indefined and vague the picture, the higher place it occupies in the opinion of the best judges of "Notes." As a cab shelter it is certainly a failure. Apsley House is an improvement, and the aspect of a dull, grey, bleak, windy London day is successfully conveyed ; but what has Mr. Ludovici beeu about with the Royal Exchange ? I have nothing to say against his flower girls if they are not to be considered as portraits, but I protest against the building being removed fifty feet or thercabouts, so as to bring it close against the pedestal of the Duke of Wellington's statue. Liberties such as these may be taken with Vienna or St. Petersburgh, but London buildings, to be looked at by London people, ought to be a little near the mark.

No. 5, entitled "A Fare," represents a typical London girl, most likely one of the ladies of the ballet, whom Mr. Ludovici is so fond of paintiug, stepping into a hansom and speaking to the driver over the roof. Mr. Ludovici is as unfortunate with the cab as he is with the cab shelter. Such a squat vehicle was never seen before, while the distance from the driver to the grouud is at least two feet shorter than it should be. When a hansom cabuan is hailed by a lady he gallantly leans over the top of the cab, so as to throw the weight in front, and thus lower the step for the accommodation of the fair fare. Mr. Ludovici's cabman is sitting stolidly back, while the vehicle itself is so low that the lady will probably crush her bonnet when she steps inside. Of course this is a small matter, but London life is made up of small matters, and not to take notice of them shows but a superficial acquaintance with the subject.

"Oranges and Watercress" is orly noticeable for the way in which Mr. Ludovici has entirely missed the colour of both. His oranges are vapid, his watercress such as no one would buy. Nor does the seller make amends. In "Doorsteps," where a servant girl is having a mild flirtation with a butcher boy, he is more fortunate. The pose of the girl wringing the flannel is very happy, more happy, indeed, than the expression of her face, which lacks character. "The Ladies' Restaurant" shows some skill, but no more than is necessary for the foundation of a wood-cut for an illustrated paper. Another picture of a restaurant entitled "Luncheon Time," may be true to London life, but preserve me from so gaunt and desolate a place to have luucheon in. Mr. Ludovici's demon of dullness pursues him into another eating place, the Café Royal, which the habitués will scarcely recognise.

In some respects, "Sailing Boats on the Serpentine" is very happy. The grouping of the children is pretty, the water and sky are well rendered, but one would be thankful for a gleam of sunshine. It is Mr. Ludovici's fancy to ignore the sun. To his pictures of "Henley Regatta," which he chooses to call a portion of London life, the most joyous scene which can well be imagined, he has imparted a sadness which totally falsifies the effect. The photographs of the Regatta, with their brightly picked out lights and deep shadows, give a far better idea of sunshine than do Mr. Ludovici's pictures, though they have the assistance of colour.

"Cricket on Hampstead Heath" is marred by the defect just mentioned ; it is cold and tame. In "Kites on Primrose Hill," the wonder is that such solid kites can rise in the air. "Duck and Darlings, Regents Park," may be commended, but one may well ask of "Parrots at the Zoo," whether they are not drawn from pantomimic property models, so abnormal are they in size. "Kensington Gardens ;" "Bears and Buns, Zoological Gardens ;" "Illuminating the Gardens ;" "Italian Exhibition," call for no comment ; nor need reference be made to the "Bits" representiug a pantomime rehearsal at Drury Lane. Mr. Ludovici has already given us a good deal of life behind the scenes, and it is difficult to see why he should paint any more of this kind of thing. His pantomimic children are dolls in a fog, with dots for their eyes, aud a dab of paint for their noses and mouths, and the public can well be spared them.

On the whole, it must be said that Mr. Ludovici has not succeeded in his attempts at portraying London life, and his failure should stimulate some photographer who has the leisure and perseverance to see what photography can do in this direction. There must be an enormous field of queer bits of character in the London streets. Of course they need an infiuite amount of patience, and a little good luck, to secure, but the difficulties are not insurmountable.

PHOTOGRAPHY AND THE LAW OF ERROR.

BY CAPTAIN ABNEY, C.B., F.R.S.*

The Conference, I hope, will excuse such an uncanny title as that which I have chosen. It looks odd, to say the least, seemingly indicating that photography is subject to errors of some description. I am not going to enter into any optical errors to which it is liable, but only to its inability to render truthfully the gradations of black and white. A question which I have often asked myself is this : in a negative or in a print, do the values in density of deposit, that is, in the translucency of the former and in the blackness of the latter, have any relation to the value in intensity of the light acting to produce such density or blackness ? This question, as I have said, I have very often asked myself, as my writings will show ; bnt it is only quite recently that I have been able to answer the question satisfactorily to myself, and I hope it will appear equally satisfactory to the meeting.

If au initial impact of light has to be given in order that any action may be visible on a negative or print on development, we may suppose, after such an impact, that equal increments of intensity in light will give equal increments of action on the sensitive salt; but it by no means follows that the density of deposit will proceed by equal increments. As an exampla, if we take an intensity of light, which we may represent by 1, and another intensity of light, which we may represent by 2, and allow them to act on different parts of the same plate, it by no means follows that on development the opacity caused by the latter will be double that caused by the former. We may look at it in this way : if we have "n" circular discs of very thin metallic silver, and place them at random on an area of a given size, it may be or may not be that some will overlap others ; but the chances are much greater that, if we have 2 n of these discs and scatter them at random on the same area, some will overlap others. Suppose in the case of the n discs none overlapped, but that in the case of the 2 n discs some did, and if the area of each disc was a and the area of the surface on which they were scattered was A, then in the first case the transparency of the surfaces to light would be measured by $(A-na)$, and in the second $A-(2na-2nk)=A-2n(a-k)$, where k is the amonnt of average overlap of the discs. Evidently, then, the transparency of the last area would not be twice that of the former. In the same manner it can be argued that by increasing ths number of particles to 3, 4, &c., the "n" transparency would not be proportional to the number of particles scattered. This is exactly what occurs when light acts on a film. The number of particles of deposited silver in a given area are presumably proportional to the intensity of the light acting, bnt they are in a sense scattered at random over that area, and hence some overlap, and the overlapping increases as the number of particles increase. If this were not so we onght to have an intensity of light in which absolute opacity is introdnced after a certain exposure, which we know is not the case.

Were it so in a Spurge's sensitometer, in which the light admitted to each chamber increases 2^2, we ought, if we know the size of a particle, to be able to calculate the curve of descent. This can be readily done, for if we measured the transparency of the part of the plate where the intensity of the light was

* A communication to the Conference.

known, then that would give us a measure of the areas of the particles deposited, and we ought to be able to calculate the transparency for any other intensity of light. Thus on a sensitometer plate, if the smallest hole gave a transparency to light of $\frac{99}{100}$ of the original light falling on it, then we should know that the silver deposit was $\frac{1}{100}$ of the area on which it was scattered. At the fourth smallest hole, where the light acting is doubled, the silver would occupy $\frac{2}{100}$ of the area, and the transparency would be $\frac{98}{100}$; at the seventh hole it would be $\frac{4}{100}$ and the transparency $\frac{96}{100}$; similarly the tenth hole would give $\frac{92}{100}$, the thirteenth $\frac{84}{100}$, the sixteenth $\frac{68}{100}$, the nineteenth $\frac{36}{100}$ of transparency, while the twenty-second would cause total opacity of deposit.

Now, from absolute measurement we know that such is not the case; the curve which a developed plate exposed in the sensitometer takes is very different, as the diagrams show. The curve which the transparency takes is identical with the curve of error of observation, taking for abscissæ the number of the holes and not their area. I may refer you to Sir G. Airy's book on the "Theory of Errors," and there you will find that the probability of an observation being at a certain distance from the truth is expressed by the formula

$$A' = A\epsilon^{-kx^2}$$

where A' is the probability of error, and x the distance from the truth.

I should like here to give the measurements of the apertures of a sensitometer made on Spurge's plan, in order to show the accuracy which is attainable by it. The holes were measured by a micrometer made by Hilger, which is capable of measuring to $\frac{1}{100000}$ of an inch. The following measures were made in $\frac{1}{10000}$ of an inch. The largest hole is indicated as having the highest number, the holes are intended to diminish in area by $\frac{1}{2^3}$.

Hole No.	Theoretical.		Measured.	
	Diameter: ten thousandths.	Area.	Diameter: ten thousandths.	Area.
30	4560	1633	4560	1633
29	4017	1267	4063	1296
28	3605	1017	3620	1029
27	3202	814	3220	817
26	2856	642	2873	648
25	2497	491	2560	515
24	2290	412	2280	409
23	2031	324	2030	324
22	1818	260	1810	258
21	1642	211	1610	204
20	1439	162	1436	162
19	1260	122	1280	129
18	1145	102	1140	102
17	1010	81	1010	81
16	894	62·7	905	64·5
15	800	50·3	806	51·0
14	724	41·2	718	40·5
13	650	32·2	640	32·2
12	554	24·1	570	25·5
11	512	20·6	508	20·2
10	465	17·0	452	16·1
9	416	13·6	403	12·8
8	358	10·1	359	10·1
7	305	7·3	320	8·1
6	285	6·4	285	6·4
5	231	4·15	231	4·15
4	217	3·7	226	4·0
3	194	2·9	202	3·2
2	181	2·5	179	2·5
1	158	2·0	160	2·0

The boring of the holes will be seen to be very accurate, and the deviation from what was desired is as small as can be expected. In the very small holes the percentage of error is much larger than in the large ones, which might be anticipated. In my experiments the twenty largest holes were all that were utilised, and in these the error is certainly small enough to be negligible.

I must here put in a word to ask photographers to conduct experiments of this description with as much accuracy as possible. There is a degree of refinement in photographic experiments which is often quite unnecessary; but, on the other hand, the phrase "about so much" should never be used, unless it can be shown that such an approximation is sufficient.

Let me explain how the experiments were conducted. A gelatine, or other plate, was placed in the sensitometer and exposed for a given time to the light from an equally-illuminated surface. It was developed and placed in the apparatus for measuring the transparency of the deposit, as I have recently described. The number of the holes was then placed as the scale for the base of the curve, and the transparency of each set up as an ordinate; a curved line was drawn through the extremities of these ordinates.

In the formula $A' = A\epsilon^{-kx^2}$, x was the number of holes from the first hole in which the action of light was apparently *nil*. To find k, x was taken some way down the scale, and the value of A' (which, in this case, was transparency of deposit) was taken from the curve A, the total transparency was also known. This gave k. Using this value of k, the transparency of deposit was calculated for each ordinate, and, as before stated, the resulting curve was found to agree with that plotted.

I cannot say exactly, at the present time, why the formula does apply to photographic plates, though the theory would seem to point to a connection between the transpareney and deposit in the way I have indicated. Professor Rücker and myself have both had a try at the adaptation, but have not yet finished our investigations. It is, however, none the less true that the formula holds good when a negative is developed, or when a platinum print is developed, allowing for the light reflected from the platinum as well as from the background of white paper, as the examples I give show. But it does not hold good in the case of a silver print, for reasons which, I trust, you will appreciate. When light acts on chloride of silver it blackens it, and after the first short impact of light, of course, the subsequent light has to struggle through the various intensities of blackness to reach the silver salt below, and this must necessarily modify the result. On the other hand, when a plate is exposed to light, the change in colour is so small that, practically, the light has only to struggle through the silver salt in its pristine state. The same applies very nearly to a platinum print, in which the change in colour of the iron salt is small.

In the appended table are two examples of the theoretical and observed curves, one being a gelatine plate and the other a platinum print.

Bromo-Iodide Gelatine Plate.

No. of Hole.	Observed Transparency.	Calculated Transparency.
1	124	—
3	118	117
4	114	111
5	105	103
6	94	92·5
7	83	81
8	71	70
9	59	59
10	50	48·6
11	39	38·7
12	29·5	30·6
13	23	23·1
14	17	17·5
15	13	13·3
16	9	9
17	7	6·5
18	5	4·4
19	3	2·8

In the formula—

$A' = A\epsilon^{-kx^2}$
$A = 124$
$k = \cdot0116.$

Platinum Print.

Abscissæ (No. of Holes).	Observed Reflected Light.	Calculated Reflected Light.
1	45	45
2	45	45
3	44	43·7
4	42	42
5	40	40
6	37·5	37·5
7	35	34·6
8	32	31·7
9	29	28·8
10	26	25·1
11	22	22
12	19·5	19·1
13	17	15·9
14	13·5	13·3
15	11·5	10·9
16	9	8·9
17	7	7
18	5	5·6
19	4·5	4·5
20	3·5	3·4

In the formula—

$A' = A\epsilon^{-kx^2}$
$A = 45$
$k = \cdot0072.$

CHEMICAL CHANGES FROM THE MODERN POINT OF VIEW.

BY C. H. BOTHAMLEY, F.I.C., F.C.S.*

The development of the science of energy and the establishment of the great principle of the conservation of energy, following

* A communication to the Conference.

upon that of the conservation of matter, has naturally exerted great influence on the development of chemistry, and on the attitude of present-day chemists towards the problems with which they have to deal. The application of what are commonly called physical methods to the solution of chemical problems is becoming more and more frequent, and it may now be taken as recognised that, so far as it is possible to draw a distinction between them, experimental physics is the mechanics of masses and molecnles, whilst chemistry is essentially the mechanics of the atoms.

It is not possible, in the time at my disposal, nor would it be desirable before this audience, to enter upon anything like a complete technical discussion of this aspect of the subject. All I can attempt is to indicate in a very general way the character of the phenomena, and the nature of the considerations which have to be taken into account. Chemical changes which seem to be simple present a considerable degree of complexity when they come to be closely examined, and many of the reactions with which we, as photographers, have to deal, are of a particularly complicated character, and their proper investigation involves more than an elementary knowledge of physics and chemistry, if, indeed, their solution is possible at all in the present condition of our knowledge. It is probably too much to hope that this paper will do anything towards checking or improving the hopelessly inaccurate chemical speculation, and the loose and unscientific treatment of chemical problems which, unfortunately, characterises so much of the photographic literaturo in this country and in America; but if that result were to follow, even in a small degree, any trouble which the preparation of this paper has involved would be amply repaid.

The modern view of chemical changes is, in a word, a dynamical view, and the adoption of physical methods has necessarily led to the adoption of physical phraseology. It will therefore be convenient to defino at once some of the terms which we shall frequently have to use. A system is a body, or a group of bodies, to which, for the purpose of our investigation, we exclnsively confine our attention; it may be of any magnitude we please, and may consist, say, of a single molecule of water, or may include thc whole solar system. The configuration of a system, at any given instant, is the relative arrangement of all the parts of the system at that instant.* The velocity of a reaction is the rate at which chemical change takes place, and is measured by the quantity of a given substance formed or decomposed in unit time. The limit of a reaction is the amount of change which has taken place when a condition of equilibrium is established and the reaction ceases; it is generally expressed as a percentage of the total change theoretically possible.

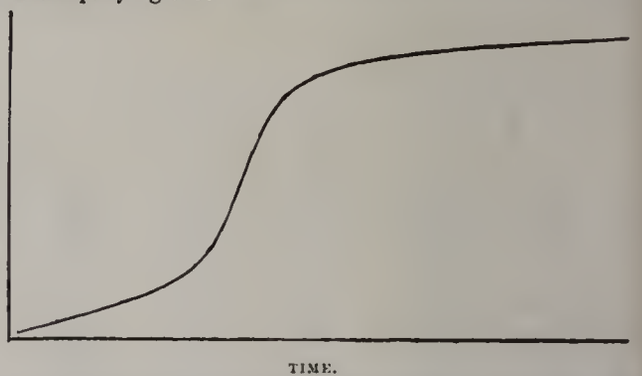
Complete knowledge of a chemical change involves a knowledge of the initial and final distribution of matter, as indicated by the composition and quantities of the reacting bodies and the products; and a knowledge of the initial and final distribution of energy as deduced from the distribution of the matter, and from the quantity of energy which is liberated or absorbed in the form of heat or electricity during the reaction. It also involves a knowledge of the conditions under which the change will take place, its velocity, and its limit; and of the way in which these quantities are affected by the temperature, concentration, and relative masses of the reacting substances.

Every chemical change is so intimately associated with physical changes, that we are obliged to consider them in connection with each other, and in some eases find it very difficult to distinguish between them. In many cases the velocity and limit, the direction, and even the very occurrence of a reaction, are dependent upon the physical conditions. This has been recognised for some time. If, for example, a solution of ammonium carbonate is added to a solntion of calcium chloride, calcium carbonate is precipitated and ammonium chloride remains in solution; but if, on the other hand, solid calcium carbonate is heated with solid ammonium chloride, ammonium carbonate is volatilised and calcium chloride is left behind. The direction of the change is determined in the first case by the insolubility, and in the second case by the volatility, of one of the products, which removes it from the sphere of action, and thus prevents anything of the nature of a reverse action.

It has long been known that the occurrence or non-occurrence of a chemical change is dependent not only on the nature of the substances which are brought together, but also on the temperature. Sulphur, for example, remains unaltered in the air at the ordinary temperature, but takes fire if heated. It has recently been found, however, that the presence or absence of very minute quantities of certain substances may exert a very great influence. Dry carbonic oxide will not burn in perfectly dry air or oxygen, and a mixture of the two gases will not explode unless a minute quantity of water is present; perfectly dry sulphur, carbon, and even phosphorns, will not burn, in the ordinary sense of the word, in dry oxygen. We have, of course, analogons phenomena in the case of those silver compounds which are not affected by radiation, except when in contact with the various redncing agents which we call sensitisers. A satisfactory explanation is in many cases not yet forthcoming, but the importanco of the observations is obvious.

The velocity and limit of a reaction are determined hy the natnre of the substances, their relative masses, the concentration of the solutions, the temperature, and in some cases the pressure, and other conditions. If we take, as an example, the reaction between ordinary alum and hypo, which takes place in accordance with the following equation:—K_2SO_4, $Al_2(SO_4)_3 + 3Na_2S_2O_3 + 3H_2O = K_2SO_4 + 3Na_2SO_4 + 3SO_2 + S_3 + Al_2(OH)_6$,—we find that if we mix the two solutions and heat them, the formation of a precipitate takes place more rapidly and more abundantly than if we allow them to remain at the ordinary temperature. If we mix equal volumes of 5 per cent. solutions of the two salts, and equal volumes of ten per cent solntions, the formation of a precipitate is more rapid in the second case. Direct experiment shows, however, that the limit of this particular reaction is always the same, and if sufficient time is given, either the alum or the hypo is completely decomposed.

In most cases it is found that the velocity of a chemical change is at first very small, but increases rapidly and attains a maximum, then decreases very gradually as the reaction approaches completion. If the progress of decomposition is represented by a curve in which the abscissæ represent the time, and the ordinates the amount of change, the general nature of the cnrve is shown by the accompanying cnt:—



We are compelled ultimately to attribute chemical combination and all chemical changes to the existence of some force of the nature of attraction, which is exerted in different degrees between the atoms of the different elements, and to which we give tho name chemical affinity. The older chemists drew up Tables of Affinity, which were snpposed to show the relative attractions of substanccs for one another, and the order in which they can displace one another from compounds. It was, however, soon recognised that the relative affinities vary with the conditions, and so early as 1775 Bergmann constructed different tables of affinity for high and low temperatures. The following small table, for example, shows the relative affinities of the different acids for potash, dependent upon whether the reaction takes placo in solution at comparativoly low temperatures, or between the solid substances at a high temperature:—*

In solution: low temperature.	*Solid: high temperature.*
Sulphuric acid.	Phosphoric acid.
Nitric acid.	Boric acid.
Hydrochloric acid.	Arsenic acid.
Phosphoric acid.	Snlphuric acid.
Arsenic acid.	Nitric acid.
Acetic acid.	Hydrochloric acid.

Later, attempts were mado to represent affinities by numbers, and it was laid down as a general principle that the snm of the affinities of the products of a reaction is always greater than the sum of the affinities of the original substances.

Our present knowledge teaches us that it is extremely difficult to draw up tables of affinities which shall be really useful, and hold good through any considerable range of conditions. Moreover, we have learnt that, in discussing any given chemical change, it is not permissible to follow the example of the older chemists

* Maxwell, "Matter and Motion."

* Muir, "Principles of Chemistry," p. 402.

and confine our attention to one or two products. Every one of the original substances, and every one of the products, be its proportion ever so small, must be taken into careful consideration. Take as an example the relative affinities of the haloid elements—chlorine, bromine, and iodine—for silver, a question which has for us a special interest. If we add a solution of silver nitrate to a solution containing potassium iodide, bromide, and chloride in about equal proportions, we find that the precipitate at first consists of silver iodide. When all the iodide has been precipitated, silver bromide begins to form; but it is not until all the bromine is thrown down that any considerable amount of silver chloride is formed. From this result we should write, in the order of their affinity for silver, iodine, bromine, chlorine. If, however, we take silver iodide and bring it in contact with bromine, silver bromide is formed and iodine is liberated; and if the silver bromide in its turn is brought in contact with chlorine, bromine is expelled and silver chloride is formed. From these results the order of affinity would be completely reversed—chlorine, bromine, iodine.

Now, it has been established by innumerable experiments that the quantity of energy in the form of heat liberated by the formation of a given compound under a given set of conditions is a constant quantity, which is known as the heat of formation of the compound. Further, the work which has to be done—*i.e.*, the quantity of energy in the form of heat, electricity, or radiant energy which is required to decompose a compound—is exactly equivalent to its heat of formation. It follows that compounds with the greatest heats of formation are the most difficult to decompose, and hence the heats of formation may be taken as measures of the strength of the attraction which the atoms have for one another, or, in other words, as a measure of their chemical affinities. It is also found that when substances which can react in different ways are brought together, there is a tendency to the occurrence of that particular reaction which liberates the greatest quantity of heat. This, in fact, is only a special case of the principle of the Dissipation of Energy, according to which the energy of the material universe, whilst remaining constant in amount, tends to pass into the form of heat and become evenly distributed. Quantities of heat are expressed in thermal units or calories, a major calorie being the quantity of heat required to raise the temperature of a kilogram of water by 1° C., and a minor calorie the quantity required to raise the temperature of a gramme of water 1° C. The action of the haloid salts of potassium on silver nitrate, all the substances being in solution, liberates the following quantities of heat:—

	Cals.
$AgNO_3$ diss. + KI diss. = AgI ppt. + KNO_3 diss.	26,440
$AgNO_3$ diss. + KBr diss. = AgBr ppt. + KNO_3 diss.	20,130
$AgNO_3$ diss. + KCl diss. = AgCl ppt. + KNO_3 diss.	15,870

The formation of the iodide in this way liberates more heat than the formation of the bromide; that of the bromide liberates more heat than that of the chloride. In accordance with the principle just stated, the tendency to form silver iodide should be greatest, and the tendency to form the chloride least, and this we have seen to be actually the case.

The heat liberated by the formation of each of the three compounds from its elements is found to be as follows:—

Silver iodide.	Silver bromide.	Silver chloride.
13,800 cals.	22,700 cals.	29,380 cals.

and since the heat liberated or absorbed in the conversion of one compound into another is the difference between their heats of formation, it is easy from these data to deduce—

AgI + Br = AgBr + I	liberates	8,900	cals.
13,800 22,700			
AgBr + Cl = AgCl + Br	liberates	6,680	cals.
22,700 29,380			

8,900 cals. and 6,680 cals. being the differences between the heats of formation of the iodide and bromide, and the bromide and chloride respectively. Here then we have the explanation of the second set of decompositions. How can we reconcile the two? Returning to the first set of changes, we find that we are dealing not only with the decomposition of a silver compound, but also with the decomposition of potassium compounds. Silver nitrate becomes silver iodide, bromide, or chloride; but potassium iodide, bromide, or chloride at the same time becomes potassium nitrate. The heats of formation of these salts are found experimentally to be as follows:—

Silver nitrate.	Potassium nitrate.	Potassium chloride.	Potassium bromide.	Potassium iodide.
23,300	110,960	101,170	90,230	75,020 cals.

Now, if we compare these numbers with those obtained previously, we find that—

$AgNO_3$ into AgI	= 13,800—23,300	= absorbs	9,500 cals.
$AgNO_3$ „ AgBr	= 22,700—23,300	= absorbs	600 „
$AgNO_3$ „ AgCl	= 29,380—23,300	= liberates	6,080 „

but

KI into KNO_3	= 110,960—75,020	= liberates	35,940 cals.
KBr „ KNO_3	= 110,960—90,230	= liberates	20,730 „
KCl „ KNO_3	= 110,960—101,170	= liberates	9,790 „

That is to say,—

1. The conversion of silver nitrate into the iodide absorbs 9,500 cals., but the conversion of potassium iodide into the nitrate liberates 35,940 cals.: giving a balance in favour of the reaction of 26,440 cals.

2. The conversion of silver nitrate into the bromide absorbs 600 cals., but the conversion of potassium bromide into the nitrate liberates 20,730 cals.: giving a balance in favour of the reaction of 20,130 cals.

3 The conversion of silver nitrate into the chloride liberates 6,080 cals., but the conversion of potassium chloride into the nitrate liberates only 9,790 cals., so that the total balance in favour of the reaction is only 15,870 cals.

In these cases it is evident that the direction of the reaction is determined by the circumstance that the heat disturbances accompanying the changes of the potassium salts are very much greater than those which accompany the changes of the silver salts in the opposite directions. Practically, the same results are obtained with ammonium or sodium salts in the place of those of potassium, and we have here a very striking instance of the importance of taking all the reacting bodies into consideration.

(*To be continued.*)

Correspondence.

MAY AN OPERATOR REASONABLY EXPECT A REFERENCE FROM A LATE EMPLOYER?

Dear Sir,—Will you kindly allow me to raise a point which affects the interests of both employers and employed, in relation to the question whether an operator may reasonably expect a reference on leaving his employer? I was in the employ of Mr. W. J. Byrne, of Richmond, in the capacity of assistant operator, having been with him two years. I left him of my own accord to improve my position, and have since lost two appointments on account of Mr. Byrne refusing to give me any reference whatever. The following correspondence explains itself:—

From J. H. K——, *London, 22nd March*, 1889, to G. H. Bell, *Lime Grove, Shepherd's Bush.*

Dear Sir,—I have written Messrs. Byrne and Co., and their reply is that they decline to give you a reference. Under the circumstances, I have no alternative but to regard your statements as not confirmed, and to decline an engagement.—Yours truly, J. H. K——.

Queensgate Studio, 42, Harrington Road, S.W.

To W. J. Byrne, Esq.

Dear Sir,—Mr. H. Bell has applied to me for an engagement, and gave you as a reference. I only want to know if he is sober and steady. Kindly reply per return, and oblige,—Yours faithfully, Henry Ashdown.

Hill Street, Richmond, Surrey, March 27, 1889

Henry Ashdown, Esq.

Dear Sir,—I beg to acknowledge the receipt of your letter of the 25th March, and decline to give Mr. Hamilton Bell a reference.—Yours very truly, W. J. Byrne.

Hill Street, Richmond, Surrey, March 27, 1889.

Mr. Hamilton Bell.

Sir,—We beg that you will not refer to us, as we decline to give you a reference.—Yours truly, Byrne and Co.

On the occasion of my entering Mr. Byrne's employment, he demanded and received first-class references. Is this just? Am I to be barred from any further prospects in my profession owing to the caprice of my late employer? If Mr. W. J. Byrne has any reasons for denying me what I consider my rights, he may perhaps be induced to reply to this letter through your columns; and I have no objection to his publishing any charge that he thinks he may have against me. I shall be glad, also, to have the opinions of your readers on this general question.—Yours truly, George Hamilton Bell.

Lime Grove, Shepherd's Bush, W., April 3rd, 1889.

Proceedings of Societies.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE usual meeting of the above was held in the Society's Rooms, Grand Hotel, on Thursday, March 28th, Mr. B. KARLEESE in the chair.

Messrs. H. S. Gent, C. F. King, J. C. Newey, F. P. Osborne, J. B. Stone, J.P., W. Shakespeare, and T. Taylor were elected members.

The HON. SECRETARY read a letter from Mr. J. B. Stone, J.P., suggesting a meeting of the Vesey Club and the Birmingham Photographic Society to promote the interests of advanced and historical photography. This was referred to the Council. Also letter from Mr. F. Hoskins, offering prize for the best enlargement (12 by 10) of an instantaneous picture of working objects taken with camera held in the hand.

Prizes were also offered by the lantern committee for the best six slides illustrating the City of Birmingham, and from Mr. J. H. Pickard, for the best three pictures to be taken on the Dovedale excursion.

Mr. WALTER GRIFFITHS then gave his paper on "Various Printing Processes."

During the discussion which followed, Mr. E. C. MIDDLETON said that aristotype paper was practically the same as Obernetter paper. He should like to ask if any one present knew how the blue process paper could be made to keep; he had known of some that would keep two years.

Mr. HARROLD BAKER mentioned the continuing action of carbon prints after exposure; they would go on printing even in the dark. The best plan was to place in a calcium tube after exposure, if required to keep them for development.

E. C. MIDDLETON: A warm damp atmosphere is conducive to the continuing action. There is a peculiar action of the carbon tissue. If an exposed carbon print is pressed against an unexposed strip of carbon tissue, an image will be formed as if it were placed under a negative, and by the continuing action a picture can be obtained. The Calotype process is a very rapid process. A printer can begin to pull off prints in twenty-five minutes from receiving the negative, and can get them at the rate of 300 prints per day. Line drawings can be made by printing by the blue processes, then going over the outlines with pen and ink, washing off the blue print, and leaving in appearance a line drawing.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

ON Monday, April 8th, a meeting of the above Club will be held in the Iron Room, Stroud Green, when Mr. Clifton will demonstrate the working of Carbutt's films. Visitors invited. To commence at 8.15. If intending members will communicate with the Secretary, he will be pleased to propose them for election at the next meeting. The Hon. Secretary is Mr. George R. Martin, Harringay Park Granary, Green Lanes, Finsbury Park.

BATH PHOTOGRAPHIC SOCIETY.

A MEETING was held at the Royal Literary and Scientific Institution, Terrace Walks, on the 27th ult., Mr. WILLIAM PUMPHREY, President, in the chair.

The CHAIRMAN stated that the first out-door meeting would take place on Thursday, the 25th, Farleigh Castle being the destination.

At the ordinary meeting, on the 24th, Mr. PERREN will give a demonstration of platinotype printing by the hot bath process.

Mr. A. G. BRISTOW exhibited a shutter he had made to work in the diaphragm slot. The action was that of opening and closing at the centre, the rapidity being governed by and equal to the strength of the rubber spring used. Mr. Weldon, from whose pattern he worked, found a very high speed attainable in this manner.

The CHAIRMAN said that such rapid shutters must be used in a very quick light. Mr. Swift had lately constructed a lens of 24 inches focus, which was stated to have an aperture of 5½ inches clear, very nearly f. Such an amount of light entering the camera must be controlled by a rapid shutter. Mr. Swift had promised to send one of these new lenses for them to examine, and he (the Chairman) was very anxious to see its performance as regards depth of definition.

The Hon. Sec. (W. M. ASHMAN) thought the provision for opening and closing an exposing shutter in the centre of a diaphragm plate of a rectilinear lens was correct in principle, as well as very convenient in practice.

Capt. HARRISON drew attention to Sands and Hunter's shutter, which fulfilled these conditions, and was readily adjustable for slow or rapid exposures. His pictures of trotting horses, racing yachts, &c., were taken in this way, accelerated by the tension of six rubber bands. He next alluded to the steadiness of the "Ashford tripod," especially when used on board ship, and explained to the meeting how, by the use of a view finder to his cameras, a fixed focus at seventy yards, and placing one leg of the tripod behind the camera instead of in front, he was able to steer for a wave, cloud, or other passing object, and so secure any desired subject. This was admirably illustrated in a number of studies of instantaneous work which were passed round. Hydroquinone was the developer used for most of the negatives, and the prints comprised the processes of silver, platinotype, and iron compounds.

Mr. WALTER PITT exhibited some large prints of mechanical drawings made by means of the iron salts. This process is largely practised by his firm, and the results were of great excellence.

Mr. GEO. F. POWELL drew attention to silver prints of the same subject from two different negatives; one having received a brief exposure in sunlight, and the other two hours in moonlight. He thought more attention might be given to photographing landscape in moonlight.

Mr. ERNEST PITMAN passed round some very good photographs of snow scenes, 15 by 12, which he had enlarged from small negatives taken in the locality.

The room was then darkened, and a series of about 60 transparencies of well known places in the Highlands of Scotland were exhibited by Mr. J. Dugdale. These were by the wet collodion process, and coloured by the exhibitor. The lantern, of the prismatic type, was operated by Mr. Davis, who employed the oxy-ethyl light with an ether saturator of his own construction, which he stated could not by any chance explode. The lecture reading was given by Mr. Sutton, and these three gentlemen were warmly applauded.

At the close about thirty transparencies were exhibited and explained by Captain Harrison. The subjects were the same as those shown by him at an earlier part of the proceedings. They were also developed with hydroquinone.

The CHAIRMAN having thanked those who had contributed to the success of the evening, said that several matters must unavoidably stand over until the next meeting, April 24, among them being some very remarkable photographs of Niagara in summer and in winter, lent by Miss Ashley; and in closing the meeting pointed out that for many outdoor purposes focussing every picture was unnecessary. He had taken negatives for a month at a stretch without readjustment, the conditions being—objects focussed beyond thirty yards, and a small lens aperture.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on the 28th ult., Mr. C. H. COOKE in the chair.

Mr. A. COWAN passed round some cloud negatives in carbon by Mr. Green, of Berwick, also some cabinet pictures of ornithological subjects.

Mr. W. H. HARRISON gave a description of the Trinity House lamps, illustrating their construction by sketches on the black board. In the course of his remarks he said, Sir James Douglas, chief engineer of the Trinity House, informed him that with paraffin oil having a flashing power of 250° Fah., the level of the oil is about half-an-inch below the top of the brass burner. With gas lamps constructed on the same principle, exactly twice as much light is obtained from a given quantity of gas as with the Standard London Argand burner. Mr. J. Matthews, proprietors of the firm De Ville and Co., Farringdon Road, says, that the two-ring gas flame gives only about twenty per cent. less light than the two-ring paraffin flame, and the oil should not vary for practical purposes more than a quarter of an inch from the theoretically proper level. Mr. Harrison thought such a lamp might advantageously be used for lantern purposes.

Mr. J. E. FRESHWATER thought it would not be equal in illuminating power to a good three or four-wick ordinary lamp.

Mr. W. E. DEBENHAM believed there would be too much heat, and in answer to a question as to the desirability of using a

reflector, said it might be useful for illuminating purposes, but not for optical projection.

The Hon. Secretary promised to communicate with the manufacturers with a view of getting them to exhibit a lantern or burners at a future meeting.

Mr. J. W. Cox asked what was the best carbonate of soda developer?

Mr. A. Cowan replied:

Pyro	1 grain
Soda	16 grains.

A discussion arose as to various fog horns and screens used in connection with lighthouses, and the possibility of utilising the screen principle in testing the rapidity of shutters, as had been suggested some time since.

Mr. T. E. Freshwater exhibited the latest map, showing where in all probability the late Mr. Donkin lost his life.

A member stating that photography was being used for measuring the height of mountains;

Mr. W. E. Debenham said that was so, and in all probability it would be very largely employed for this purpose before long.

Shaftesbury Photographic Social.

The above Club held their monthly social last Friday evening, at eight o'clock, in the Craven Hall, Regent Street; Mr. Stuart in the chair. The evening was spent in song, music, and recitations; the Secretary, in an interval, reading a summary of the Club's doings during the last six months, as also a statement of its financial position, which was encouraging.

On Saturday afternoon the Club make their first outing of the season to Epping Forest.

Any information respecting the Club may be obtained from the Hon. Secretary, Mr. John B. Rintoul, 36, Brewer Street, Golden Square, W.

Liverpool Amateur Photographic Association.

The usual monthly meeting of this Association was held on Thursday, March 28, at the Rooms, Crescent Chambers North, Lord Streett; he President, Mr. A. W. Beer, in the chair.

The minutes of the last meeting were read aud confirmed.

The following were duly elected members of the Association:—Miss Rose Collier, Rev. C. Courtenay, Messrs. F. Anyon, Holbrook Gaskell, junr., Henry J. Houghton, Robert Jardine, W. O. Pearson, George B. Prescott, and R. Richardson.

The Hon. Sec. read letters from Messrs. H. N. Atkins, J. Stanley Riley (the hon. sec. of the Chester Society of Natural Science), offeriug the use of their dark room to members of the Liverpool Association; and from the Treasurer of the Boston Camera Club, aunouncing that the set of slides, "Illustrated Boston," had been dispatched, and stating terms of the trust on which they were to be held. He also distributed circulars of Ashford's tripod, and showed some prints sent by Julius Mayer, Breslau, to show the efficacy of Schirm's magnesium flash lamp.

A resolution was passed that the Secretary write to the Treasurer of the Boston Club, immediately on arrival of the slides, acceptiug the trust, and thauking them for their gift; also that the offer of the Chester Society be accepted with thanks, and reciprocated by the offer of the Association's dark room.

The President announced that the first excursion of the season would take place on Easter Monday to Ludlow, and that a full card of excursion arrangements was being printed, and would shortly be distributed. He then gave a short account of his visit to the Camera Club Conference, describing the meetings as being very interesting and successful. He also meutioned that Mr. Walter Hughes had been appointed Assistant Hon. Sec.

Mr. S. G. Harrison Dearle then gave his reading on "English River Scenery," illustrated with a number of slides by York and others. He took his audience along the Thames, from its source to London Bridge, then in succession visited the River Fall, Truro, Dail, Lyn, Avon (Bristol), Avon (Warwick), Derwent, Dove, Nidd, Ure, Brathay, Yare, and Wye, concluding with some views taken by a picnic-basket camera introduced by himself and Mr. Ashcroft.

Some beautiful and highly picturesque scenery was shown and described, and the racy and quaint remarks of the reader proved most amusing and interesting.

Mr. Paul Lange followed by showing a set of 200 slides sent by the Birmingham Society, as the "Illustrated Boston" which had been announced had not arrived as was expected. They were largely of the neighbourhood of Birmingham and Warwickshire, and proved very interesting, although the large number to be got through permitted only a hurried view. Mr. Phillips operated at the lantern, and at the close a hearty vote of thanks was passed to Messrs. Dearle and Lange.

Mr. Harrison Dearle showed the picnic basket camera invented by himself and Mr. Ashcroft, and Mr. Archer exhibited Lancaster's detective camera. They both seemed well adapted for their purpose, and each had many good features. Mr. Sharp also showed an album of Zachnsdorf's mounts, which are removable at will.

Bristol and West of England Amateur Photographic Association.

The March meeting of the Association was held in the large room of the Queen's Hotel on Wednesday, March 20th, at 7.30 p.m., Colonel Playfair in the chair, when Colonel Senior was present, in accordance with his promise, to deliver a lecture on one of his trips to India, illustrated with lantern slides taken by himself, of some of the fair and stately palaces and shrines with which that wonderful land is overspread. The lecture, which was highly appreciated by those present, took the form of progressive stages—from the large cities in the hot and thickly-populated plains, to the exquisite scenery of the hill stations, and further still, to the bleak snows of the Himalayas. The slides illustrating the great temples of Lucknow, Benares, Agra—an index of the laborious patience and great ability of the lecturer—were very well received, and the exquisite details of the inlaid and pierced walls calling forth much praise.

Colonel Senior showed many views deserving of special comment, from which we would single out, from its remarkable character, a view in the vast dark cavern-like interior of that greatest of mausoleums—the Taj Mahal. This view, showing the rich screen fronting the founder's tomb, was taken by him in the days of wet collodion plates, by the aid of £5 worth of maguesium wire, which had to be kept burning for a great length of time, as its light was lost in the profound gloom. The slides showing the marble exterior of the Taj were very good, and exhibited well its noble proportions. Another view, showing the interior of a zenana, with a zenana lady attended by two English missionary ladies, was very curious. The opportunity for taking this subject, which possibly has occurred to no one before Colonel Senior, came about through the wish of the noble lord of the zena to possess a picture of this wife. The lecturer's account of the difficulties under which he took the picture, owing to her excessive shyness, was very amusing. The whole lecture was enriched by graphic descriptions of the various places visited in the tour, and terminated in the exhibition of a few very choice slides on scriptural subjects, painted by an American artist, and shown by Colonel Senior on account of their great richness of colour.

At the conclusion of the lecture a vote of thanks to Colonel Senior for his kindness in providing so pleasant an evening's entertainment was given.

Messrs. M. Lavington, H. A. Hutchinson, and J. W. Evans, were elected members of the Association.

Mr. Brightman submitted circulars and application forms for entry iuto the Philadelphia Photographic Exhibition, for the benefit of members present. The meeting then concluded.

Notts Amateur Photographic Association.

The usual fortnightly meeting of the above Association was held on Monday evening, the 1st. inst., at the Society's Rooms, Cavendish Chambers, 19, Market Street; the President, Henry Blandy, L.D.S., Edinburgh, in the chair. This was the largest gathering of members during the session.

The President called upon Mr. S. Bourne for his paper on "Hydroquinone as a Developer."

Mr. Bourne said: When, at our Secretary's request, I promised to give a paper on "Hydroquinone as a Developer," I hoped to be in a better position to deal with the subject than I find myself this evening. My engagements and the unsuitability of the weather for out-door photography have left me little opportunity for making experiments with this last addition to our developing agents. Let me say in the first place that I am not one of those photographers who are continually changing their developers, and trying every new formula which crops up in the photographic journals. The journals must of course fill their pages, and considering their numbers, I often wonder how they contrive to fill them with readable and interesting matter, all bearing upon photography. We owe all our progress to experimental photographers and chemists, and therefore I could not be understood to speak in any spirit of depreciation of their work; on the contrary, I have the greatest admiration and

respect for it. The lecturer then gave his experience with this developer, giving formulas, exposures, &c., exhibiting negative transparencies and prints, fifty magnificent lantern slides being thrown on the screen.

Leicester and Leicestershire Photographic Society.

A lecture in connection with the above Society was delivered by Mr. J. T. Cook, one of the members, of the large room Co-Operative Hall, High Street, on Wednesday, March 27th, entitled "Through Australia and New Zealand," illustrated with upwards of forty lantern slides, reproduced from negatives taken by Mr. Cook *en route*, and were projected on the screen by the aid of the oxyhydrogen lantern kindly furnished and admirably experimented by Mr. F. Pierpoint, a member of the Society.

The audience, numbering between 250 and 300, were admitted by invitation ticket, and the lecture was thoroughly enjoyed.

Afterwards the slides which obtained the silver and bronze medals of the Society at the late competition were passed through the lantern, and the proceedings brought to a close.

Talk in the Studio.

"Graphic" Exhibition at Stuttgart.—The *Journal of the Society of Arts* says:—"Information has been received from the Foreign Office through the Science and Art Department, that a 'Graphic' Exhibition is to be held at Stuttgart, next June, in celebration of the King's Jubilee. This Exhibition is limited to firms or institutions of Wurttemberg. It will comprise the following sections:—1. All branches of the publishing business, such as books, musical works, and periodicals, as well as other auxiliary arts and processes, viz, engraving, lithography, chromolithography, xylography, zincography, photography, &c. 2. Collections of kindred articles belonging to, or represented by, subjects of Wurttemberg. 3. Bookbinders' work, book tools and stamps. 4. Paper, and wares manufactured from the same. 5. Mechanical processes in operation, especially in the form of type-founding and accelerated printing presses. 6. An historical display of ancient specimens of the graphic arts, as also of ancient Wurttemberg, artistic journals, illustrations, bindings, caligraphy, &c. The Royal Library, at Stuttgart, which possesses one of the richest collections of Bibles, will alone provide a choice display of manuscript and printed books."

Bristol and West of England Amateur Photographic Association.—The next monthly meeting of the Association will be held at the Queen's Hotel on Wednesday, April 17th, when Dr. H. Brown will read a paper entitled "The Eye, considered as a Camera." This will be followed by a discussion. A lantern will be at the disposal of any members caring to bring slides illustrative of their work in the past season. Members will kindly accept this intimation of the April meeting.

Photographic Society of Great Britain.—Ordinary meeting, Tuesday, April 9th, at 8 p.m., at the Gallery, 5a, Pall Mall East; Mr. Friese Green will read a paper, "Some Effects probably Due to Phosphorescence, Electricity, and Colour Sensitiveness."

Platinum Black Photographs.—The *Star* says: "A very interesting little exhibition of the new platinum black photographic process has been held at Anderton's Hotel. Mr. Blanchard has invented a peculiar sensitised paper for the purpose, and a solution of platinum which, in consequence of being much more finely precipitated, produces a deeper and warmer black colour, combined with clearer definition of outline. The process differs only from the ordinary one in the matter of toning, and is capable of being applied either to the old collodion wet plate, or to the modern dry-plate system. A heavy dark colour is produced by undertoning, and *vice versa*. The results speak well for the efficacy of the process, and the inventor claims that his pictures are quite as permanent as those produced by any other process."

*** Everything relating to the Literary Department of the Photographic News, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," should now be sent to Mr. Spiller, who is alone responsible for all which appears under that heading.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, Photographic News, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

"205."—Answered by post, and names of firms given. The permanent sensitized paper is commonly prepared by floating the already-silvered paper on a second bath of weak citric acid, about five grains to the ounce; some operators blot off the excess of this latter before drying.

J. L. (Leeds).—The connection between water-gas and photography would seem to be rather remote, and we are unable to advise you further than to say whatever process tends to cheapen gas must ultimately prove beneficial to you in common with all who use it for illuminating purposes. We supposed the chief advantage to lie in its application to heating boilers, furnaces, and for metallurgical uses principally; but from the prospectus (duly received) it seems that lighting also is contemplated, and that the Syndicate holds the patents for Fabnejelm's incandescent magnesia light. By same post came Mr. T. Fletcher's new pamphlet on the economy of gas as a fuel.

T. R. M.—Red gauze fabric makes a good non-breakable protection for portable dark-room lamps, but we fail to see any advantage in ordinary daily use; for the wire meshes, being absolutely opaque, cut off a large proportion of what would otherwise be available light.

W. E. Debenham.—The letter was intended to be a full explanatory answer, without reservation of any kind, and was manifestly so understood by another correspondent. We do not wish to re-open the discussion.

M. A.—1. Cellotype ivorine is merely another name for xylonite. It is not the pigmented gelatine formerly used in the eburneum process. 2. It may be a good idea to employ blind men in certain departments of the dry-plate manufacture, for protracted existence in rooms almost absolutely dark must prove very trying to ordinary individuals. We should be glad to bear of such a case.

Wm. Lang, Junr.—Thanks for your letter and reference to the Energiatype process, by which we understand that this name was originally applied by the late Robert Hunt to such pictures as were developed with ferrous sulphate. The only portrait of Mr. Hunt which we have is that taken in or about 1883 by the Luxograph Company. Write to Mr. G. E. Alder, 98, North End, Croydon.

Zero.—All the published Alpine views by the late W. F. Donkin can be had of Messrs. W. M. Spooner and Co., 379, Strand, W.C.

Box.—Your description is not quite clear. If you wish to print from your roller-slide negatives, you may either oil them or transfer to glass, and then proceed to print in the usual way. Be particularly careful to guard the negatives from the silvered paper. Some prefer to print through talc in order to avoid contact, as gelatine films are so very easily injured in the printing process.

C. G.—The simplified platinotype process announced this week by Mr. Valentine Blanchard promises to be an important step, and, so far as can be judged by the specimens exhibited, is capable of modification to suit various requirements. The paper is said to be permanent, and so also are the prints, which are toned, rather than developed, to the shade required. We had the opportunity of comparing silver prints with platinum from a goodly series of Mr. Blanchard's well-known subjects, and the warm, vigorous tones of the latter were greatly admired.

C. Davies.—You need not fear to employ your plates remaining over from last year, but as a measure of precaution you should expose one of them, or a plate from each batch, to prove by actual trial that they are still right. We assume that they have been properly kept meanwhile away from light, damp, and mildew.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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PLATINUM PRINTS BY THE SUBSTITUTION METHOD.

As far as we know, the oldest form of the platinotype method is that in which a silver print is first made, and then converted into a platinum print by immersion in a solution of platinum salt, generally a solution containing chloride of platinum. The silver of the image now unites with the chlorine which holds the platinum in solution, and the consequence is that the platinum is deposited where the silver formerly was, forming in fact a new image of metallic platinum, but incorporated with the new image, is the original silver remaining in the form of chloride.

The older practioners of this form of the platinum process often failed to entirely convert the silver image into a platinum image, and they very generally failed to remove the silver chloride resulting from the reaction; consequently, the results were often unsatisfactory, the prints sometimes becoming yellowish from the action of light on the chloride of silver, and sometimes from the fading of the silver portion of the image.

The conditions of successfully and satisfactorily working the substitution process of platinotype are now so much better understood that there need be no uncertainty as to whether any trace of silver remains, and it is as easy to obtain an image in pure platinum by starting with a silver print as a basis, as it is to obtain a print in platinum by any one of the complex methods now extensively adopted.

The essential conditions of permanency are secured by a complete substitution of the silver by platinum, followed by a hyposulphite bath to remove the chloride; but as the substitution of the last trace of silver by platinum is very slow, it is often desirable to treat the prints with a solution of perchloride of iron, or, as preferred by some, a solution of cupric chloride, after the platinum solution has acted a sufficiently long time. The perchloride of iron bath, or the cupric chloride bath, rapidly converts all traces of silver into chloride, so that the hyposulphite solution can remove all traces of silver.

One substantial advantage of the substitution process is, that a person possessing a silver print, whether a print by development or a direct print, can easily convert it into a permanent platinotype should he desire so to do.

From time to time this indirect platinotype process, in which the silver image is converted into a platinum image by substitution, has been touched upon in the PHOTOGRAPHIC NEWS, and one of the most important articles recently published in relation to it is that of M. Vidal, on p. 82 of our volume for 1887. M. Vidal points out, as one of the special advantages of the substitution process, that the colour or tone of the deposited platinum is rather warmer, or more tending to brown, than the platinum deposited by the more commonly talked of platinum methods.

M. Vidal, in the place referred to, gives the following particulars as to the method of converting prints developed on Eastman paper into platinotype, and his remarks are equally applicable to prints on other gelatino-bromide or gelatino-chloride papers, whether the prints are developed images, or printed out in the frame. M. Vidal says:—

The prints are immersed in the toning bath composed as follows:—

Bichloride of platinum	1 gramme
Water	2 litres
Pure hydrochloric acid	30 grammes

The prints are left in this bath sufficient time for them to be well covered with a good coating of platinum, this metal being gradually substituted for the silver. The image is weakened under the action of the toning bath; therefore over-exposure is necessary, as is the case with impressions on albumenized paper. With a little practice, it is easy to know what the proportion of this over-exposure should be, and also the time necessary for the immersion in the platinum bath. To verify whether the toning action is produced, and to appreciate its intensity, have at hand in a small dish a solution of twelve per cent. of bichloride of copper dissolved in water. Before toning, the image on a fragment of a print plunged into this bath will completely disappear, the reduced silver being transformed by the bichloride of copper into white chloride of silver; but as soon as the deposit of platinum has begun to take place, this metal, not being attacked by the liquid in question, an image at first feeble is seen to remain, becoming more and more powerful in proportion to the time of immersion in the platinum bath. Images thus produced are indestructible, for, admitting that that portion of the image which is of silver may completely disappear, there will always remain the platinum image, somewhat attenuated, it is true, but quite complete, however, if the duration of the exposure and development have given an intense proof. If all the silver image has disappeared, we shall obtain the change of colour referred to in the first part of this letter. There will remain an image of sepia colour; and we may assure ourselves, without waiting for it, of the effect of any alteration due to time by plunging, after toning, the entire proof into the bath of bichloride of copper. All reduced silver which has not been replaced by platinum will be transformed into white chloride of silver, and what remains visible is an image formed solely of platinum. If it is desired to preserve it as such, there is nothing further to do than to place the image in hyposulphite of soda to dissolve all the chloride of silver, and an image will remain formed exclusively of platinum. It may be that in studying this question more deeply, we may succeed in forming on the

silver image a deposit of platinum of a black colour. We are now engaged in experiments having this end in view. When a proof has been passed through the bath of bichloride of copper, in order to ascertain the amount of platinum that has been deposited, it may be easily restored to its primitive condition by immersing it, after washing it in three waters, in a bath of ferrous oxalate identical with that which has served to carry on the development. The image immediately regains its original vigour, and there is nothing to prevent its being afresh submitted to the action of the toning bath for a more complete platinisation if required. We only insist that platinum toning allows us to obtain at less cost than by any other means images having platinum as a base; and, under conditions as to rapidity, of great value. We believe we render a service to our photographic brethren by pointing out a method destined to extend the field of their labours.

Last week we quoted a newspaper paragraph referring to a demonstration by Mr. Valentine Blanchard of a platinum black process; and although we have received no details, it is said to at any rate involve the making of a silver print in the first instance. Indeed, the fact of so very eminent and well-known a technical and scientific expert as Mr. John Spiller, F.C.S., F.I.C., writing in last week's News, of Mr. Blanchard's process, that it "promises to be an important step," has raised widespread expectation, and it may be that the secret will be announced before the present number reaches the readers, as the Camera Club meeting of the 11th instant will have been held, at which meeting Mr. Blanchard promises to give some account of his method.

In reference to M. Vidal's formulæ for the platinising solution, we may observe that our own experience indicates that it is often desirable to considerably diminish the quantity of hydrochloric acid, and occasionlly—as in the case of highly-albumenised prints—to omit it altogether, provided that the platinum chloride which is used has a distinctly acid reaction.

One very considerable advantage of the substitution platinotype method is that any negative from which a good silver print can be obtained—and what negative will not yield a good silver print if the right method be selected?—can be made to yield an excellent platinotype. Indeed, the latter part of M. Vidal's article gives a means of obtaining a vigorous platinotype from a very faint silver print, it being only necessary, instead of removing the chloride of silver at once with hyposulphite, to reduce it again to the metallic state with an ordinary ferrous oxalate developer, and to use this silver image as a means of producing a second deposit of platinum. There is no limit to the number of times this may be repeated, but in the end the whole of the silver should be removed by complete conversion into chloride, and treatment with hyposulphite.

PHOTOGRAPHIC CONGRESS IN CONNECTION WITH THE PARIS EXHIBITION.

It is proposed that during August there should be held in Paris a conference at which certain questions of catholic interest, and, according to the present arrangements, the conference is to commence on the 6th of August and terminate on the 17th; but on the 20th a public discussion on the results of the conference is to be held.

Among the points of general interest, concerning which it is desired to come to a definite understanding, the following are enumerated, but other questions may arise:—

1. The general introduction of a fixed unit of light.
2. Uniformity in the expression and mode of measuring the focal length of objectives.
3. A common means of expressing the photometric intensity of the objective in relation to the diaphragm used.
4. A standard for measuring or expressing the time of the passage of light through the lens, as controlled by a shutter.
5. A uniform and easy means of adapting various objectives to the camera.
6. Uniform dimensions for plates.
7. Standard terms for the expression of photographic formulæ.
8. Uniform nomenclature for photographic methods.
9. Custom House regulations in relation to sensitive preparations.
10. Copyright in photographs.

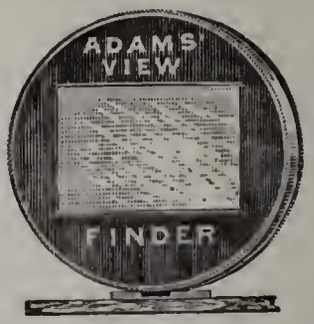
Persons intending to offer papers or discourses in relation to subjects within the scope of the conference should communicate at once with the organising secretary, Mr S. Pector, 9, Rue Lincoln, Paris.

MR. ADAMS'S VIEW FINDER AND ROLLER SQUEEGEE.

From Mr. Ed. J. Adams, of Great Hampton Street, Birmingham, we have the above-mentioned articles for notice.

The squeegee roller is something like a small printer's inking roller, but the wooden stock is covered with india-rubber, and for many purposes it forms a convenient substitute for the usual form of squeegee. As an aid in mounting prints the value of a roller of the sort is well understood by many photographic practitioners.

In the view finder we have a concave lens so mounted that it can be readily attached to a socket previously screwed to the front of the camera, and the holding piece



is attached to a ring encircling the finder, so that it can be readily put to the horizontal or the vertical position. The worker behind the camera now sees the view in reduced form within the rectangle screened off from the concave lens, the angle of view being constant for a given distance of the eye from the finder; it being very easy to bear these distances in mind in relation to each lens used, with sufficient exactness for much out-door work.

It is obvious that the rectangular aperture in the screen or diaphragm over the concave lens should be homologous with the plates used, if the greatest exactness is required—thus, for example, the same aperture will serve for 15 by 12, 5 by 4, and 10 by 8—but it will not give the exact proportions of a quarter-plate or a half-plate. In order to suit all proportions, it might be convenient to have a series of card or paper screens fitting into the arrangement like Mr. Waterhouse's diaphragms, and in this case it might be convenient to provide an eye-hole as a constant point of sight on the back of the camera, as the operator could cut a screen to suit lens and plate in a few seconds, and he would be able thus to ensure the greatest accuracy in determining the field of view.

OBTAINING A PRELIMINARY DEPOSIT OF COPPER WITHOUT A GALVANIC BATTERY.

Mr. G. Scamoni gives the following process in Dr. Eder's "Jahrbuch." The gelatine relief, developed upon a glass plate, is made conductive with plumbago, the same as for an ordinary deposition, bee's-wax being smeared round the margin to prevent the copper from being deposited over the edges of the plate, as then it would be difficult to detach it. Two strips of wood are laid at the bottom of a dish—preferably a gutta-percha one—and the

plate carrying the relief is placed on them. Clean iron filings are now strewn over the surface very sparingly by the aid of a wire sieve ; be careful to avoid thick patches of filings, otherwise the copper will not be deposited on the plumbago surface, but merely at the top of the filings.

By means of an ordinary glass spray-diffuser, with a double india-rubber blower, distribute a concentrated solution of copper sulphate over the plate, commencing along the nearest edge and continuing in a right-to-left motion until the farthest edge is reached. The copper solution must now be poured on freely, and to ensure a homogenous deposit, move the filings over the coppered surface by dabbing with a mop of wool held in a piece of glass tubing.

As some heat is evolved during this process, all haste should be made ; five minutes will be found sufficient time to cover two square feet of surface with a film of copper.

Have ready to hand a jug of cold water, and swamp the plate as soon as it is covered with copper, and no plumbago shows through ; afterwards wash under a weak stream of cold water, to remove all the iron filings from the plate. A broad camel-hair brush can be gently passed over the surface to assist this.

If the solution is poured on in drops, instead of using spray, the pieces of film thus deposited will become detached during the operation of washing, bringing the plumbago with them ; this may also happen if the water is propelled with too much force against the film. If, perchance, a patch should remain which the copper has not covered, blow the solution away from that spot, take a pinch of filings and strew them upon it, and then pour some fresh solution over them, when the deposit will at once take place if the plumbago has not been brushed away.

When all the filings are washed off, immerse the plate at once in the depositing trough, and make the connections ; on no account let the water dry on the film. If the depositing apparatus is in another apartment, lay a sheet of wet bibulous paper over the plate, and do not remove it until the moment before placing it in the bath.

RUSSIAN CORRESPONDENCE.

BY C. T. CHESTERMAN.

At the last meeting of the Imperial Russian Technical Society, it was announced that His Imperial Majesty had been pleased to present Colonel Vishniakoff with a massive gold watch, bearing the Imperial Eagle on one side, and on the reverse the inscription "For photographic services." Captain Smirnoff, of the Imperial Navy, has also received a splendid set of photographic apparatus from the Czar for various photographic work done by him.

The Vice-President, Mr. V. Sreznefsky, acquainted the members with the different processes in which galvanoplastic had been used for making printing surfaces from photographic images. Various examples, maps, &c., lent by Mr. Laptieff, of the General Staff Office, and microscopic impressions and copies of old etchings by Mr. G. Scamoni, were shown.

In the General Staff Office Marriott's process is worked, in which a picture in pigmented gelatine is developed upon a silvered copper-plate, and a copper deposition formed on the plate. Mr. Scamoni's printing surfaces for microscopic characters are obtained by intensifying a positive image on collodion until sufficient relief is visible, then it is dried, and varnished with a varnish that retains sufficient tackiness, after the solvent has evaporated, for the plumbago to adhere to it, in order to prepare it for the galvanic bath. For very fine work this gives a relief much sharper that gelatine does, but it is more difficult in practice. It was also explained that Mr. Scamoni gave his gelatine reliefs a preliminary coating of copper previous to hanging them in the galvanic bath, thereby guarding against the acid action of the copper solution from swelling and eating away the gelatine ; consequently the lines are much sharper in the resulting plate.

Photographic units are once more on the *tapis* on account of the proposed congress in Paris. Dr. Lindsay was only partly correct, with regard to Russia, in his communication to the Camera Club last year, inasmuch as apothecary's weight is only used by the old school physicians; the younger M.D.'s prescribe in grammes ; scientists and photographers use the same. In all photographic text-books published since 1872, the formulæ are given in metric system, all scales sold by photographic store-dealers are supplied with gramme weights, and the use of the metric system is legal, although not brought into general use ; all articles being sold by the pound of 409½ grammes. Chloride of gold is sold in one gramme tubes, and phials containing thirty grammes of special salts for photographic purposes are imported.

The English system is certainly very perplexing to foreigners ; for instance, it is generally believed that all photo. formulæ are given in apothecary's weight. "Liesegang's Almanach" gives under heading of English weight troy (apothecary's weight), as if they were identical. In the "American Annual" for 1887, under fluid measure, we find 16 ounces, or a pint, sometimes called a pound. According to Sresnefsky's "Reference Book for Photographers," in English formulæ the pound of 16 ounces of 480 grains each is in use ; one grain, English,=0·0648 gramme ; 15·43 grains=1 gramme ; and 1 ounce=28·34954 grammes ; 1 grain, Russian apothecary's weight=0·0622 ; 16·075 grains=1 gramme ; and 1 ounce= 29·8601 grammes.

It is well that Austria has adopted the metric system, as their apothecary's weight differed from both the above, one grain being equal to ·072918 gramme, and 1 ounce = 35 001 grammes.

In Eder's "Jahrbuch," 1888, 11 ounces troy is 1 lb. ; this is of course a printer's mistake ; nevertheless all these little things tend to puzzle the ever-increasing army of amateurs, and they will only be too glad if the Photographic Club succeeds in its enterprise, as several experiment considerably with formulæ from British and American photographic literature. The meaning of a Winchester puzzles many.

Although plate sizes are expressed in centimetres, yet as a large number of English cameras are used here, Felish's Dry-Plate Manufactory, and Warnerke's Laboratory, put up plates to fit them, but their general sizes coincide with Monckhoven's and Schleussner's, which are much used in Russia. The Ilford's in French sizes put up with formulæ in French are making way here, notwithstanding the high price at which they are retailed.

Dr. Olchin, in his "Photographic Knowledge Fifty Years Ago," now being published in the *Photographic Messenger*, quotes a paragraph from the *Athenæum*, No. 602, which I have not seen mentioned elsewhere, to the effect that the writer, who signs H. L., has made an improvement in the preparation of paper, which, however, he does not consider of great importance (*sic*)—coating the paper with a mixture of equal parts of albumen and water.

In the *Photographische Correspondenz* for January is a drawing of a very useful appliance for photo-engravers and zinc etchers, which I take the liberty to bring before your readers. Anyone who has sifted asphalt or powdered resin will know how difficult it is to prevent a mess, and will thank Herr Schrank for his communication.

A, is a wide necked glass bottle with a flat rim ; B, is a deep cardboard receptacle made somewhat conical, also with a rim to fit on the rim of the bottle ; a piece of fine muslin is stretched over the bottom, or rather takes the place of it, and is held on with a thin wooden hoop ; C, is a cover of wood turned to fit tightly into B. For use, put the sieve B into the bottle, and empty the powdered resin into it, press in the lid, which should fit perfectly tight, and

shake until all the finer particles have passed through the muslin. Even if the resins are bought ready powdered, they will be improved by passing through the finest lawn, as the best work can only be done with very fine powder.



Apparatus for sifting impalpable powders, by Herr Schrank.

There were 133 exhibitors at the Moscow exhibition, besides the historical and scientific sections, but there was nothing of sufficient merit to justify the award of the large gold medal.

Everything is now definitely arranged with regard to the photographic jubilee exhibition in St. Petersburg, and all foreign exhibits will be allowed to pass the Customs free of duty; dues will only be levied on articles sold here. The committee intend publishing two catalogues, one of them to be illustrated by process work, heliogravure, collotype, and photographic prints. Anyone sending six hundred prints on paper 6¼ by 9¼ inches, obtained by any process connected with photography, will have the privilege of a whole page advertisement in all editions of the catalogue free of charge, otherwise the fee is £1 4s. for each edition. All communications to be addressed Pantilaymonovsky No. 3, St. Petersburg.

FIFTY YEARS' PHOTOGRAPHY.

BY W. LANG, JUNR.*

IN 1838 Daguerre attempted to float a company to work his process, for at this date he announced that he had at last overcome all difficulties. The public were incredulous, and so the company was never established. It was different with the scientists of that day. They foresaw the capabilities of the new-found art; and in Arago, the famous astronomer, Daguerre found a most excellent champion. It was in a large measure due to his personal efforts and his great eloquence that the French Government granted to Daguerre a life-pension of 6,000 francs. Isidore Niepce received one of 4,000. This was given on the understanding that the whole world was free to use the discovery about to be divulged by Daguerre. It is a fact worthy of being noted that Daguerre patented his invention in England. Was this in revenge for Waterloo?

It would take up too much time to go into details regarding the actual process; suffice it to say, that in the original method iodide of silver, produced by exposing a silver plate to the fumes of iodine, was made use of, and development was by means of the fumes of mercury, while the unacted-on iodide was removed by a solution of common salt. Subsequently, by the use of bromine in conjunction with the iodine, a more sensitive surface was obtained, and the salt solution replaced by the hyposulphite; further, the image was strengthened by a deposit of gold. This was due to Fizeau. From what has been said it will be seen that Daguerre's process, as at first brought forward, was not altogether a very perfect one.

Before we leave Daguerre we may briefly state that he retired from active life, or rather left Paris and settled down at Bry-sur-Marne, shortly after the pension had been awarded him. He married an English lady, Louise Arrowsmith, but had no family. IN the church at this place, a canvas five yards square testifies to the handiwork of the dioramic painter. It is placed behind the high altar, and being lighted from above, several optical effects are brought into play. The subject here depicted is the interior of a Gothic edifice. He still experimented, and, in 1844, he announced he would be able to take a horse at full gallop. He tried hard to fix the colours in pastel work, so as to do away with the protecting glass; but this problem remains practically unsolved to this day. In passing I may mention there seems to be at the present moment an attempt to introduce pastel work by our local artists. This class of work has always been a favourite one with French artists. Perhaps some of our members may take the matter in hand, and bring renown to our Association, succeeding where the illustrious Daguerre failed. Daguerre died suddenly on July 10th, 1851, in the prime of life. In the cemetery at Bry-sur-Marne a monument was erected over his remains by the Société Libre des Beaux Arts in the year 1852. In 1883, a succeeding generation has erected at Cormeilles-en-Parisis a statue commemorative of Daguerre and his work. It is erected on a small open place opposite the house where he was born, and consists of a pedestal some six or seven feet in height, surmounted by a bust in bronze, the work of the sculptor Capellari. On the pedestal are the dates 1789 (year of Daguerre's birth) and 1883 (year in which the statue was erected). The actual date on which the inauguration took place was Sunday, August 26th. The portrait now on the screen is taken from a Daguerreotype secured by Mayall in the year 1846.

Although when treating of of Niepce we made no reference to the memorial which France, assisted in some measure by the whole photographic world, has erected at Chalons-sur-Saône, it was not from any overlook, but seeing this recognition of posterity of a great man did not take place till after homage had been done to Daguerre, we thought it better to refer to Niepce's memorial at this point. A good idea of the original statue will be had from the transparency now shown. The inauguration of this tribute took place on June 21st, 1885, and was made the occasion of a considerable amount of ceremony. The artist, who was good enough to do the work gratuitously, was M. Guillaume. The statue, which is in bronze, was cast at the famous workshops of Barbadienne, of Paris. It seems to me that France is much more zealous of the honour of its great men than we are. Our countryman, Talbot, who did equally good work, and who was as early in the field with his discoveries as Daguerre, has, as yet, not had that recognition which ought to have been rendered him long ago. How comes it that no commemorative statue has been erected to the man who shares with the Frenchman, whose career we have just been considering, the honour of being the discoverer of photography? Let us consider briefly Talbot's work, and I think we shall see how justly entitled he would be to the recognition I have spoken of.

Henry Fox Talbot was born in the first year of this century. In 1821 he graduated with honours at Cambridge. It was intended that he should have a political career, and for two years he had a seat in Parliament; but his instincts were scientific, not political. In 1834 he retired from public life and devoted himself to scientific research. He was a member of the Royal Society, and contributed many important memoirs to that important body. The communication which interests us more especially was the one which was read on January 31st, 1839, and which was entitled "Some Account of Photographic Drawing; or, the Process by which Natural Objects may be made to Delineate Themselves with the Aid of the Artist's Pencil." This was followed by another communication on the 21st of February, when the method of preparing the sensitive paper was given, for Talbot made use of a paper support, whereas Daguerre and Niepce had employed metal plates. The fixing of the picture Talbot effected by means of a solution of common salts, or solutions of bromides and iodides. In the introduction to his "Pencil of Nature" Talbot asserts that as far back as 1835 he had secured pictures of his residence, Lacock Abbey, in the camera. The manner in which he puts this fact is well worth quoting. He says: "This building was the first that was ever known to have drawn its own shadow."

We have had a lantern slide made from the actual picture of Lacock Abbey figuring in the "Pencil of Nature," and we will now have it thrown on the screen. This picture is only one of a series I hope to bring before you at some future time, as I intend having transparencies made from all the photographs in the "Pencil of Nature.

Talbot's process possessed one great advantage over that of Daguerre's. By his system he was enabled, having once got the original picture, to reproduce it over and over again. The first picture had the lights and shades reversed, and to this the now

* Continued from page 133.

familiar name of negative was given, while to the copy, with the lights and shades as in nature, the term "positive." These terms were introduced by Sir John Herschel. The process which now bears Talbot's name—Talbottype, and which was designated by himself Calotype—was first communicated to the Royal Society, June 10th, 1841; and whereas, in his photogenic drawing, Talbot employed silver chloride in the presence of silver nitrate, he now had recourse to silver iodide. Briefly described, the preparation of the sensitive paper was as follows:—Writing paper was in the first instance brushed over with a solution of silver nitrate; when dry it was dipped into a solution of potassium iodide of a certain strength; after drying, to render it sensitive, a solution of what Talbot called gallo-nitrate of silver was brushed over it, this operation being done by candle-light. The paper could be used either in a moist or dried condition. After exposure in the camera, to render the latent image visible, the gallo-nitrate solution was again resorted to. This developer was made as follows:—One hundred grains of silver nitrate were dissolved in two ounces of water, and strong acetic acid to the extent of a sixth of the volume of solution was added. This was called A. A saturated solution of gallic acid in water formed solution B. A and B immediately before use were mixed in equal quantities, and this formed the gallo-nitrate developer. It is now pretty certain that the Rev. J. B. Reade had also adopted a similar mode of development, and in point of time was actually before Talbot, and on this point an attempt was made to render Talbot's patent for his process invalid. In a lawsuit it was decided that Talbot had the better claim, seeing the reverend gentleman had not published his method in a properly recognised manner.

A great advance in the proper fixing of the pictures was arrived at when hyposulphite of soda was employed instead of the bromides and iodides. Sir John Herschel had, as far back as 1819, shown that these silver compounds were soluble in a solution of the salt in question, but the fact, some way or other, was overlooked till Sir John called attention to it. In the year 1840 the hyposulphites had been known for some considerable period, Chaussier, in 1799, being the first to prepare them. There are several reactions by which they may be obtained, but we refer only to one. The sodium salt may readily be obtained by passing sulphurous acid gas into a solution of sodium sulphide.

It would be beyond the limits of the present communication to individualise all the various modifications of calotype that were from time to time brought forward. In some cases the paper, to render it more translucent for printing purposes, was waxed before being sensitized instead of at the end of the operations, when the negative had actually been secured. Suffice it to say, that the paper process held its own till the year 1857, when the advent of collodion altered completely the character of photographic operations. There are other matters, however, to refer to before we can approach this era in the history of photography. To return to Talbot. In addition to the "Pencil of Nature," he published another work, illustrated by silver prints, "Sun Pictures in Scotland." This was in 1845, and one of the most interesting pictures in the collection is now shown by means of the lantern. It represents Walter Scott's monument in Princes Street, Edinburgh, as it appeared in October, 1844. It was then in course of erection, and the scaffolding surrounding it is well seen in the picture. All the views in the sun pictures would be particularly interesting to reproduce for showing in the lantern, and I hope to have this done soon. The work is lying on the table for the inspection of members. In addition to calotype, an engraving process was devised by Talbot, as also a very sensitive plate which was able to record the printed matter of a paper which had been fastened to a wheel, and which was made to revolve rapidly, the whole being illuminated for an instant by a discharge from a Leyden battery; this was in 1851. The details by which this result was obtained are published in the *Athenæum* of December 6th, 1851. He devised also a method of calotype whereby positive pictures were obtained in the camera.

As already indicated, Fox Talbot did not confine himself altogether to photography; he was a mathematician of the first rank. He was one of the first who, in conjunction with Sir Henry Rawlinson, deciphered the cuneiform inscriptions brought from Nineveh. In 1834 and 1835, we find that he has papers, "Experiments on Light," and "On the Nature of Light," and, in 1872, we find that he has the following papers:—"Notes on some Anomalous Spectra," "On the Early History of Spectrum Analysis," and "On a New Mode of Observing Certain Spectra." He seems to have been a busy man all through, and he died full of years and honours on September 17th, 1877. Before proceeding further it should perhaps be mentioned that in 1852 he renounced his patent rights, and gave, with certain reservations, the right to work his process free to his countrymen.

We have already referred to Sir John Herschel's application of the now universal solvent of the unacted-on silver salts, viz., hyposulphite of soda: let us see what part he played in the drama of photographic discovery. The name of Herschel is so intimately connected with the science of astronomy, that the photographic work of the younger Herschel, as he has been called, is on this account not so fully realised as it deservedly should be. It is an ascertained fact, that as early as 1839 Herschel obtained a camera image of his famous telescope on paper prepared with carbonate of silver, and fixed with hyposulphite. He first suggested the use of glass plates in photography. He was the originator of the various iron processes. He experimented largely in the direction of colour photography, studying the action of the spectrum on all kinds of susceptible substances. The colouring matter of flowers was also dealt with by him in a similar manner. To detail all Herschel's discoveries would require a a complete paper by itself. Many of the processes devised by this investigator have dropped out of sight, but his cyanotype, or blue process, remains to this day, and is largely made use of by engravers in copying plans. The platinotype process of Willis is, in reality, based on the fact first enunciated by Herschel that light reduces ferric salts to the ferrous state. The salts of mercury were also pressed into the photographic service by this illustrious scientist. He it was who first showed the bleaching action of the bichloride of mercury on a silver print; this was in 1840. In 1843, Herschel published a process whereby what are known as breath pictures were produced. It would be most interesting to reproduce many of these early results. We could have plenty of material for our meetings if some enthusiastic member were to take up some of these bygone methods and show them to our members. The suggestiveness of all the work which Herschel did in this way is only known to those who have taken the trouble to go into the literature of the subject; but we must hurry on. It just remains for us to say, that Herschel *secundus* died in the year 1871, on the 11th of May, at Collingwood. He was born in the year 1792, and was, at the time of his death, close on eighty years old. The nation, in giving him a place among the great men interred in Westminster Abbey, have shown their appreciation of his worth. His remains have been deposited close to those of Sir Isaac Newton. The biography of Sir John Frederick William Herschel has yet to be written. The same applies to his father Sir William Herschel.

The action of light on bichromate in presence of organic matter is the basis of carbon printing, Woodburytype, collotype, and analogous processes. The fact that light could impress an image on paper saturated with a solution of bichromate of potass had been known for a considerable period before anything practical resulted from it. The name that has been associated with the reaction indicated is that of Mungo Ponton, and curiously enough, the year 1839 saw this announcement also.

Another early worker, and one who has just recently passed away, was Robert Hunt, his death occurring in the year 1887. Born in 1807, he had reached the ripe age of eighty. I regret I am unable to show his portrait. A record of his experimental work is to be found in his "Researches on Light," the first edition of which was published in 1844, and this has followed by a subsequent edition in 1854, containing almost as much as double the amount of matter coutained in the original. He was a voluminous writer in his day, but it would extend this communition to an undue length were we to particularise these. Hunt was the first to draw attention to the use of sulphate of iron as a develeper, and this was as far back as the year 1844. As you are aware, in the collodion process this chemical is employed to the present day. In his experiments the action of the solar spectrum on silver salts, with or without admixture of other substances, was fully gone into. It may interest members to know that at the first meeting of the first photographic society in Glasgow, on March 8th, 1854, Hunt was present and addressed the meeting. Though we may call ourselves the heirs of that Society, still we are not the true descendants. The Glasgow Photographic Association can date from 1862, seeing it was only a revival of the older Photographic Society of Glasgow. At the meeting in question, Jabez Hughes read a paper on "The Prospect and Progress of Photography." At that time Hughes had his studio in Glasgow, and Sheriff Bell was the chairman of the evening.

To return to Hunt. From a photographic point of view we think it unfortunate that an original investigator such as he did not remain true to his first love. He drifted, ultimately, into a different scientific channel altogether. He was a geologist as well

as a photographer, and as he received the appointment of "Keeper of Mining Records," the work of his later years lay in quite an opposite direction. He edited "Ure's Dictionary of Arts and Mines," and his latest work was "British Mining," published in 1884. Hunt was a member of the Royal Society. To those of our members who may wish to get suggestive material for new processes and new reactions, we know of no treatise or treatises which can compare with Hunt's "Researches on Light."

We will now cross the channel and see what was being done in France by two men whose names are now a record of the past, Abel Nièpce de St. Victor and Edmund Becquerel. Nièpce the younger, as he has been called, was not, as generally recorded, Niecphore Niepce's nephew, but the son of a nephew, Bernard Niepce. Nièpce de St. Victor was a soldier, but studied chemistry, and, inspired no doubt by what Niepce the elder had done, busied himself with photographic matters. In 1847 he presented to the French Academy a memoir of a process in which starch spread on glass holding the silver salts was made use of. In 1848 he announced the albumen process, in which the starch was replaced by the white of eggs. Nièpce de St. Victor is usually credited with being the first to use glass, but I think this honour should be given to Herschel, as already pointed out. Nièpce de St. Victor worked hard at the still unsolved problem of heliochromy, or photography in natural colours. A certain amount of success attended his efforts, and I believe specimens of results obtained are to be seen seen at South Kensington; however, as these experiments for the most part refer to a period beyond that at which I shall have to close this communication, we shall rather pass on and consider the work of Edmund Becquerel, which dates from the year 1848. Nièpce de St. Victor died on April 6th, 1870.

Becquerel was a French physicist, and his father, Antoine Cæsar Becquerel, was also a man famous for his scientific researches, which were chiefly electrical. Becquerel the younger, on February 7th, 1848, presented a memoir to the French Academy of Sciences on the coloured photographic image of the solar spectrum. He experimented with Daguerreotype plates, and by means of a layer of chloride—or, rather, what is known chemically as a subchloride—he was able to reproduce in a more or less perfect manner the colours of the spectrum which had been allowed to fall on the plate. Another memoir was submitted in the following year, viz., 1849, and in this he gives full details as to the preparation of the colour sensitive chloride. His mode of preparing this was an electrical one, and consisted in placing the plate in a solution of hydrochloric acid, connecting it with the positive pole of two Bunsen cells. Opposite the silvered plate a platinum conductor of the same size was placed in solution, and the current in passing decomposed the acid, and the chlorine given off attached itself to the silver plate, giving the form of chloride susceptible to colour influence. We need not go further, but enough has been said to show how early in the day the search after colour photography took place. As the matter stands, we are apparently no nearer the unsolved problem than in the time of Becquerel, notwithstanding the fact that succeeding workers have spent years of study and research on the subject. So far photography in natural colours has proved a veritable *ignis fatuus* to the photographic traveller. Is this to be the permanent state of affairs, and are we to accept the fact that the thing is impossible? I do not wish to be dogmatic, but taking it for granted that heliochromy were to-morrow an accomplished fact, it could not impress me more than does the fact that our photographic plate is now so susceptible to light radiations that an exposure amounting to only the fractional part of a second can give a picture. Would colour photography be one whit more wonderful than this everyday occurrence in our photographic work? Science, to my mind, has performed feats much more difficult of accomplishment, and seemingly more impossible than what this appears to be. Take the telephone: even the most sanguine electrician did not conceive it possible that speech could be reproduced at the end of a wire miles apart from where the original words were delivered. Take the phonograph: what could be more wonderful, or even more weird, than the fact that we are enabled to put away the tones and voice of a human being, and reproduce them, it may be years afterwards, when the speaker has been called to his fathers, and the voice is hushed for ever.

In conclusion, we should refer to Dr. John William Draper, the famous American, and his photographic work. I propose, however, breaking off at this point, and will leave the consideration of what he did to another occasion, when I shall be able to show his portrait by means of the lantern.

(*To be continued.*)

TO MAKE GRAINED NEGATIVES FOR ZINC ETCHING WITHOUT A SCREEN.

BY W. T. WILKINSON.*

This is done by coating the plates with an emulsion containing sulphate of baryta in very fine powder, and well shaken up before coating. Pictures are taken upon these plates, and developed and fixed in the usual way, but the image, instead of being smooth and nice, will be covered with myriads of fine pinholes. These negatives are used for printing on the zinc in bitumen, then etched in relief for type blocks.

Instead of sulphate of baryta, carbonate of soda, &c., may be used in the emulsion, and, after fixing, immersion in weak acid will develop the pinholes. The bromo-chloride emulsion may be used upon collotype plates, followed by drying them in the oven at a high temperature, exposing under a reversed negative. Develop and ink up as for the paper; pull the transfers upon ordinary lithograph transfer-paper. To obtain a coarser grain, soaking in warm water will develop the reticulation.

Notes.

We rather sympathise with the *Globe*, which has protested against the circulation of the portraits of Richard Pigott, "photographed immediately after death," copies of which have been sent our contemporary by a well-known firm. It is difficult to conceive anybody buying such productions, but a taste for the morbid is not uncommon. Happily, up to the present, English photographers who have been called in to photograph horrible scenes—and there has been a good deal of work of this kind during the past twelve months—have not abused their opportunities. That such horrors would find a sale there is no question.

English photographers have on more than one occasion got into serious trouble on the Continent through setting up their cameras near fortifications. Before long they will run the same risk in England. The Attorney-General has in preparation a Bill to deal with the offence of disclosing official secrets, and among the clauses is one which treats of sketches and photographs of fortresses. The penalties attached are very severe in cases where the object is to give information to foreign Governments. Of course, a photograph of fortifications may be taken for a very innocent purpose, and a photographer, camera in hand, may wander near earthworks and batteries without the least intention of photographing one or the other, but to the sentry he will appear an enemy, and therefore the best plan will be to give the defences of England a wide berth.

It is curious how sensitive crowned heads are to the political influence of photographs. In France, as we have noted on more than one occasion, the greatest importance is attached to them as a political engine, and a very good guide to public opinion may be found in a study of the photographs in the various shop windows. The Sultan of Turkey evidently fears the power of photographs. The Crown Prince (the Sultan's eldest brother) being suspected of conspiring against him, the Commander of the Faithful had, the other day, all the shops in Pera where photographs are sold overhauled for likenesses of the Prince,

* A communication to the Conference.

and those found were confiscated, and their sale forbidden. Undoubtedly the popularity of an individual may be always tested by the interest which the public take in his portrait, and perhaps crowned heads are right, from their point of view, in suppressing the likenesses of possible rivals.

Messrs. Marion and Co. send us for notice a useful pamphlet which they have issued, and which contains a number of developing formulæ reduced to the percentage system, or as near as one can hope to get when using weights and measures jumbled in the fashion usual among photographers: still quite near enough for ordinary use.

To make ten per cent. potassium bromide solution, we are told to take 480 grains of bromide of potassium and water to make up to ten ounces. Nothing is said as to whether the fluid ounce (volume occupied by 437½ grains of water) is to be the ounce by which the water is gauged, but photographers would probably use the fluid ounce in ordinary cases, making the solution somewhat too strong in potassium bromide.

If the 480 grains of potassium bromide was made up to the *weight* of 4,800 grains with water—*i.e.*, 10 ounces troy weight—the solution would contain ten per cent. of the bromide. That is to say, ten *grains* of the solution would contain one grain of the salt; while ten *minims* of Messrs. Marion's solution would contain one grain. A minim of water is rather less than a grain, as a fluid ounce of water, which weighs 437½ grains, measures 480 minims.

As a laboratory operation, we may mention that weighing a liquid is often far preferable to measuring it, as involving less risk of contamination from dirty measures, and very often weighing is the quicker operation of the two, especially in the case of such viscous liquids as can scarcely be measured without considerable inaccuracy.

For weighing liquids, a pair of scales with platform pans, and the beam underneath, is to be preferred; and as an aid to quickly counterpoising the bottle or other vessel into which the liquid is to be weighed, it is convenient to provide two light boxes of tin plate, each large enough to hold a quantity of the finest shot, or of large clean round sand corresponding to the full load of the balance. By putting the empty box on the weights pan, and pouring the shot from the full box to the empty box, the counterpoise is quickly effected, after which the required weight is put in the pan. If now the liquid were to be poured into the vessel till the scale bumped down, more than the required quantity would have been added, and supposing other ingredients to be already in the vessel the work would be spoiled, or at any rate marred. To obviate this a small weight is put on the pan where is the receiving vessel, so that the pan will bump down rather before the full quantity has been added; and the little weight being now removed, the liquid is added cautiously till a balance is effected. All this is very quick in practice, and in our own hands involves less loss of time than the frequent washing out of measuring vessels, to say nothing of the risk of contamination by imperfect washing, in addition to the risk of error from the adhesion of a viscous liquid to the sides of the vessel.

Some persons in weighing liquids keep a special pair of scales, in which a glass beaker is permanently balanced against the opposite pan, a course which involves both the disadvantages touched on in the preceding note.

In *La Nature* are given the following reproductions of photographs of the spark discharge of the Ruhmkorff coil, one terminal being placed near the middle of a gelatino-bromide plate and in contact with the film; under the plate a sheet of ebonite extends a trifle beyond its edges, and under this a metallic disc connected with the other terminal of the coil, and the breaks in the primary circuit were made by hand. Fig. 1 shows the



Fig. 1.

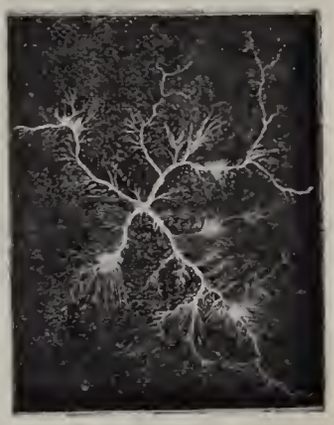


Fig. 2.

discharge when the terminal, in contact with the film, was positive; and fig. 2 shows the discharge when the poles were reversed—*i.e.*, negative terminal next the sensitive film. Readers who will turn to p. 466 of our volume for 1886 will find numerous illustrations of the electric spark as depicted photographically.

M. Chevreul, whose death at the age of a hundred and three years has just been announced, leaves behind him a splendid record of work; indeed, his active labours have proceeded without intermission since he entered Vauquelin's laboratory in 1803. He was especially modest in all his work, never claiming, even by inference, that infallibility, a profession of which so often characterises less able scientific experts.

It would be interesting to know what is the general experience of artists in regard to their sitters. Does the influence of the photographic studio sit awkwardly upon the latter, and does it take some time for the artist to obtain a thoroughly natural expression? We ask the question because, very recently, we had an opportunity of seeing an artist attached to an illustrated paper sketch the head of a gentleman whose portrait was to be published, and the operation was very instructive. The sitter had

clearly got the head-rest aud camera in his mind's eye, for no sooner did the note-book and pencil make their appearance than he rose to his feet and stood as rigid as a seutry. The artist entreated him to be seated and make himself comfortable, and after a little hesitatiou he acceded to the first suggestion, but was not successful as to the second. He was evidently of opinion that he must not move a muscle of his face, and though the editor of the journal, who was present, plied him with all sorts of subjects for conversation, only monosyllables could be extracted from him, though, as a rule, he was chatty enough. He seemed afraid both to open his mouth and wink his eyelids, lest he should injure the operator, and it was only towards the end of the sitting that he began to thaw a little. If all who sit to have their portraits painted are like this one, artists have certainly a bone to pick with photographers—that is to say, photographers of the old school.

The fates were against Mr. Friese Greenc when he read his paper on Tuesday at the Photographic Society's meeting. In the first place, the room was changed, and, instead of having the spacious area of the gallery, he had to put up with a make-shift apartment, in a corner of which he had to show himself in company with a somewhat bulky apparatus. The apartment, besides being small, had the disadvantage of having a staircase ascending into it, and every now and then the noise of the turnstile below, like a gigantic watchman's rattle, floated through the room. It was also unfortunate that, owiug to a protracted discussion on the medal question, Mr. Greene's paper had to be pushed to the end of the meeting, when the members were tired, and could not, we fear, follow it with the attentiou it merited. In addition, the flash-light experiment could scarcely be called a complete success. A gentleman had been told off to turn out the gas directly after Mr. Greene had blown the illuminating powder into the flame. Mr. Greene religiously blew, and the gentleman religiously turned out the gas, but the unexpected result was total darkness, for something was wrong with the illumiuating apparatus. On the second attempt the flash appeared, but the gentleman forgot to turn out the gas. A third try came off successfully so far as the light was concerned, but the reception was hardly so exhilaratiug as one would have liked. The problem to be solved was, whether those present, when they shut their eyes, saw the light as it appeared when their eyes were open, or whether they saw it reversed. "Do you see it?" asked Mr. Friese Greene. "*I smell it!*" ejaculated a sepulchral voice in the gloom. This was not encouraging; but it is satisfactory to know that Mr. Greene did not mind. He is, so we learn, accustomed to criticism, and in this respect compared himself to an egg, which got the harder the more it was boiled. Mr. Greene shows he has the true philosophical spirit.

Lobengula, the king of the Matabeles, who has lately had his envoys in England, does not know what a treat is in store for him. The agent of a newly-formed mining company, which has obtained a concession in an adjoining territory, has just started with a fixed intention to photograph His Majesty. Lobengula has never been photographed, and is not particularly anxious for the honour; but the agent in question, who is armed with a full photographic outfit, believes he can overcome the objection of the monarch. His idea is that as the Queen has sent one of her portraits to the dusky potentate, he can persuade the latter that Her Majesty is burning to have one of his in return. Possibly he may succeed. The experience of most travellers is that the uututored savage is more frightened of the camera than of the photograph. Modern appliances, and the absence of the big brass lens so suggestive of a small cannon, make the task easier.

The plaintiffs iu a receut theatrical libel case must have a profound faith in the efficacy of photographic evidence. The question at issue was the particular attitude assumed by the plaintiffs, who are dancers, which attitude was severely commented upon by a theatrical newspaper. As a part of their case the plaintiffs put in photographs to show the judge and jury that their dancing was perfectly proper and decorous. As the photographs were taken in a studio, and as the dancers posed themselves for the occasion, it is difficult to see what bearing they could have had on the matter, seeing that the dance complained of took place somewhere else. Now had the *Era* mau provided himself with a magnesium apparatus and an instantaneous camera, and taken a series of photographs of the poses which so offended him, he might have won his case. As it was, he lost it. How much of the plaintiff's success was due to the photographs exhibited we are unable to say.

The plan hitherto adopted of distributing free photographs to the readers of a "Bits" periodical does not appear to have been altogether a success. The conditions were, the possession of a coupon of the current week's number, and of a coupon of the preceding number. Armed with these, you proceeded to the photographer before the next number came out, aud you had a sitting free for one photograph. Innocent people may ask how did this benefit the paper? Well, if many did as a photographic friend of ours did, the benefit is pretty intelligible. The photographer in question had a great desire to see the people who were photographing for nothing and for this purpose bought the paper, in which he took not the slightest interest, and never read for weeks and even months. Somehow something always prevented his going, and, when he had the opportunity, he discovered he had omitted buying the issue of the previous week, without which he was ineligible. Certainly, he more than paid the price of the photograph. But now this is altered, and his chance is gone. Probably others find it inconvenient to go at a precise time, and the proprietor of the paper has wisely arranged to give six gifts of a dozen cartes every week. All you have to do is to intimate your desire, accompanied by the indispensible coupon, and, if you are lucky, you may be selected as the proper person to be photographed.

THE FUTURE OF THE FLASH LIGHT.

BY C. BRANGWIN BARNES.

When any new discovery, invention, innovation, or process takes place, having a direct bearing on "the art science," many enthusiasts at once proclaim that photography will be thereby entirely revolutionized. When gelatine bromide dry plates of greater rapidity than wet collodion were introduced they prophesied the speedy death of the latter, and, to all intents and purposes, it is dead; but who will be bold enough to say that the process of the future will not be a wet plate once again? Our enthusiasts also prophesied the speedy exit of the silver printing process, with its evanescent, though beautiful, results, in favour of the carbon process, with results absolutely permanent; but, although carbon is in use to a certain extent, that extent is still a limited one, and so far as general photographic printing is concerned, both as regards portraiture and landscape work, in the hands of both professional and amateur followers of the art, silver is still king, and seems likely to remain so. Then came the emulsion printing process, by which the prints were produced with rapidity far in advance of either carbon or silver, and which were stated, like the former, to be permanent. This process was to become general in a very short time; but, at present, it seems to have made very little headway; in fact, it appears now that if silver printing is to be superseded, it will be by platinum.

The latest invention—or, perhaps, improvement would, in this case, be the better term—is known as the flash light; and is really, so far as its photographic utility is concerned, an improvement on the ordinary magnesium light effected by using the magnesium in the form of powder instead of wire. The powder, when projected into a flame of gas or spirit, is much more incandescent than the wire or ribbon, and of far greater actinic power, as a flash, which takes place in the fraction of a second, is sufficiently strong in actinism to give a sufficiently exposed image upon a gelatine plate of ordinary studio rapidity. Such being the case, there are not wanting enthusiasts in the cause who prognosticate a tremendous success for the process, going so far as to state that it will oust our old friend the sun from his post of honour, so far as taking the negative is concerned, and that specially-built studios of glass will no longer be required.

Pictures have been taken and exhibited rivalling good daylight portraits, it is true, but I do not think there is any immediate necessity to shut up our glass rooms and discard old Sol. I would not for one instant seek to depreciate the value of the discovery, which I consider most valuable, and likely to lead to great things in the future—in fact, for use when the daylight is waning, or, from outside fog, lacks actinic power, if for nothing else, the needful apparatus for taking flash light portraits should find a place in every studio, and will very quickly repay the necessary outlay, which is not at all extensive. Opinions vary as to the best form of lamp, and it would be out of place, in a paper like the present, to express a personal opinion as to which is the best. Intending purchasers cannot do better than see the different kinds in action, and choose for themselves; but, as regards the powder used, I would decidedly advise the selection of pure magnesium unmingled with chemicals such as chlorate of potass or picric acid, as we do not wish to introduce an element of unnecessary danger on to the scene.

Besides the great utility of the new light in the case just mentioned, it cannot but be a very great aid in the taking of "at home" portraits, doing away with the necessity for the prolonged sittings which have up till now been required when taking a photographic portrait in an ordinary sitting room. For use as an aid to the photographing of interiors, the value of the flash light cannot be over-estimated. In addition to shortening the exposure in the case of ordinary interiors, the use of the magnesium flash lamp overcomes the difficulties caused by the introduction of windows into the picture, which, with an ordinary exposure, always produces halation and spoils the photograph; besides which many interiors which are so dimly lighted as to render the production of a good photograph by the ordinary process next to impossible, can now be successfully reproduced.

The new light will also be of great assistance in copying old paintings. I remember one I had to copy some years ago, which was supposed to be of great value, and the owner of which would on no account allow it to be taken away from the room in which it was hung, for the purpose of copying. The room in question was dimly lighted, and after exposing a very rapid plate for twelve hours, I had only a very much underdone negative. Had the flash light have been at hand I could have obtained a good one in as many minutes.

Genre pictures and photographs of stage plays will now become much more easy of production, and we may expect, ere long, to see some startling results as regards the latter. The flash-light will also prove a remunerative investment for the purpose of taking at-home portraits on the occasion of fancy dress balls or evening parties; the instantaneous exposure giving better results as to expansion, &c., than the more lengthened one necessary when other compounds than magnesium powder are used for lighting, added to which, the paraphernalia and apparatus are much smaller and easier of transport. A general view of the ball-room can also be taken, and will, in some cases, realise a good sale, as nearly all who were included in the picture would order copies not only as a memento of the occasion, but for the novelty of the thing. Meetings of scientific and other societies, as well as social gatherings or re-unions of families round the home fireside at yuletide, or other seasons, will all afford opportunities for the photographer with an eye to business. No interior photograph need now be merely a picture of a room, as its usual inhabitants may be in their accustomed places, and the result of this will soon be seen in the disappearance of the harsh-looking photographs of apparently uninhabited store rooms of furniture.

Perhaps the reader will think I am one of those very enthusiasts whom I rather deprecated at first, but it must be noted that I do not for one instant imagine that the magnesium light is going to take the place of sunlight for ordinary portraiture; on the contrary, I opine that studio photography will still go on as it has done, but for the flash-light I foresee a very bright future. Its introduction will, I think, mark an entirely new epoch in photography. It will revive waning business, and bring the necessary and needful kudos into the pockets of hard working photographers, not by clashing with or superseding their ordinary work, but by opening quite a new groove, which can be worked in conjunction and as part of the business of the ordinary photographer. Our studio work can jog on as usual, so can the landscape and architectural work; but we can now add a new branch thereto by the aid of our new servant the Magnesium Flash-Light. If judiciously worked I see no reason why the flash-lamp shall not, so far as a bread-winner is concerned, rival the far-famed lamp of Aladdin.

SPEED INDICATORS FOR SHUTTERS.

BY G. LINDSAY JOHNSON, M.A., M.B.*

The instruments which are best suited for testing the rate of shutters fall under two heads: those which depend for their motion on gravity, and those which are moved by mechanical means. Under the first head we have for our standard of time a pendulum; (2) a weight dropped from a known height in front of the camera; (3) the rate of a ball or cylinder rolling down a smooth board at a known angle; and lastly, in the case of the well-known drop-shutter, the distance through which the drop falls in front of the lens. This latter is very convenient,

* A communication to the Conference.

as the rapidities can be marked on the drop itself, according to the height through which it falls. For those who may have one of these shutters, I append a table containing the fractions of a

Diameter of lens aperture in centimetres.	2 cm.	4 cm	6 cm.	8 cm.	10 cm.	15 cm.	20 cm.	25 cm.	30 cm.
4 cm.	1/16	1/22	1/27	1/13	1/35	1/43	1/50	1/55	1/61
5 cm.	1/13	1/18	1/22	1/25	1/28	1/34	1/40	1/44	1/49
6 cm.	1/10	1/15	1/18	1/21	1/23	1/29	1/33	1/37	1/40
7 cm.	1/9	1/13	1/16	1/18	1/20	1/25	1/28	1/32	1/35
8 cm	1/8	1/11	1/14	1/16	1/18	1/21	1/25	1/28	1/30

second which the drop takes to fall across lenses of various diameters. The top line represents the distance in centimetres through which the drop falls before the lens begins to be uncovered.

The other forms above mentioned all possess such great drawbacks, in my opinion, that they may be dismissed at once as unpractical for our purpose.

Under the head of mechanical time indicators we have two distinct classes: those which are used for direct light, and those in which reflected light is employed to register on the sensitive surface. Among the former we have Addenbrooke's apparatus, which he exhibited at the Photographic Society, and which consisted essentially of a dark slide containing a sensitive plate, and capable of being revolved by a crank worked by the hand. The slide, open in front, rotated in a narrow fixed box, perforated in front by several small holes placed in a line from the centre. In front of this again was a lantern containing a piece of magnesium ribbon, and having the shutter to be tested fastened in front. When ignited, the light, entering the holes above mentioned the moment the shutter was released, acted on the plate as it was rotated at a given rate—say once in a second—forming, when developed, dark lines or arcs. The length of these lines had only to be compared with the circles of which they formed the arcs to indicate the fraction of a second taken by the shutter at that particular point.

The objections to this method are, first, the difficulty of regulating the speed by the hand in a uniform manner; secondly, the necessity of working in a dark room; thirdly, the fact that the ratio between the arcs and their circles had to be increased each time.

The next method by which direct light is used may be described as a drum moved by clockwork. This drum carries on its surface a band of very sensitive film or tissue, and is protected from the light by a wooden box perforated by an aperture corresponding to the opening of the shutter. In front of this aperture is a tube fitted with an objective, in front of or within which the shutter works. A release, acting on the clockwork, sets the drum revolving, and the shutter—pointed to the sun or other bright illumination—is released, and records the impress of light on the revolving surface of the film when developed. I have made one of these machines after the pattern suggested in the journals, and should have exhibited it to-day but for some alterations I am making to it. This is by far the most scientific form of speed-measurer, as the abscissæ ruled off on the developed film represent the size of aperture at any given time, while the ordinates show the total duration of the exposure in terms of the circumference multiplied into the speed of its rotation. But this, again, has many objections. If we wish to prevent fogging the film, a lens is necessary to limit the action of the light; and then the difficulty of focussing the lens comes in, and of fitting the lens to the tube. To avoid these difficulties I have contrived the following form of speed-indicator. I removed the escapement from a large kitchen clock, and in its place substituted a fanfly to regulate its velocity. By filing this down, I got it to cause exactly one revolution of the dial screen per second. The dial, which is a white porcelain one, is divided circumferentially into sixty divisions, and each of these in a separate scale into ten smaller divisions, making six hundred in all. Screening these from the light is a black metal screen, with a rectangular opening at one spot equal to ten of the smaller divisions in breadth. As this screen revolves once every second, if the shutter were opened for that time, all the divisions would be recorded on the sensitive plate behind the shutter and lens; or, again, if the shutter were opened for $\frac{1}{10}$th of a second, seven large divisions would be recorded—*i.e.*, six divisions uncovered, together with the one large division behind the aperture.

Besides this movable disc there is a short recording hand moving from the centre, which makes 1-12th of a revolution in a second, *i.e.*, one complete revolution in 12 seconds.

In order to find the exposure for all parts of the plate some other contrivance is necessary, seeing that all shutters start from nothing, and after arriving at their maximum opening, close up more or less quickly to zero. This result is obtained by placing immediately in front of the plate in the camera a screen containing six square apertures, each about one-fourth of the height of the plate. Three of these apertures are arranged one in the centre of the plate, and one above and below, and three at the side of the plate arranged in a similar manner. We have thus six squares. Five of these squares are always covered up by square cardboard screens, so that the light only passes through one at a time. The screen is made somewhat shorter than the opening of the camera to allow the hand to be inserted to remove the small square screens more easily, for the slide comes too close against them to allow of handles being attached.

We now suspend the clock to one of six nails which are driven into the wall at such distances that the camera in its proper relative position will allow the clock to be seen, filling up one of the squares when viewed through the ground glass. Thus, each square is opened in turn, and as the weight is released and the clock shield revolves a shutter exposure is made. When all six have been taken, the plate, previously inserted behind the screen, is developed in the usual way, and according to the number of divisions visible in each negative, the exposure for each part of the plate, &c., can be read off at once. Of course, it is necessary to have the clock facing a strong light, such as the sun, or bright sky.

Discussion.

Captain Mantell asked Dr. Johnson whether he had insured the accuracy of the speed of the clock in any way, and pointed out how that could be very easily done by synchronising it with an electric attachment.

Mr. Wollaston gave his ideas on testing shutters. He totally refused to believe that it was possible to get even fairly accurate results with instruments of the dial type. He thought the only true way was to place the source of light inside the camera and pass it through the shutters and lens on to a revolving circular plate, such as is sold with Stern's waistcoat camera. He would then place in the diaphragm slot a special stop, having a small hole on the outside edge, another nearer the centre, and so on; in fact, a series of small holes along a diameter. A photograph taken would then give dark spots corresponding to each hole, and as the shutter successively opened and closed it would make its own record on the revolving plates, and the length of the marks would give the time the shutter was open at each part.

Mr. A. J. Wall asked Mr. Dallmeyer why he did not use shutters working in front of the plate; he was now devising one that on a whole-plate would work at $\frac{1}{4000}$ of a second.

Mr. Dallmeyer, in reply, said that he had not treated of any other but diaphragmatic shutters, and had endeavoured to improve the efficacy of these as much as possible.

PICTURES BY THE ACTION OF HEAT AND "COLD."

BY D. WINSTANLEY.

Article IV.

Another means of obtaining thermal pictures will probably be in the sulphuration of the surfaces of burnished metals, or in their amalgamation by mercurial fumes.

Concerning the coin experiment mentioned in Sir David Brewster's letters, I performed it frequently at the time when first I read of it, and I have carefully re-performed it now. Selecting one of our bronze coins of the date of 1861, I rubbed it on a knife-board until the image was considerably effaced and, in parts, nearly gone. This I have cautiously heated on a shovel, burnished side up, of course, over a glowing fire, and frequently examined by the light of day. These are the results:—The image and superscription first appeared in a most magnificent and glowing red, upon a ground of yellow, which shone like burnished gold. After this, the red assumed a purple hue,

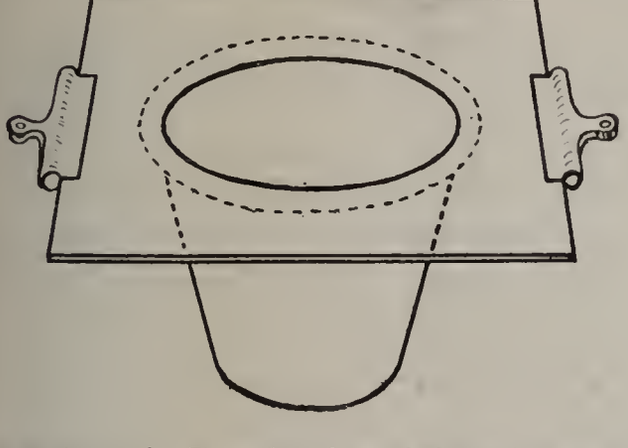
• Continued from page 76.

and the ground work, which was quite separate from the letters and the figure, was composed of sporadic patches of dark blue and gold, and the whole three colours remained, although considerably dimmed, upon the coin when it had cooled.

Upon re-heating, the colour of the ground turned to the glorious red, and the image to a splendid and a polished green exhibiting the phenomenon of specular reflection. On cooling, the image gradually lost its lustre, and when cold, it looked like tarnished brass upon a ground of the most extraordinary red and blue that I have ever seen. I commend the whole of the experiments I have recorded so far to the attention of the intelligent photographer desirous of affording his friends some rational recreation in the Christmas holidays, and I shall feel much obliged to anyone who will send me, through the editor, photographs of successful pictures in dew-drops or in ice, and I shall have pleasure in sending him results of interest in return.

I have often noticed the surface of copper kettles in the windows of those who deal in such like things, covered by oxidation with a magnificent display of all the rainbow hues, and it occurs to me that by the use of stencils, or masks such as those I have described, this oxidation produced under the influence of the sunshine would slowly form in the pattern of the mask, and possibly under the operation of a projected spectrum yield us a photograph in colours.

The next experiments I have performed in frigerography have been with iodine. This substance, with which photographers are more or less familiar, slowly vapourises at the ordinary temperature of the air, and will be often found sublimed upon the upper portions of the bottles in which it and its solutions are contained. Subjoined is a sketch of



apparatus used. It consists of a conical vessel of earthenware (originally used for warming infants' food), together with two pieces of stout card held together by strong metallic clips. In the middle of each card a circular hole is cut, that in the lower one being just large enough to encircle the flange of the vessel underneath, and that in the upper one of such a size as will just leave the inner portion of the vessel all exposed. For the performance of an experiment, between these cards, a sheet of writing-paper together with a stencil or a mask is placed, a little iodine is thrown into the pot, and the cardboard cover fixed in position, with the paper underneath, and the mask or stencil on the top, and in this condition the whole is exposed in chilly weather to the nocturnal sky. The theory of the experiment is, that beneath the openings of the stencils or the blackened portions of the mask, the sheet of writing-paper will be colder than elsewhere, and thus condense the iodine in larger quantity, and yield a frigerogram perhaps visible at once, but certainly capable of development by starch. My experiments have proved this view to be correct, and I have obtained quite a number of pictures of the kind.

(*To be continued.*)

LIGHTING IN THE PHOTOGRAPHIC STUDIO.

BY C. P. I. DUCHOCHOIS.*

V.

Having described the effects of light and shade, and the rules to be observed, we must now study what should be the construction of the studio or glass room, and how the light plays on the sitter in order to produce these effects.

The painter disposes the light so that it falls on the model at an angle of 45 degrees. It is the classic lighting, and answers admirably to show the *modelé*, and that is all which is necessary; for the artist creates in his imagination a certain scene with certain effects of light and dark, and reproduces it with his palette without regard to the lighting of the model in his studio, although guided by it to some extent, his previous studies and observations of nature being the real guides. Not so with the photographer; he can reproduce only what appears before him, and, therefore, he should direct, alter, and reflect the light on the model to produce the picture he has conceived; in a word, he should design a natural, living scene, and then mechanically—or nearly so—fix this scene projected at the focus of his optical apparatus by chemical means. The first part of this belongs to the artist, the other to the photographer. Let us place a model in a studio lighted from above only: we observe that the wrinkles of the face are exaggerated, giving an older, hard appearance to our model—the eyes are sunken, shadows objectionably dark are cast under the nose, the lower lip, and the chin, whilst the hair, strongly lighted, appears grey. On the other hand, if the model be lighted entirely by a side light, the *modelé* of the face is injured, and, consequently, the features of the model much altered; the eyes are dull for want of contrast, the delicate shading of the mouth disappears, the lighted side is flat, and the shaded one, without form, in a deep shadow, the whole face having a hatched shape. Therefore, to obtain a more suitable lighting, the studio should be constructed with a top and side light, in order to combine the two lights in just proportions. The studio represented in the annexed figure is

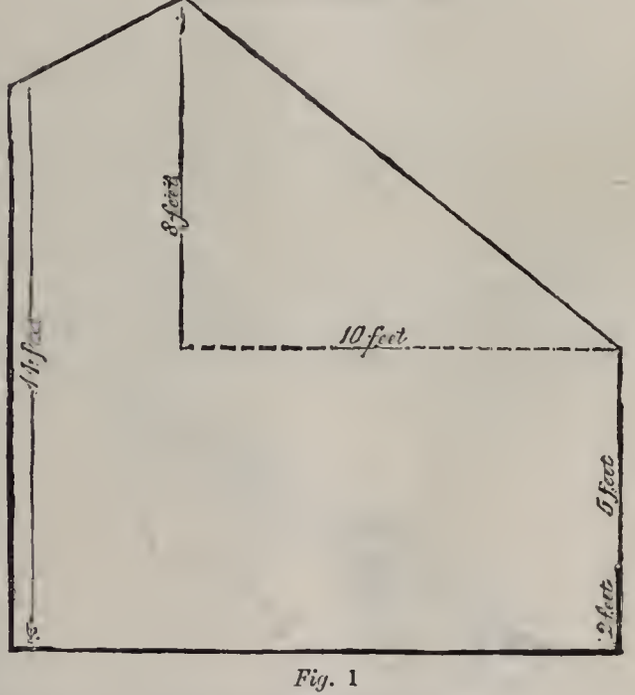


Fig. 1

generally recommended by artist-photographers. The room is 14 feet wide and 14 feet high. The pitch of the glazed roof is about 47½ degrees. The side light commences 2 feet from the floor, and rises 7 feet above, being 14 feet wide, which is more than necessary. The room should be as long as possible—at least 40 feet—to allow the use of long focus lenses for groups, large figures, &c., in order to avoid exaggerated foreshortenings—one of the greatest shortcomings in photography. As to the glazing, clear glass is generally employed. Ground glass—polished side outward, of course—is selected to practically get rid of reflections, especially from brick houses when an open sky cannot be secured, and even then—for the top light, at least—

* Continued from page 806, vol. xxxii.

it will produce a light softer, more pleasant, and less tiresome to the eyes of the sitter. In Paris nearly all the studios are thus glazed ; moreover, it does not much diminish the strength of the light, as one may be led to suppose.

VI.

To direct and regulate the light, a system of spring shades, curtains, or shutters should be adapted to the glazed side and roof of the studio.

The most simple and less costly arrangement to control the side light consist of narrow curtains, arranged in sections to mask partly or entirely the light, and sliding on rods or wires. This arrangement is well-known and explains itself. The curtains should not be white nor blue, but of a dark grey greenish colour, as well as the wall of the studio. All reflected actinic light should be avoided in the studio, except that managed by the artist.

For the roof curtains may also be employed. They are troublesome to organize, and still more troublesome to work with cords, pulleys, &c. Mr. Schaarwachter, one of the leading photographers in Berlin (Germany) has devised an ingenious system to move these curtains with the greatest ease, which Mr. Baden Pritchard thus describes :– "In the first place, Herr Schaarwachter has no lines or cords for the moving of the blinds or curtains. These, of blue linen, hang in very loose festoons from the roof. Brass wires run the whole length of the glass roof ; they are parallel, and, perhaps, 2 feet apart. They are kept taut—this is uecessary—in the same way, pretty well, as our wire fencing ; that is, each end of the wire passes over a roller (*a*), and then round a wheel furnished with a cog (*b*). On the face of the cog-wheel are two

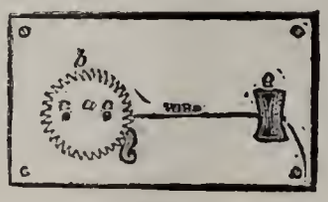


Fig. 2.

holes (*c*) into which a key, or winch, fits for the purpose of keeping the wire taut ; the arrangement can be easily understood by our cut fig 2.

It is necessary that brass wires be employed, and not iron, for the latter rusts, and then loses its smoothness, and unless the wires are smooth, the curtaiu rings will not run upon them with ease and facility, for, as we have said, the curtains are quite loose and baggy.

Here is a transverse section of the roof, fig 3, showing how the wires are fitted, and how the curtains are arranged.

a, *a*, *a*, *a*, are sections of wires : *b*, *b*, *b*, the curtains, which are so hung as to overlap one another. Herr Schaarwachter simply uses a light bamboo pole to manipulate his curtains. He pushes

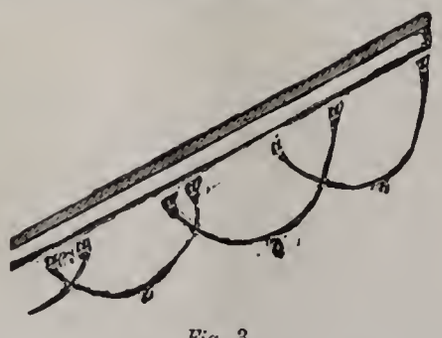


Fig. 3.

the curtains on this part of the roof, or makes them cover that part. The rings on the stretched brass wires move with exceeding facility, and a more simple plan of manipulating curtains to effect light and shade cannot be conceived."

Another excellent arrangement to direct the light on to or away from the sitter is a system of shutters about two feet wide, revolving on pivots or on hinges. They may be made of tin or zinc, paiuted white on the side facing the light, and of a neutral colour on the other ; or they may consist of very light frame-work, with calico stretched over them, and papered white and grey-green, as mentioned above. Whatever they may be, those fixed ou the glazed roof especially should move in sections to lighten any part of the studio at will, by means of centre pieces fixed to each other, and when shut they should project one over the other ; this arrangement is similar to window blinds.

Generally the pitch of the roof is not so inclined as to prevent the sun shining into the studio at midday, in the morning and evening in the long days of the fine season, whereby the dusts, always floating in the air, being illuminated by the direct rays of light, form a mist in the studio which obscures the model, producing on the negative an effect resembling a chemical fogginess, for which it is often mistaken. This should be obviated ; furthermore, when the sunbeam does not fall between the model and the camera, as iu the case above, it is reflected by the floor and walls of the studio, and thus badly interferes with the lighting of the model.

Ssveral contrivances have been devised to that end, such as a large frame-work, like blinds, constructed on the roof at the end of the glazed part, or awnings similarly arranged ; which latter is, by-the-bye, objectionable on account of the wind, and necessitating to be moved by cords and pulleys. Light narrow frames covered with mineral paper of good quality (the ordinary kind rapidly turns yellow), revolving on pivots and placed near the glass, answer quite well ; morcover, they soften the light, intercept very little of it, and can be let to hang down when the sun no longer shines on the glazed roof. This arrangement is suitable when the roof is not glazed with ground glass, and the light controlled, not by curtains, spring shades, shutters, &c., but by movable screens, and is even preferable to ground glass, for it permits using the light from the clear glass to obtain a brighter illumination.

VII.

We have just said that the light can be regulated by movable screens as well as by curtains, shutters, or other contrivances fixed to the glazed side and roof of the studio. Indeed that is an excellent mauner, perhaps the best, to control the light to obtain delicacy of details, together with vigour and effect in photography.

Place a model under the light at a certaiu distance from the side light as is proper, and no matter how the light is distributed over it by the curtaius or shutters, one side is always brightly lighted, while on the other too deep shadows are apparently projected. Look at the face of the model, you can hardly see any details in the shadow side, but interpose a tinted cardboard near the lighted part so as to obscure it, immediately all the details in that shadow become visible. Hence it is evident that it is not the shadow which is too dark, but that it is the lighted part which dazzles us by its brightness. This effect is equally produced on the negative. It will even be exaggerated, for, as you well know, strong and weak lights do not impress the silver compound according to their relative value, the former acting more energetically than the latter in comparison. Therefore the light should be better distributed to avoid this objectionable opposition of light and dark, not by turning the face to the light, which flattens it ; not by white reflectors to throw light on the shadow, which destroys the *modelé* and projects a false light—one which comes from another direction—but by screens to soften certain parts by forcing, so to speak, the light to be diverted from its direction and diffuse on the model.

Various movable screens are employed to regulate the lighting. All those described further on have their utility. They should be at hand in every studio.

To prevent the light falling directly from above on the head of the model—and therefore to project deep shadows under the eyes, &c., or to cast a shadow on the hair, in order that the model does not look light-headed—a head-screen is employed. It is simply a wooden frame, about two feet square, covered with pale rose muslin and fixed to a Success head-rest, which permits turning it at any angle, sideways or upward, and to place it at a certain distance over the head of the sitter.

Next comes a screen about forty inches wide, six or seven feet high, over which is adapted, with hinges, another light screen or canopy about forty inches long, which can be heightened to an angle of forty-five degrees, or lowered by means of an iron lead as seen in fig. 4.

This screen-canopy is covered with light rose muslin, very transparent on the side, and serves to control both side and top light instead of curtains.

Lastly, two narrow upright tinted screens should be provided with which to control the side light only.

As to the reflectors, two, about four feet high, should be at hand. They must move on pivots and be covered on one side

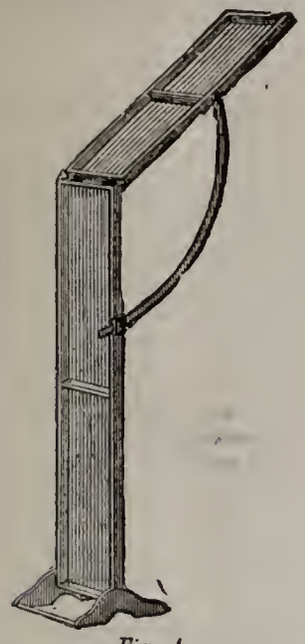


Fig. 4.

with white calico to throw light on dark dresses, and on the other with a material of a non-attractive colour to darken light dresses.

The head-reflector will be described further on.

(*To be continued.*)

SHUTTERS.

BY T. R. DALLMEYER, F.R.A.S.*

So much has been written upon this subject from different points of views, that to try and condense all that has been said of value in a short paper would be an impossibility. I should like, however, to point out as concisely as possible the best forms of shutter from theoretical, as well as practical, aspects. On looking through various journals upon the subject, I came across a very important and interesting paper contributed to *Nature* by Mr. A. Mallock, reprinted by our President in the *Photographic Journal* for February, 1887, and I would recommend this to your attention, and ask you to consider my contribution as supplementary, for it is precisely from his stand-point that I propose to treat the subject myself. The right heads under which to consider the construction of shutters are :—

1. That the mechanical movements are so arranged that they will not cause any shake to the camera, from the commencement of exposure until its conclusion.

2. Adequate regulation for prolonged, and very rapid exposures.

3. The considertion of the best position for the most *even illumination* of the photographic plate ; and

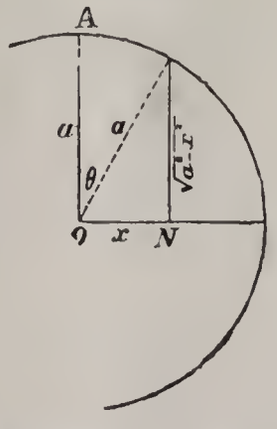
4. For given purposes systems that may be at variance to equality of illumination, but still shall in a given time produce *the most light upon the plate.*

The two first considerations I do not propose to treat of now ; they are easily judged, though not so easily attained. The two latter, however, point to the fact that the two most important directions in which to construct shutters are—

1st. One for *equality* of illumination where this is a *sine quâ non ;* and the 2nd for efficiency as regards the *quantity* of illumination.

It can be clearly demonstrated that the best position for equality of illumination is at the optical centre of the combination, and the aperture should be of circular form, or as nearly as possible so. Every ray passes through the optical centre of the combination, and heuce from its very smallest aperture to its largest there is an even amount of illumination transferred to the plate. A specimen shutter of this form I present to your notice. It is applicable to single or double combinations, and should always be placed approximately in the position of the diaphragm, at or close to, the optical centre. It is essential, too, for rigidity and perfect centreing of lenses that the tubes supportiug such a mechanical arrangement should not be entirely severed, and this difficulty is overcome. A shutter constructed on these lines to produce an even motion requires a considerable amount of mechanism iu the regulator, and this adds largely to the bulk ; it is impossible to reduce this at the same time maintaiuing any certainty of an even motion. Therc are purposes for which such an instrument is iuvaluable, but, as I shall show with regard to a shutter of the most efficient form, the difference between this said equality of illumination in the central shutter as compared with the equality of illumination in an efficient shutter *of the right construction* leaves little to be chosen on theoretical as well as on practical grounds. Mr. Mallock has pointed out what will at once suggest itself to your minds, that the most efficient form of shutter for illumination is one consisting of parallel plates moving from the centre of the lens to the edge and back again. In this manner the largest portion of the lens is first exposed to the light, and also receives most of the light towards its closing. It will not be necessary to repeat the process in mathematical notation by which the efficiency of several different types of shutter is arrived at. Comparing those most frequently employed, the least efficient is a drop-shutter of circular aperture ; the most efficient is that opening from the centre of the lens, the aperture being formed by the edges of two plates. The central shutter constructed for equality of illumination is intermediate betweeu the two. A consideration of the only drawback to the most efficient form has led me to consider more fully a means of overcoming this objection, viz., the inequality of illumination upon the plato. In the central shutter, although of low efficiency (if the motion had been absolutely regular), I endeavoured to improve its efficiency by constructing the mechanism for opening and closiug in such a manner that the shutter itself remained open longer than it took to arrive at the full aperture and to close finally again. However, this was not within very remarkable proportions. Some month or two ago, a shutter was shown to me by Mr. Lyon, of Cambridge, which worked between the lenses, being formed of parallel plates opening and closing, and he claimed for it that the period of opening and closing was only a small fraction of the period that it remained full open. I then pointed out to him that I had already made a shutter on an eutirely different principle, as regarded the driving portions of the mechanism and working outside thc lens, but it certainly did not remain full open so long compared with the times of opening and closing as his did. I was struck with the probable advantages to be derived from such irregular movements, and was led to investigate theorctically how far a shutter constructed on these lines is more efficient than those of regular motions as dealt with by Mr. Mallock. The practical result is shown in the shutter before you, the movement of the parts being attained in a manner that entirely avoids shake. I wish to mention here the valuable assistance rendered me by Mr. Beauchamp, engineer of Tottenham, who has worked conjointly with me in perfecting mechanical details.

To calculate the light traversing a circular aperture whilo opening by two shutters originally meeting aloug a diameter, and separating with uniform velocity :—



Let AOB be thc quadrant of a circle, PN the edge of the shutter at a given instant.

Let I = normal illumination,—*i.e.*, the amount of light falling on unit area of the plane of AOB per sec. If a = area of

* A Communication to the Conference.

aperture AONP, the light crossiug it per sec. is $1a$, and in a line dt, $1adt$, the total light admitted by the shutter being

$$\int_o^T Ia\, dt,$$

T being the time the shutter takes to open.

Now a=AONP=AOP+ONP

$$= \frac{1}{2}\theta a^2 + \frac{1}{2} x \sqrt{a^2-x^2}$$

Again $x = vt \therefore dt = \frac{dx}{v}$

$$\therefore I = \frac{1}{2v} \int_{t=o}^{t=T} \left\{ a^2\theta + x\left(a^2-x^2\right)^{\frac{1}{2}} \right\} dx^*$$

$$= \frac{a^3}{2v}\left(\frac{\pi}{2} - \frac{2}{3}\right) I = \frac{\cdot 452\, a^3\, 1}{v}$$

If T = time of motion, $v = \frac{a}{T}$

And $I = \cdot 452\, a^2\, IT$.

To apply this in two particular cases, to compare efficiency in manner of opening.

Case 1. Total time of exposure, $\frac{1}{10}$ sec.

Shutter opens in $\frac{1}{100}$ sec., remains open $\frac{8}{100}$ scc., and closes in $\frac{1}{100}$ scc.

The total illumination in these steps is

$$= \cdot 452\, a^2\, I \cdot \frac{1}{100} + \frac{\pi a^2}{4} 1 \frac{8}{100} + \cdot 452\, a^2 I \cdot \frac{1}{100} = \cdot 07187\, Ia^2.$$

Case 2. Total time of exposure, $\frac{1}{10}$ sec. Shutter opens in $\frac{1}{20}$ sec., closes in $\frac{1}{20}$ scc.

The total illumination

$$= 2\left(\cdot 452\, a^2 \cdot I \cdot \frac{1}{20}\right) = \cdot 0452\, a^2 I.$$

The ratio of the light admitted in the first case to that in the second

$$= \frac{\cdot 07187}{\cdot 0452} \text{ or } \frac{14}{9} \text{ nearly.}$$

Hence it is of interest to observe that, with the most efficient form of shutter, although used full aperture for a much longer time than is employed in opening and closing, it is shown that a shutter constructed on these lines is much more (in the particular instance once and a-half times) efficient as the same shutter with even motions. The result, then, of the whole matter is, that the future photographic shutter in one in which the whole aperture of the lens employed may be used for the longest time possible, compared to the periods of opening and closing; and it is apparent that if this proportion is excessive, it will, except in some particular instances, be advisable to employ the most efficient form of shutter except where absolute equality of illumination becomes an essential, and in the latter case it must be at the optical centre of the combination and of the central form.

* To show the integration of this expression :—

$$\text{Integration of } \left\{ a^2\theta + x\left(a^2-x^2\right)^{\frac{1}{2}} \right\} dx$$

$$= a^2\theta\, dx + x\left(a^2-x^2\right)^{\frac{1}{2}} dx$$

(1) $\int \theta\, dx$

$$x = a \sin\theta,\ dx = a\cos\theta\, d\theta.$$

$$\therefore \int \theta\, dx = a\int \theta\cos\theta d\theta = a\int \theta d\sin\theta = a\left(\theta\sin\theta - \int \sin\theta\, dx\right)$$

$$= a(\theta\sin\theta + \cos\theta)$$

the limits are from $\theta = o$ to $\theta = \frac{\pi}{2}$

$$\text{hence } \int \theta\, dx = a\left(\frac{\pi}{2} - 1\right).-$$

(2) $\int x\left(a^2 - x^2\right)^{\frac{1}{2}} dx$

$$= -\frac{1}{2}\int \left(a^2 - x^2\right)^{\frac{1}{2}} d\left(a^2 - x^2\right) = -\frac{(a^2 - x^2)^{\frac{3}{2}}}{3}$$

the limits are from $x=o$, to $x=a$ and the integral is $\frac{a^3}{3}$.

The entire integral of the given expression is therefore :—

$$a^3\left\{\left(\frac{\pi}{2} - 1\right) + \frac{1}{3}\right\} = a^3\left\{\frac{\pi}{2} - \frac{2}{3}\right\}.$$

EARLY PHOTOGRAPHS.

BY W. M. ASHMAN.

Brief though the history of photography is, that period is richer in discoveries originating from scientific research than any like epoch in modern times. So rapid, too, has been the transition from process to process, and from the discovery of one new principle to that of another, that to-day many of us are accustomed to regard formulæ and methods in vogue not more than thirty years ago as antiquated and of little practical utility; yet, if one happens to meet a bright and well-executed production, the history of which can be assigned to a byegone age, it is sure to call forth very high encomiums, and the more remote its date the greater its intrinsic value.

For the next fortnight, at least, the spacious Palace at Sydenham will be devoted to an exhibition of objects of interest pertaining to the origin and growth of photography, and if this should fairly represent the vast importance which photography plays in the arts and manufactures of to-day, the capacious building selected will be none too big for the purpose. I need not here speculate upon what the nature of these exhibits will be, since future reports will deal with them in detail; but I understand that some of the earliest calotypes produced by Fox Talbot, and recently presented by Mr. C. H. Talbot to the Bath Photographic Society, are among the collection. Many of these, I am informed, are in an excellent state of preservation, which is the best possible evidence that silver prints need not necessarily be fugitive, for the examples referred to have been produced nearly fifty years.

At the last meeting of the Bath Photographic Society Mr. C. H. Talbot brought before the notice of members thirty-two specimens of his father's work between the years 1835 and 1840, the result of experiments leading up to the discovery and publication of the Calotype process. These were mostly dated and signed, but in only one case was the method of fixing noted on the photograph. Mr. Talbot concludes that in general those negatives which presented a bluish appearance were fixed with salt, and those which have a yellow ground were fixed with iodide of potassium; but he says that it does not follow that they were produced with iodised paper. The positives he supposes to have been fixed with salt. These early photographs Mr. Talbot does not propose to exhibit again, at least for the present, but his notes concerning them are of historical interest as follows :—

"1. The first is a fern leaf, undated, but on very thin paper with a watermark of the year 1835. This photograph may possibly have been made in that year, as my father has recorded that he even obtained views in the camera in 1835. I have, in a book, another negative photograph from the same dried specimen, but turned the other way, dated May, 1839. It is on thicker paper. A portion of the leaf, which is missing here, is there represented. It may have been loose in the original. It would not, however, I suppose, be safe to assign a date to this photograph.

2 and 3. Two specimens of flowers and leaves, undated, but one on paper with the watermark 1838. It is the one on which a group occurs.

4 and 5. Two small views of Lacock Abbey, undated, but which appear to be very early ones.

6. A photograph of the great seal, marked 'fixed with salt,' November 20, 1839.

7, 8, and 9. Three positives—views of Lacock Abbey, signed by my father and dated 1839.

10. A negative dated November 23, 1839, which has

been waxed—apparently fixed with salt—an interior with oriel window facing south, and bust of Patroclus. I have a print made from this negative in the book before referred to.

11 and 12. Two views of south front of Lacock Abbey, dated November 16 and November 20, 1839, apparently fixed with salt.

13. A fairly preserved positive of same front, signed and dated November, 1839.

14. A copy of a print, signed and dated 1839.

15. I now come to a negative evidently fixed with iodide of potassium. It represents Lacock Church, and is dated November 12, 1839, and there is a mark by which it appears that the exposure was one hour.

16. A small negative, apparently fixed with salt—the same subject as the last, and dated November 16, 1839—four days later.

17. South view of Lacock Abbey, fixed with iodide of potassium, dated January 14, 1840.

18. View in courtyard, Lacock Abbey, apparently fixed with salt, dated January 20, 1840.

The rest are evidently all fixed with iodide of potassium.

19. South front of Lacock Abbey, February 24, 1840.

20. Door and oriel windows in the said south front, March 21, 1840. I may mention that these are part of the alterations made by my father in the old building, in the year 1828. By a mark the exposure appears to have been eight minutes. I have a fairly preserved print in the book before referred to, apparently made from this negative.

21. The Entombment of Christ, from a plaster cast, April 24, 1840.

22. A vase in garden, Lacock Abbey, April 27, 1840.

23. Bailey's Eve (plaster cast), April 29, 1840. This negative has been waxed.

24. Three plaster casts, apparently set out on a grass plot, representing Eve, Patroclus, and, I believe, the Venus of Arles, May 1, 1840.

25. Vase in garden (same as shown in 22), daisies amongst the grass very visible, May 4th, 1840.

26. View in courtyard, Lacock Abbey, May 22nd, 1840.

27. View in courtyard, Lacock Abbey, undated, but probably about the same date as 26.

28. Plaster vase, May 22nd, 1840. This appears to me to be a particularly good one. I have a fairly preserved print, in the book before referred to, made from this negative. The cut-off corners and top line of negative coincide with blackened parts of the print, and the date can be read on the print. It is noticeable that this negative has never been waxed.

29. Lacock Abbey (south front), May 22nd, 1840.

30. Same subject, August 23rd, 1840.

31. View from Lacock Abbey Lodge, August 24th, 1840.

32. Exterior of hall, Lacock Abbey, September 1, 1840. This hall was built by John Ivory Talbot, in the reign of George II., about 1750, on the site of an old monastic hall. This negative is the last of the series, and its date, September 1, 1840, brings us very near indeed to the date of the discovery of the latent image and the mode of its development. This discovery was made on September 20 and 21, 1840, and changed the whole system of my father's work in photography. The result was the Calotype process."

We hope the photographs, which are reported to be in a remarkably good condition, and of the historical value of which there is no doubt, will at some future date be bequeathed to the authorities of South Kensington Museum, or some other national institution available for the purpose, and we think the labours of Fox-Talbot are as much entitled to public recognition by Englishmen as that accorded to Daguerre in France. Furthermore, this jubilee year of photography, 1889, offers a fitting opportunity to carry it out.

THE RELATION OF PHOTOGRAPHY TO THE PICTORIAL ART.

BY JOHN BRETT, A.R.A.*

Let us first consider what are the pretensions of the painter's art, and what it sets out to do. Then let us examine those of photography, so as to determine what capacity it has to become its rival; and lastly, let us find out how far either of these two arts are or can be serviceable to the other. Both may be in a sense called pictorial, for they both set out with the same fundamental purpose; and at first their paths appear to lie parallel. The basis of all good pictorial art consists of a reproduction of natural images or views; and the photographic art, no less than that of painting, aspires to get a true and honest representation of real things, and especially of transient appearances; but when the theory of the subject is examined, the parallelism of their paths is soon found to cease, and farther on they diverge widely, never to meet again. It will be my endeavour to show the extent of their parallelism, and the necessity of their divergence; and if the result of the inquiry should tend to curtail the aspirations of the photographer, I shall regret that result; but we want before all things to get at a sound theory, and to set forth the plain, unvarnished truth.

Assuming as I do that the painter's art is founded on correct representation of real things, it is obvious that the photographer starts with an advantage, but this advantage is limited to facts of form. In respect of rapidity also he has the advantage; but the elasticity of the painter's art, on the other hand, gives him a clear lead, inasmuch as he can manipulate his image at pleasure, so as to produce on the spectator any desired effect. Here it is that the paths begin to diverge. One of the functions of the painter's art is to exalt natural appearances, but the misfortune of the camera is that it is liable to degrade them. We must be careful here to note that exaltation does not imply misrepresentation; and, the distinction being rather subtle, I must dwell upon this for a few minutes to explain the difference. Let us consider how it is possible to exalt natural images. Taking an abstract point of view, is it not presumable that they are already sufficiently beautiful, and that any tampering with them is irreverent and injurious?

In a few rare instances this is doubtless true, but, on the other hand, if we consider nature from man's point of view, nearly all her performances have flaws and blemishes, and exhibit such blundering as cannot be overlooked. The philosopher, of course, values what we call nature's defects, and accepts the whole turnout as the best of all possible worlds; but art has to address herself to mankind as it exists, and allowance has to be made for preconceptions, both inherited and acquired. Art is not intended for gods, but men. The painter's art proposes so to set forth natural images as to develop their utmost capacity for charming mankind; and it proceeds on the assumption that the pleasure afforded by beauty is one that does not blunt our sensibilities, but improves and quickens them, and tends to disqualify them for unworthy entertainment; that beauty, in short, is an unalloyed good. It is true that the photographer has some power to improve natural images by touching out or reducing their defects, but unfortunately he has not an equal facility for accentuating the beauties; and so it usually happens that whilst he is busily engaged in touching out the defects of the picture, he is in an equal degree depriving it of character, and reducing it to insipidity.

Artistic work is always to a great extent done from memory, often entirely so. Most of the choice and exquisite appearances of nature show themselves but rarely, and too often refuse to sit for their portraits. Even amongst the faces of fellow creatures we know that their gleams of consummate beauty are only revealed under peculiar circumstances, and these circumstances can very rarely, if ever, be available to the photographer; but the artistic memory can treasure them up and reproduce them, even after intervals of years (like the phonograph does with sounds). Memory, therefore, is one of the chief of the artistic equipments. All the work done from memory is liable to be biassed by the personal taste of the performer, also by his intellectual calibre, and by his experience of the range of natural variations; and when his admiration for his model is raised to the pitch of enthusiasm, he unconsciously emphasises those elements of the scene which especially interest him. This is the reason why artistic representations often surpass in delightfulness the real images.

One of the strongest resources of the pictorial art is composition. Composition means such an arrangement of several images

* A communication to the Conference.

that they shall add lustre to one another. Composition depends partly on contrast: contrast of shape, or of mass, or of texture. (I do not mention colour for obvious reasons). In some degree the photographer can compete with the painter in composition, though in this he is heavily handicapped, because he has to take the items of his picture as he finds them, whereas the painter can adapt them to his purposes by boldly altering them, although it should not be overlooked that he is limited in doing this by the necessity of keeping within the laws of nature and of congruity.

Contrast is only one of the elements of composition. An equally important element is the arrangement of the lines, quantities, and intensities of the masses in a harmonious series, the purpose of which is to bind together in artistic unity in sequence of impressions, so that they may all be appreciated simultaneously in the completed pictures.

In a fine composition nothing could be omitted without compromising all the rest, just as in a closely reasoned argument the omission of even one word is enough to throw the whole train off the rails. This problem of composition in pictures is necessarily abstruse, and fine examples are only achieved intuitively by specially gifted persons. There is another resource of the pictorial art available also to the photographer, though only to a limited extent; and that is sentiment.

Let us examine this quality to see what it depends upon, and what is its value. Views of the external world produce upon intelligent spectators a large variety of impressions, some of which are sublime, and worthy of perpetuation (these are comparatively rare); others of them are indifferent or commonplace (and constitute a large majority); whilst some others are gloomy and distressing.

Poets, romancers, and painters have found by experience that in one respect there is a strong family likeness among their audience. They are all most deeply moved by beautiful and sublime images, which are more or less adulterated or tinged by the gloomy and the distressing; the effect of which is to connect them with human experience.

It is evident that this experience has for so many ages been developing under the shadow of adversity and conflict, that the tone of its inherited sentiment is dimmed with half tint; and so universal and persistent is this tone that I suppose no healthy nature ever completely shakes it off. When men have honestly and boldly lived out their little lives, the closing in of their day as symbolised by a sunset the beauty of which depends on some bars of dark cloud.

The strong and successful man, when surveying the retrospect, says, "I have fought a good fight"; but when Tennyson had to describe the insipid young lady, whom he called a "milk-white fawn," he disparagingly remarks that she had but "fed on the roses and lain in the lilies of life," thus pointing emphatically to the unartistic tendency of an unclouded experience.

This I take to be the explanation of the undoubted fact, that merely accurate representations of beautiful scenes fall flat upon experienced people, and fail to move them to enthusiasm.

The whole race of photographers doubtless exert themselves habitually to produce beautiful pictures, and when the best of their efforts are sifted out to form the annual exhibition, the show is of very great interest on technical grounds; but it will not be denied that it wearies rather than enchants the non-professional spectators, and that few if any indelible impressions are carried away in their memories to form the subject of delightful reflection. Thus I think we must admit that the direct artistic uses of photography are limited, and have none of that commanding influence over mens' minds which is characteristic of the fine arts. Nevertheless, photography is an invaluable servant, and I may add an invaluable teacher to the artist, and I shall presently show the nature of her lessons.

The production of a painted picture is so much under the artist's control, that he can have it turn out how he likes, if only he has a clear conception of how it ought to look when done, so that the operation is entirely delightful to him from beginning to end.

You may occasionally produce an artistic picture in photography; but so many circumstances have to conspire together to ensure such a result, that successes are extremely rare; and they go to show that the photographer himself is a miracle of perseverance and cheerfulness. Any moderately-gifted man embarking in such an enterprise should be warned against a lunatic asylum or an early grave. His hair must soon become white, for nothing wears away a man's vitals like repeated failure.

It is obvious that in respect of form the camera can give far more accurate representations than the painter can pretend to; but it is disheartening to know that the taste for accuracy is not a plentiful endowment of human nature. People are rarely thankful for it, generally indifferent to it, and in some cases they are offended at and resent it. This leads us to consider the importance of photography as an educator—first of the photographer, then of the painter, and, lastly, of the public.

Before a photograph can be taken the operator has to observe his model attentively; and observation, I submit, is the major part of education. It is only after long training that the observing faculty becomes so keen and active that a good photograph can be confidently expected. Most operators never outlive the fluking stage. The cultivation of this faculty is no simple matter: it involves a taste for analysis. Any observation that is not analytical is vague and useless. You have to consider your subject first as a group of masses of light and dark; then you think of the arrangement of line caused by the coincidence of the boundaries of these masses; then you have to study the distribution of the accent or emphasis in both elements; and, until you have become in this way a trained analyst, all your endeavours will be empirical, or shots in the dark.

Even if the photographer was at the outset a highly-cultivated person, it is certain that his practice with the camera will inevitably improve him, whatever his natural calibre may be. It will compel him to learn composition and chiaroscuro with the utmost despatch. He will pose a group, say, a dozen times in a morning, and when in the afternoon he finds that each arrangement is more hideous than the others, and that his box of plates has been wasted, he begins to feel that he must take pains; and thus the most valuable part of education is developed.

In the practice of the painter's art you can deliberate and make alterations, so that the intolerable sense of disappointment is evaded, and you can be as idle as you choose at small expense.

Now let us consider photography as an educator of artists. Its direct use in this respect is much more limited than would be supposed. First, because of the great difficulty of copying a photograph, on account of its small scale. All students of drawing are aware how much easier it is to reduce than to enlarge the scale of their model. The image in ordinary photographs being smaller than than the real object, its intricacies are much more perplexing, and its details more difficult to follow; and the errors in the copy are amplified.

When the natural object is inaccessible to the draughtsman of course he is glad enough of the photograph, but the instances are rare in which its value is continuous, since artists seldom require the same model more than once. By the time that the student has become a skilled draughtsman he has had a large experience, and his memory has become so stored with images that it may be considered as a complete dictionary of natural phenomena, and the immense practice that has to be gone through in acquiring this knowledge develops such rapidity of execution that it is seldom worth his while to put up with a photograph as a model, still less to go to the trouble of enlarging one. In fact, when the real object is accessible he could do the drawing direct in less time than he would have to expend in taking and developing the negative—not to speak of printing. The most frequent instances in which photographs have been copied by painters occur in the practice of portraiture, where the sitter's time is precious. Then it is sometimes of vital importance; but I am sorry to testify that most portrait photographs are so misleading, and so much uglier than the originals, that the trouble of the painter is immensely increased by their use.

It is also obvious that one photograph can only exhibit one phase of the sitter's character, and far more than this is required in a successful portrait. The chief direct use of the camera to the artist lies in its power of securing images of rapidly moving animals.

I think that painters owe a great debt of gratitude to Mr. Muybridge for his photographic investigation of this subject, and the splendid demonstrations he has given of the footfall of galloping, trotting, and walking horses, and we ought also to offer our hearty thanks to the University of Pennsylvania, which has so handsomely forwarded his work.

In landscape, the misfortune of the camera is that it degrades the really fine scenes, by expanding the scale of the foregrounds in relation to the other planes of the picture, where the more important features can be advantageously seen, so that the areas of the latter are dwarfed. Mountains, in fact, are made into molehills, and the photographer is driven to the device of cutting

down his print so as to show nothing but the molehills. Landscape photography at present also suffers much from the fact that the horizontal rays are less actinic than the vertical ones. The clouds which generally govern the sentiment of a landscape are fatally affected by this misfortune, because all those that present beautiful forms and are valuable elements in a composition occur near the horizon, where the disadvantage is most apparent. The zenith clouds can be photographed very well, but unfortunately, they are of no pictorial value.

Perhaps the chief practical use of photography in the painter's studio lies in its aptitude for the reproduction of drawings. My own collection of photographs from drawings by Michael Angelo, Leonardo, Holbein, and others, contains examples that represent the masters nearly as well as the originals. These prints cost only a few shillings, whereas no sum could be mentioned that would purchase the originals.

The educating influence of photography upon the average public is rather too large a subject to deal with in this paper, though it is certain that that influence is favourable to the fine arts. I think its first effect is to disenchant them with the world in which they live, and move, and have their being; but it is probable that in a wide sense the multitude of scenes presented to the desultory spectator are calculated to awaken in his progeny an interest in the visible world which might otherwise have remained latent. I think there is an off chance of this coming to pass by heredity.

"Know thyself!" is a precept that is often effectually driven home by the raw photograph, whilst the cooked one affords still deeper lessons. The touching of portrait negatives by the trade I regard as an acute instance of moral depravity. It is either a poor unworthy attempt to disguise bad work, or else it shows a deliberate purpose to demoralise sitters and filch their cash by a prostitution of the noble art of photography.

One more paragraph will now conclude my paper. I have only to point out what constitutes the high importance of the painter's art. It is the display of consummate handicraft.

The French call it "*tour de force*," but it means essentially a tribute of admiration on the part of the artist. To the spectator the enchantment of masterly manipulation is irresistible. Hardly any painter of modern times has exercised so great a charm over mankind as Rembrandt, and that charm is by no means dependent on the exaltation of the images, but chiefly upon his marvellous command of them, or his supreme manipulative skill. The same remark might be applied, though in less degree, to Landseer.

We set out in this inquiry from an identical purpose; we saw where the paths of the two arts began to diverge; we have now arrived at a situation where photography and fine art are no longer in the same field of view; one being the handicraft of men, and the other an operation of chemistry more or less directed by taste.

ON IRRADIATION IN ASTRONOMICAL PHOTOGRAPHY.

BY A. A. COMMON, F.R.S., AND A. TAYLOR, F.R.A.S.*

In comparing different photographs of stars with each other, one of the greatest of the many difficulties that beset the astronomer is the increase of the size of a star image with increase of exposure. Very little work has really been done at this subject, and the results obtained are very discordant. It will probably be found that all photographs are so modified by the different lenses and mirrors used, that it is impossible to get any general law—one that will apply to all cases; but an investigation of the influences of exposure on the size of images cannot fail to be of some value. When Bond, at Harvard College Observatory, in 1850, commenced his study of stellar photography by placing a Daguerreotype plate in the the focus of his 15-inch equatorial refractor, he found that the star α Lyra gave an image on his plate, the size of which he could measure. He was subsequently able to obtain photographs of Castor (and Geminorum), but failing with the Pole Star, he temporarily suspended work of this kind. In 1857, however, after the discovery of the collodion process, Bond again attempted to obtain photographs of stars, and this time was thoroughly successful, for images of stars down to the sixth magnitude (the limit of visibility to the naked eye) were obtained on his plates. One of the first problems attacked by Bond was to ascertain with what accuracy the photographic method of charting would enable astronomers to measure position, angles, and angular distances, and to calculate star magnitudes. He noted very early that "photographs of stars of unequal brightness present marked peculiarities in size and intensity when their images, formed in equal times, are compared together." He also found that time of exposure materially affected the actual size of the images, and this led him to the investigation of the extent to which the sizes of images differed with different exposures.

There can be no doubt that the increase of diameter of a star's image with increase of intensity of light is a fact of enormous value in determining star magnitudes, but it must not be forgotten in dealing with this question that one of the most important elements in determining the size of the photographed image of a bright point is the length of time of exposure; for increase of exposure will always increase the size of the photographed image.

The increase is due to two causes. The optical portion of the apparatus used is responsible for some of it, and the rest is due to photographic action in the plate itself under the influence of light.

The optical portion may vary through very wide limits, and the amount will probably be found to differ with different lenses, even if of the same aperture and focal distance. Around the image of a bright point, formed by any lens, whether photographically corrected or not, there is always some light due to uncorrected spherical aberration, and some colour due to chromatic aberration. The image produced by the lens is bright in the centre, but has a faint fringe of white light of more or less width, and some coloured fringe, and these will impress themselves on the plate if the exposure is sufficiently long, thus increasing the size of the image on the photograph. As the amount of the light due to spherical aberration varies with different lenses, and the amount of chromatic aberration also varies, it follows that actual size of images cannot form any means of comparison when different lenses are used, and that only plates taken with the same instrument must be compared. With reflectors only spherical aberration enters into the problem, there being no chromatic aberration. We have recently undertaken a series of experiments with the object of ascertaining the law of increase of size of image with increase of exposure, but before referring to them or to any results that we may get from them when completed, it will be of advantage to refer to previous work having any bearing on this question.

Bond in 1857 clearly demonstrated that the size of the image of a star on a photographic plate was a more reliable means of comparing its magnitude with any other star on the same plate than any method of eye observation of brightness; and the subsequent work of Draper, Rutherford, Pickering, Pritchard, Gill, and the Henri Brothers has amply confirmed this. It is one of the most marked features of stellar photographs that photographic and photometric magnitudes are quite similar except in the cases of red and yellow stars. The photographs of MM. Henri have also given some interesting results as to the time of exposure necessary to obtain images of stars of different magnitudes. Using the standard ·33 metre photographic lens they found stars of the first and second magnitude require ·01 second, of the fourth ·08 second, of the sixth ·5 second, eighth 3 seconds, tenth 20 seconds, twelfth 120 seconds, thirteenth 5 minutes, fourteenth 10 minutes, fifteenth 30 minutes, and sixteenth 90 minutes, and the size of the image was always found to vary with the time of exposure. These results were obtained in Paris, where the meteorological conditions are certainly not the best.

One remarkable property exhibited in the formation of the images of stars was noted by Bond in 1858; it is, that a certain definite exposure, depending upon the brightness of the star, is required before any light action can be detected. Then suddenly there is a clustering of ten to twenty molecules within an area having a diameter of about 1 second of arc. Prolonged exposure increases the number of particles until they overlap, while the boundaries extend on all sides increasing the area of the image, the central portions being dense and compact, while the edges are diffuse and decidedly granular. This was not caused in Bond's case by imperfections of the object glass, for by reducing the aperture and prolonging the exposure he got the same result. Atmospheric disturbances may account for some of it in the case of stars, but certainly not for the whole, for we find the same appearance on photographs, where it is impossible for any disturbances to have occurred in the atmosphere during exposure.

Bond's experiments consisted of exposing different portions of the same plate to bright stars for different times, and develop-

* A Communication to the Conference.

ing all the images at once he got them of different sizes according to the time of exposure. The stars used for different plates were Mizar and its companion in Ursa Major, Alcor in Ursa Major, and Lyra. Of Mizar and its companion he obtained photographs with 2, 4, 6, 8, 10, 12, 16, 20, 24, 28, and 32 seconds exposure with his full aperture of 15 inches; 5, 10, 15, 20, 30, 40, 50, 60, and 100 seconds, with $8\frac{3}{4}$ inches aperture ($\frac{1}{3}$ previous area), and 20, 30, 40, 80, and 90, with 5 inches aperture ($\frac{1}{9}$ area). A similar series was obtained for Alcor, and for Lyra, with the addition in the case of the latter star of 40, 60, and 90 seconds, with 1 inch aperture ($\frac{1}{225}$ aperture). The star discs obtained were accurately measured on one of the plates, and with times of exposures as abscissæ, and diameters of corresponding images as co-ordinates a curve was drawn, the equation of which showed it to be either a parabola or an ellipse of large eccentricity (the times of exposure forming the principle axis).

Assuming $Pt + Q = y_2$ where t = times of exposure, and y = diameters of star images, the constants P and Q were determined accurately for one image of a star on each plate, and from the values obtained the diameters of the other images were computed. The computed diameters were then compared with the measured diameters, and found to agree within the limits of experiment; for the exposures were liable to errors of ·2 secs., and the measurements of the discs were made with a micrometer, a single division of which corresponded to ·13 secs. of arc. The assumed formula was therefore taken as correct, and it follows from it, and from the fact that the outlines of the images are circular, that star images increase by the addition of equal areas in equal times. It also followed from the consideration of the value assigned to P and Q that Q is a function of the sensitiveness of the plate, and $\frac{Q}{P}$ gives t_0, the time required to form an image of the smallest possible diameter. Using this, we get $\frac{P}{P^1} = \frac{t^1}{t}$ to give discs of equal diameter from stars of different magnitude. From a careful analysis of his results, Bond found that the relation between the light ratios of the stars used were such, that Mizar with 1 sec. gives an image equal in area to that of its companion with 5·8 seconds, and that Alcar with 1·3 secs. gives a disc equal in area to the image of the companion of Mizar with 1 sec. These results were further checked by taking t_0, the time of actual appearance on the plate, calculating Q from the equation $Q = -Pt_0$, and determining the values of P for each star. The ratios of the light thus obtained agreed with the previous results and with the eye measurements of the differences of magnitudes, thus fully confirming the assumption of $Pt + Q = y^2$ as the correct equation. The diameters of star images computed from these new data again agreed with the actual measurements.

Comparisons of the times of formation of an image having a certain definite diameter, by the use of different apertures, led Bond to the conclusion that the effect of decrease of aperture was more than compensated for by proportionate increase of time of exposure. The chief results of Bond's work were therefore the conclusions that the ratio of the times required to form equal images of stars of different magnitude on the same plate, is independent of change of aperture of object glass, of the actual sizes of the images compared, and of the sensitiveness of the plate. Size of image is an exact measure of the photographic intensity of the light of the stars compared, and increase of area of image is proportional to increase of time of exposure.

Prof. Pritchard, in 1886, discussed the connection between the size of photographic images of stars and their photometric magnitude, and also investigated the effect of exposure on size of image obtained. He used the 13 in. De la Rue reflector at Oxford Observatory. Alcyone, in the Pleiades, was found to give a disc of ·02 in. ten minutes, corresponding to thirty seconds of arc in the focal plane. Plates were exposed to the Pleiades for 7, 12, and 15 minutes, and the sizes of the discs measured with two instruments as a matter of precaution. From the measurements of the images on the plates it was found that the magnitude of the star which was commencing to form its image on the plate A after 7 minutes' exposure was 12·84, and corresponding to this a 1st magnitude star would have had an image of ·024 in. or 46·36 seconds of arc. Plate B, although exposed for 12 minutes, had not obtained impressions of such faint stars as plate A, owing to the lower altitude of the Pleiades at the time of exposure. Plate C had a brighter zero star than B. Photometric and photographic magnitudes were found to be in agreement on all plates except in the case of the stars Plcione and Nos. 22 and 31, where differences of ·7 and ·3 magnitude were found between the photographic and eye measurements. These results, while demonstrating that there is a definite relation between the size of star discs on photographic plates and the intensity of the light, also show how much the effect of intensity, and even of time of exposure, may be neutralized by meteorological conditions. Other photographs with different times of exposure were measured at Oxford, and the results did not agree with those of Bond. Pritchard finds the areas of the images vary as the square root of the times of exposure, and not directly as the time, as Bond found. Much of this difference may be due to the fact that, while Bond used a refractor, the Oxford photographs were obtained with a reflector; and while Bond used collodion plates, the Oxford work was done with dry plates.

Mr. Turner has quite recently measured the sizes of the images of stars in photographs taken at Greenwich with a refractor, with a view of ascertaining the influence of time of exposure on the size of images, and his results show that the areas increase as the cube root of the times of exposure. The whole matter is evidently very much in need of very careful consideration and experiment. The experiments we have made in this matter have been of three kinds. An image of a uniformly illuminated pinhole has been focussed on a photographic plate by a lens, and a series of exposures made on different portions of the plate, the exposures increasing from two seconds to one hour. These images developed under the same conditions are measured, and the areas compared with the times of exposure. In the second series of experiments a concave mirror was used to produce an image of the pinhole, and exposures of the same duration as in the previous series have been made, the increases of the areas of the image, in this case, being thus directly comparable to the increase with the lens. These serve as samples of the relative effects of mirrors and lenses in producing increases of area by their optical defects; but it is intended to get photographs with many different lenses and mirrors to have the series complete. The results thus far show that there is less increase with the mirror than with the lens, and it will be interesting to find whether this holds good throughout.

In both cases the increase is due to optical and photographic effect combined, so with a view of ascertaining exactly the value of the photographic effect a third series of exposures, varying from two seconds to an hour, has been made with plates firmly pressed against a piece of tinfoil in which a number of holes have been made. Precautions were taken to ensure uniform illumination of the plates. The distance between the source of light and the plate was the same in each case, and, with all the plates developed together, any differences of the size of the images must be due to the continued effect of light on the plate, and to that only. So far as the examination of the plates has been carried, there can be no doubt that there is a very decided increase of area due to increase of time of exposure, but the discussion of the results was not finished in time for the conference. It is hoped from these photographs to ascertain the exact amount of increase of area due to photographic irradiation, and to get some idea of the proportion this bears to the combined optical and photographic effect when typical lenses and typical mirrors are used to form an image of the point of light to be photographed.

DISCUSSION.

Mr. COMMON said that the paper must be considered as somewhat premature, as the experiments were unconcluded; they were really a revival of some experiments that he had made some time ago, and he intended to continue them; he found himself in a very advantageous position for this, as he had a good collection of photographs, all having exposures of one hour, taken with different lenses. He was not aware what difference would be found between the behaviour of bromide and collodion plates, but the differences between the measurements of Bond and Pritchard were very remarkable. It might be explained by the fact that Bond could only give short exposures, as he used wet collodion. There was one point he would like to ask Captain Abney about, and that was, in Bond's equation there was a certain value q, which represented the inertia of the plate, as he found, that until the light had attained a certain strength, it made no impression on the plate, but when it did, it did so suddenly and all at once.

Captain ABNEY said that, independently of Mr. Common, he, in conjunction with his brother-in-law, Mr. Selwyn-Edwardes, had been making some experiments in the same direction, but as yet they had arrived at nothing very definite. It appears that the phenomenon was to be reduced to two distinct causes,

the photographic radiation of the plate, and the other that due to the instrument. The image of a star was assumed to be a point, but, as he had had to remark yesterday, it was very far from being so. It was a disc of definite size, that varied with the aperture of the lens used and its form. If carefully examined it would be found to be brightest at the centre, falling off towards the edges; surrounding the central disc at fixed distances were concentric rings, one outside the other, *ad infinitum*. During exposure, the central or more vigorous portion was first impressed on the plate, and then gradually the rings, but very slowly, as the first ring had only 1-57th intensity of the central nucleus and the second 1-400th. Mr. Edwardes had, however, succeeded in photographing these, using an artificial star of 1-10,000th in. in diameter. With a lengthy exposure these rings gradually filled up, and the size of the star therefore depended on the amount of these rings that were filled up, and be proportional to the duration of the exposure. With regard to the photographic irradiation of the plate, he thought at present, but he was quite ready to admit that it was not yet conclusively proved, that there was no irradiation caused by the plate, and that any increase was due to the instrument; at the same time he had not had the advantage of using a mirror like Mr. Common, and so eliminating the disturbances due to the outstanding uncorrected secondary spectrum, and he hoped, therefore, that Mr. Common would continue his experiments and give them the result of them at some future occasion.

Mr. Common asked Captain Abney how he obtained a star of 1-10,000th of an inch: he had not taken the rings into account, as he did not think they were very likely to have much effect with the lenses used in photography. He could not at all agree with Captain Abney that there was no irradiation due to the photographic plate, but he intended to continue his experiments, and hoped at the next Conference he would be able to lay his results in a more complete and worthy manner before the Camera Club. In reply to a question whether he had used backing, he said no. Capt. Abney then said that in his experiments he had, of course, taken every precaution to eliminate all the phenomena that were likely to arise from what was commonly known as halation. In conclusion, he would ask Mr. Common to allow him to join forces with him, so that they should not each be pursuing the same paths, and would ask the meeting to give the lecturer a hearty vote of thanks for bringing up so interesting a point.

PHOTOGRAPHIC OPTICS.

BY W. K. BURTON.

Chapter I.—Light.

We all have a pretty fair notion of what we mean when we talk of "light," and yet when an attempt is made to give a precise definition of the term, to limit its meaning closely, the difficulty is by no means small.

The first idea of light, and one which is strictly correct so far as it goes, is "that which enables us to see objects;" and the question what is this which gives us the power will probably elicit from a scientist that it is a form of "radient energy," which statement is also probably strictly correct, but requires a little investigation.

Taking the word "energy" first. This word is commonly defined as "the power to do work," or, in other words, to "produce motion against resistance."* Energy may show itself in many forms, as, for example, heat, light, and electricity; or again the energy may be in the form called "potential" being, that is to say, stored up, not showing itself in any way, but prepared to do so when certain conditions are fulfilled. Again, the energy may be kinetic. The energy possessed by, for example, the weight of a clock which has just been wound up is potential; the energy of that weight were the supporting chain to break would be kinetic, to a certain extent, at any rate. In each case it is energy, inasmuch as it is capable of producing motion against resistance. In the first case the motion of the works of the clock against the resistance of friction, and in the second place the motion of anything which happens to be in the way of the falling weight—against the resistance of inertia if of nothing else. In both cases the energy will, for the most part, eventually change its form from that of potential or kinctic energy into that of heat—another form of energy. For it is one of the fundamental principles concerning energy, that although it can be changed from one *form* to another, its destruction *as energy* is, so far as we know, impossible. This great principle is known as "the conservation of energy," and along with another, the indestructibility of matter, forms the basis of nearly all modern scientific reasoning. Neither principle can by any means be taken as absolutely and eternally true; all that we can say is that, within the limits of the sphere of human reasoning, they are to all intents and purposes true, and form a most useful basis for working on.

The law of the conservation of energy is thus stated by Professor Maxwell:—"The total energy of a body or system of bodies is a quantity which can neither be increased nor diminished by any mutual action of their bodies, though it may be transformed into any of the forms of which energy is susceptible."

To take a practical and familiar example, we place in the fire-box of the boiler attached to the engine of a steam crane a certain quantity of coal. This coal contains a vast amount of energy in the potential or latent form, not making itself apparent to any of our senses, but requiring only that certain conditions will be fulfilled when the potential energy will be changed with various other forms. The conditions are the presence of oxygen with which the carbon and hydrogen of the coal may combine, and, generally, some internal stimulus to start the combination. In plain language, the fire of coals wants air and requires to be lighted.

We now immediately have energy exhibited in two forms—light and heat. A certain amount of light will probably escape by the furnace door, and possibly by the chimney. That which is confined to the fire-box will be converted into heat by a process which it is impossible to follow. The greater part of it, however, is converted directly into heat, and the most of this heat is absorbed by the water in the boiler. Some of it, however, escapes up the chimney.

We shall suppose the engine used to lift a heavy weight, let us say a weight of one ton, to a height of fifty feet. When the engine is started, the greater part of the energy goes off in the form of the heat of exhaust steam. It can, however, be proved that a certain amount of the heat has taken the form of electricity, and that some of the energy is being used to perform work—that is to say, lift the ton weight to the height mentioned, 50ft. When this weight has been lifted and put in position so that it is supported at a height of 50ft. above its first position, a certain definite amount of the energy that was at first latent in the coal is now in the "potential" form in the weight. The rest of the energy has been dissipated in the various ways indicated—by far the greater part of it in the form of heat—but could it all be collected together again it would be found to be precisely the same in quantity as before the coal was lighted; or, to go farther back, because it is supposed that the coal got its energy by absorbing some of that radiated from the sun when it (the coal) was a living tree, the same in quantity as when it was sent from the sun thousands of years ago, and was absorbed by a plant growing on the surface of the earth. Nay, we might go farther back, and, accepting the nebular theory, trace the energy to that time when it was potential, or energy of *position* due to the enormous distance of the greater part of the nebulous mass from its centre of gravity.

But, to follow the portion of the energy that is stored up in the weight lifted, this can readily be converted into other forms of energy. If the support of the weight be removed and the weight be allowed to fall, the energy will be converted from the potential into the kinetic form. Leaving out of the question air frictions, by the time the weight has fallen 50ft., the whole of the energy which was

* R. J. Glazenbrook, "Physical Optics."

passed from the coal to it, and which was in the potential form, has become kinetic. At any time before it has fallen the 50 ft. a portion is kinetic, a portion potential. Thus at 25 ft. one half of the energy is kinetic, the other half is potential, and as the body continues to fall the rest of the potential energy is transformed into kinetic energy.

As we have left air friction out of the question, we must suppose the falling of the body to take place *in vacuo*. We shall suppose that when it has fallen 50 ft. it comes to rest, striking some hard substance. The energy is still not lost, but is merely converted into heat, probably a little light, and possibly some electricity. The falling body and whatever it fell on have both been heated, and had the experiment been performed in darkness a flash of light would pretty certainly have been seen to accompany the coming to rest of the falling object. It is further likely that there has been some greater or less electrical disturbance, and that a little of the energy has gone in this last-mentioned form. The whole of it, however, could it be collected together, would be just sufficient to raise the weight to the place from which it fell.

We have here seen energy changing its form many times and being divided up into different forms of energy, and this, although we have not taken into consideration at all various of its phases, as when steam was stored under pressure in the boiler, when the same steam was expanding in the cylinder, &c. Still, all these forms of energy could, with greater or less ease, be placed in one or other of two classes—potential energy and kinetic energy—the one typified by the weight ready to fall or by a coiled-up spring, the other typified by the falling weight or by a projectile that might be discharged by the uncoiling of the spring. Thus, heat, as exhibited in the fire, in the water and steam of the boiler, in the exhaust steam from the engine, in the weight that has fallen, and in the body that it has fallen on, are all supposed to be phenomena of the extremely rapid movement of the atoms or molecules of the various substances. The same may be said of the light, and probably of the electricity. Indeed, it is possible that at some time all forms of energy may be explained in terms of motion alone.

(*To be continued.*)

A COMPARISON OF DEVELOPERS.

BY LYONEL CLARK.*

Natural historians will tell you that whenever a new species is introduced into a new country it begins to multiply and increase to a most alarming extent, but after a few generations nature reasserts her ordinary law, and the new settler settles down to its ordinary and normal rate of increase. In photography we find somewhat of a parallel: the advent of any new process is received with a burst of enthusiasm, its application is universal, and its merits or faults are extolled or condemned with as much exaggeration as any unpopular Government measure in Parliament, and it is not until the first effervescent exuberance of its disciples or the deep anathemas of its opponents have subsided, that it is possible for the still, small voice of reason to make itself heard, and allow the new-comer to be judged strictly on his own merits.

Our latest advent from other climes is Quinol; this is, however, not of foreign origin, being no other than an indigenous species, which, under the name of hydroquinone, was first proposed and introduced to the photographic world by our worthy president, and that in this very room, and from the rostrum that I myself am now occupying. On its first introduction, however, it did not meet with any general favour, and it was not until, like old brown sherry, it had made a voyage across the seas and back, that it was found good enough for the palate of our connoisseurs.

Slight as was the enthusiasm with which it was first received, its restoration to the land of its birth was, however, attended with the most fulsome flattery, and all that exuberance of expletives for which our Gallic brethren are so justly famous. The new developer was to do everything and anything; a very conjuror's bottle, out of which could be got the restrainer of over- or the accelerator of under-exposure,—a very panacea for all our photogenic woes or maladies. One loquacious apostle of hydroquinone, carried away by his own enthusiasm, actually went so far as to style it an "automatic" developer, thus abolishing at once fell swoop all the sciences and beauty of development, and all the power that chemistry has put into our hands, to compensate for its own shortcomings, or the unwillingness of nature, and to enable us to relieve our beloved pursuit from the reproach that it is a mere mechanical process.

But these furious atmospheric disturbances have now subsided: we have left the roaring forties of exaggeration for the quiet doldrums of reason and Quinol, as I prefer to call it, is on its trial at the bar of the photographic world. The case was opened by Mr. Swan, in the Photographic Society's rooms, but a short time back, when this gentleman in a most able lecture very fairly stated its merits. But, on the principle of an old proverb, if I may venture to say so, I do not consider that Mr. Swan carried his investigations far enough. Development is a fairly complicated phenomenon. There is something besides the mere bringing out of detail or getting density, there are the gradations, or intensity scale of the negative, to be looked after, and this I consider the real secret of universally successful development.

A photograph of nature is made up of not only high-lights, half-tones, and shadows, but of every gradation or nuance between these salient divisions. However white the paper we make our prints on may be, it will always be less so than the bright high-lights, and the deepest blacks of the print will be behind the dark shadows of nature. We have then to compress the scale of tones of nature into the short gamut that our printing processes give us; and it is therefore evident that the developer that can give the greatest range to this gamut will *cæteris paribus* be the most useful.

To make this point clearer, a certain light intensity will give the least appreciable deposit after development on the sensitive film, whilst the darkest deposit that we can admit, this point depending on the particular printing process we intend to use, we will assume to be obtained by a light one hundred times as intense. In exposing we must expose long enough for any desired detail in the shadow to impress itself on the plate. We will take this amount of light as our unit. Now any light one hundred times as bright as this unit point will then be represented on the plate by the maximum amount of deposit possible; and therefore any lights that in intensity are superior to this figure must all be represented by an equal amount of deposit; that is to say, they will all give the same appearance on the print, and we shall lose all detail in the high-lights. Now suppose that, by some modification of our developer, we could so manage that our maximum deposit was only attained by a light two hundred times as intense as our standard minimum, I think it will be allowed on all hands that this is not only valuable, but an essential property.

It is to ascertain what are the capabilities of quinol in this direction as compared with pyro-ammonia and ferrous oxalate, that I have undertaken the following experiments. I have not sought in any way to find out the developer that will give the most detail on a plate; from a very exhaustive series of experiments that I made last year, I was led to the conclusion that no alteration in the constituents of the developer in any way affected the amount of detail that was brought out, provided that sufficient time were given. I believe Mr. Cadett has also come to the same conclusion, and as my present set of experiments show the same result, I think we may consider it as an axiom, that the action of light on a dry plate is absolute, and no strengthening of the developing agent can bring out what does not really exist.

Mr. Swan, in his experiments, made a comparison by means of ordinary negatives. I have seen these negatives, but I have found it most difficult to make any very reliable deductions from them, and even Mr. Swan was obliged to acknowledge that it required a long and careful examination; I therefore in my experiments decided to use a graduated sensitometer screen, which may aptly be described as a negative reduced to its simplest expression. The plates used were the Castle Brand, the same as those used by Mr. Swan; they were all exposed to a uniform light behind ground glass for equal periods of time. The time was taken from a pendulum beating half-seconds, and every care was taken to ensure the negatives being equally exposed.

*A communication to the Conference.

The developers compared were :—

pyro and ammonia.
quinol and caustic soda.
,, carb. soda.
,, carb. pot.
,, ammonia.
ferrous oxalate.

The pyro used was sulpho-pyrogallol, and the quinol was Byk's, and was made up the same as the pyro with four times its weight of sulphite of soda, acidified with sulphuric acid. The caustic soda was the fused in sticks. The carb. soda was the anhydrous salt, and the carb. pot. the ordinary one of the pharmacopœia. The ammonia was the ordinary so-called 880°, but I cannot guarantee its strength. The ferrous oxalate was made up of acidified saturated solutions of potassium oxalate and proto-sulphate of iron. The restrainer used was invariably potassium bromide.

At the risk of being prolix, I will again state exactly those points in development I was investigating. Some little back, I saw some photographs of Capt. Abney's ; they were of snow scenes in the Upper Alps, and although the range of tones between the bright reflected light on the snow, and the deep shadows in the fir-trees was enormous, yet they were all proportionally represented in the photograph, both as regards the details in the shadows of the trees, and in the high-lights of the snow. These plates were developed by pyro and ammonia, and Captain Abney was kind enough to make known the particular formula he used for these views, which will be found on page 24 of vol. ii. of the *Camera Club Journal*.

In my own mind, I set this result down as the standard of excellency that any developer must attain in order to come into universal use. How far quinol was capable of doing this the following experiments will, I hope, show. I will not weary you by going through them *seriatim*, but rather give you my deductions.

Commencing with pyro, we find the following laws : by decreasing the quantity of pyro, the alkali remaining constant, we get loss of detail, and also loss of density in the high-lights ; if, however, we continue development long enough to bring out all the detail, then the density in the high-lights has also increased, and the result is what I call normal. If, however, whilst keeping the pyro down,– say, ½ grain (all quantities are in grains per ounce of developer), and increase the ammonia up to four or six minims,—we find that now we can get out all the details before high-lights gather any great density, and, therefore, we get a long low curve. This is precisely what we require ; we have brought out the detail in the shadows, and the high-lights have not yet assumed any over-density, although by the suitable addition of more pyro we can at any time get any amount that we may desire.

Now, as to the behaviour of quinol under such circumstances, I am sorry to have to admit that it totally fails ; its action is very distinct from that of pyro. If we decrease the quinol we lose detail, just as in pyro ; but if we increase the alkali, unlike the pyro developer, we get no increase in detail, or, what is the same thing, no increase in the speed with which it appears, unless we add the alkali to a most enormous and impracticable extent, and this is practically the same, whatever alkali be used. Ammonia appears to promise the best results, but it has to be added to an enormous extent, and then green fog makes its appearance with as much vigour as in any pyro-and-ammonia developed negative.

To recapitulate the salient differences between pyro and quinol : the attainment of a low curve of intensity practically means that the detail, or least exposed portions, must be brought out rapidly before the high-lights, or most exposed portions, have had time to gather density, and this may be said to depend on the speed with which those details can be brought out. Now, when a small quantity of pyro is present, increase of alkali means increase in the speed with which the detail appears ; but with quinol, on the contrary, increase of alkali, in reasonable quantity, does not mean increase in the speed of development. In order to obtain this the quinol itself must be increased, in which case the development can be made most rapid, but unfortunately it is attended with an equal increase in density. The experiments show this most conclusively. Potassium bromide remains constant throughout. As its action is always to increase density, and as I was striving to keep density down, it became unnecessary to take this salt into account, although I found that a little is necessary to prevent a general slight reduction of the presumably unexposed portions of the film.

I found no practical difference in results when using the fixed instead of the caustic alkalis ; development was undoubtedly more slow, but the gradations were practically the same.

With ammonia, I found the greatest difficulty in getting any sort of an image, unless both the ammonia and the quinol were increased to a very great extent. I find one note, that with a half-grain of quinol no image showed after ten minutes, although twenty-five minims of pure ammonia were added. The whole of the results with ammonia give green fog and metallic fog in a most virulent degree, and prove, I think, pretty conclusively that quinol is just as prone to fog as pyro, when used with the same alkali.

Passing now to the negatives developed with ferrous oxalate we see that the rate or speed of development increases with the amount of the potassium oxalate present, so that it is possible to somewhat vary the gradations of the scale, one curious note, on diluting the ordinary developer with water, increases the density of the negative very considerably, being directly antagonistic to the result of having the oxalate in great excess.

From the above series of experiments I am led to deduct that, as far as regards the getting out of detail, pyro, quinol, and ferrous oxalate are all equal. As regards density, that is, the getting of the greatest amount of deposit for a given time of exposure, quinol and ferrous oxalate have, perhaps, the advantage over pyro, but my pyro series of experiments do not obtain any specimens specially made with the idea of getting density ; so that it is quite possible that pyro may hold its own even in this in most cases undesirable respect.

With regard to getting a low intensity curve, pyro is a long way the best, ferrous oxalate comes next, and quinol last. I am, therefore, led to believe that for negative work quinol will never oust pyro, to which I consider it decidedly inferior. It is, of course, difficult to make any statement as to the anti-fogging tendencies of quinol, but I am inclined to believe that this is simply a question of the alkali that is used ; with ammonia, even with small quantities, quinol gave me green fog as badly as any pyro developer ever did, and I therefore consider that it is not altogether so successful in this direction as one has been led to suppose. Quinol is not as soluble as pyro, and therefore presents a certain disadvantage from the point of view of ready carriage ; and, lastly, quinol is more expensive than pyro. Therefore, taking all these considerations into account, I do not think that quinol is destined to survive long as a developer for photographic negatives. As a developer for lantern-plates, owing to the great beauty in the colour of deposit that can be obtained by it, it may possibly live long and prosper ; but as a developer of negatives its restoration to the country of its birth will be as short as the historically famous restoration of the Stuart dynasty.

Discussion.

Mr. E. J. Wall said that he had made some comparative experiments with hydroquinone, ferrous oxalate, and pyro, and had got results that entirely disagreed from Mr. Clark's. He had found that hydroquinone gave the best intensity curve, then pyro, and lastly oxalate. He considered that Mr. Clark had used too much sulphite ; he should only have used equal weights, and no bromide. He thought, too, that the best results would be got by a mixture of the carbonate and hydrate of soda. One point he had found efficacious in giving a slow intensity curve was one proposed by an American gentleman, and consisted in soaking the plate in the hydroquinone first.

Mr. Webber said that he had had good results from using equal weights of hydroquinone and potassium bromide, and thirty times as much sulphite.

Mr. Elder did not think that the addition of sulphite made any real difference ; personally he used six times the weight. He quite agreed with a mixing of the alkalies, such as the two hydrates, or a hydrate and a fixed alkali, which probably arrived at very nearly the same thing, and had got good results. Some four or five years ago he had made experiments on the fixed and caustic alkalies, and had found the latter to be the best. He wished, however, to protest most strongly against the use of the name quinol, which was ridiculous, as quinol was quite a different chemical to hydroquinone, from which it differed by having one molecule of water less.

Mr. Bothamley said that the only really reliable experiments that he was aware of having been made hitherto were some that were carried on in the laboratory of Dr. Eder ; from these experiments it was deduced that quinol was a little inferior to ferrous oxalate and pyro, but the carbonate was the alkali used. This pointed out the desirability of making a large variety of experi-

ments, and not deducing results from one experiment only. In treating of the density curve of plates, it was also essential to try more than one brand of plates, for everyone knew that although plates might be the same as regards their rapidity, no two gave the same intensity curve. With regard to the name quinol, he had now been for some years one of the abstracters for the Chemical Society, and he had invariably found this salt—one of the phenyl group—properly classed under the name of quinol; and it must not be confounded with quinone, a name which he was not aware had ever been used for hydroquinone.

The Chairman said that he did not agree with the last speaker's remarks as to the nomenclature of hydroquinone, but a discussion of it would bring up a chemical question foreign to the present paper. With regard to the use of sulphite in the developer, at the present time photographers did not seem happy unless they were making some mess or other. A far better preservative than sulphite was distilled water, and in his first experiments with hydroquinone he had used nothing but pure water, and even when using ammonia he found an entire absence of fog. Of course, if distilled water was unprocurable, and the ordinary water contained lime, then sulphite might be necessary.

Mr. Clark, in replying, said that of course it had been impossible to try all the combinations of the different alkalies, and if this was to be further complicated by trying each different brand of plates, the time necessary to complete them would be somewhat long. There was, however, no reason why other workers should not take up the thread where he had dropped it, in which case he hoped his experiments might be found of some value. In regard to the nomenclature of quinol and hydroquinone, he personally was entirely indifferent, and he would stand aside and allow the chemists to fight out the battle themselves, and he would then use the victor's name with the greatest equanimity.

DEPTH OF FOCUS.

BY CONRAD BECK.*

It is with some hesitation that I discuss the question of depth of focus, as in doing so I lay myself open to being voted a bore. I have thought, however, I would add my opinion to those which have already been expressed in the discussion of this point, which always seems to have been, and I suppose always will be, one of the most prolific discussions in photographic optics. I had a dim sort of idea that it might be possible to focus the matter down to the "Circle of Least Confusion."

Let us state, to commence with, that it will only be necessary in the consideration of this subject to treat of the light that passes through the centre of the lens and forms the centre of the picture. The construction of the various forms of photographic lenses, the number or shapes of the lenses of which they are composed, do not in any way directly affect the consideration. The only factors upon which the question of depth of focus depends are—

1. The focal aperture of the lens.
2. The diminishing power of the lens.
3. The aberration of the lens.

I have here used the word focal aperture to denote the aperture as reckoned on the universal system,—that is, the aperture in terms of the focus as $\frac{f}{8}$ $\frac{f}{16}$ &c., but I wish it to be understood here even more exactly than this. In the sense I use it, it means the actual diameter of the working aperture of the lens in terms of the focus actually in use, that is, if we were using a lens to give a life-size picture, the focus in use—that is, the actual distance from the lens to the photographic plate—would be double the ordinary focus of the lens, and the actual *focal aperture* of the lens would then be only half what it is for distant objects where the principal or real focus is in use. Of course, for all ordinary landscape photography, the focal aperture of the lens is the diameter of the working aperture divided into the focal length $\frac{f}{8}$, $\frac{f}{16}$, and so forth; but for copying, enlarging, or portrait purposes, we must make use of the definition I have given above.

In the first portion of this paper I propose to neglect aberration, that is, I shall suppose that every lens brings the image of a point on the object to a mathematical point on the picture. Thus we may consider that for this purpose any photographic lens may be represented by a single lens of the same focus and aperture, only presuming that this single lens will accurately bring all the light coming from a point on the object to an exact point on the picture.

Now let us investigate the case of our single lens. I have here a lens, and I have on one side of it, two candles at different distances from it. What is happening? On the other side of this lens, pictures of these candles are being formed in the air. They are not at present visible, but they are there nevertheless. If I put two cards in such a position that the light is reflected from them, we shall see that where these pictures are being formed there are two planes corresponding to two objects, and two only. If I put a third candle in between my present candles, I get a third picture-plane between the two original picture-planes. Every object has a particular picture-plane on which its picture is thrown, and if we take a series of objects at different distances from our lens, and note where their corresponding pictures are formed, we shall notice that a certain interval between two objects is represented by a certain interval between their picture-planes, and that no two objects at different distances have their pictures on the same plane.

Thus, supposing we were taking a photograph, theoretically only one plane of our landscape could be sharp in our picture, wherever we put the photographic plate. But it is not necessary that the rays of light should come to a mathematical point in order that our photograph should be what we should consider sharp. We do not use a microscope to examine our photographs, and we do not expect to enlarge them more than a few diameters, so that, suppose some of the objects are pictured a minute fraction in front of the plate, and some a minute fraction behind, and some on the plate itself, they may all appear sharp unless very highly magnified. That is to say, owing to the fact that light from a point on the object need not be brought to quite a mathematical point on the picture in order to produce a sharp photograph, there is a certain allowable interval between the picture-planes, and all the objects whose pictures lie within this interval will be sharp on the photographic plate.

Now, on what does this allowable interval depend? I propose to call it the *focal interval*. It depends solely and entirely in a lens free from aberration on the focal aperture of the lens—that is, whether an aperture is in use of $\frac{f}{8}$, or $\frac{f}{4}$, $\frac{f}{32}$, and so forth.

Now, suppose that in figure we have a lens A B, forming an image at C C of an object at K K. The picture that will be formed at O′ of the point O, on the object K K, will be formed by the bundle of light contained by O A O′ and O B O′, and a picture of the object K K will be formed on the plane C C. Let us suppose the photographic plate be placed at D, the rays which meet at a point at O′ will fall on the plate at D, not as a point, but as a circle of light, of which E F is the diameter. Now, provided this circle is quite small when it reaches the plate at O (I should put the largest limit at say ·005″), the photograph will still, for all practical purposes, show it as a point, though it is not so in reality. That is to say, objects that have their pictures at C or at D, or at any point an equal distance behind the plate, or between these points, will all appear sharp on our photograph. This distance between these points is therefore the allowable difference in focus, or what I have called the *focal interval*. Now, if we reduce the aperture of our lens one half, the picture O′ of the point O is now formed by the bundle of rays included by O M O′ and O N O′, and the size of the circle of light, when it meets the plate at D, is reduced one half, and therefore, supposing it is allowable to have our circle of light as large as E F, we can take our photographic plate back from D to D′ and still get as sharp a picture. Thus, by halving the *focal aperture* we double our *focal interval*, or the allowable distance between our picture-planes.

It is evident that, with every aperture of our lens $\frac{f}{8}$, $\frac{f}{16}$, and so on, we can only have one particular *focal interval*, in order to obtain a particular degree of sharpness, whatever be the focus of our lens. If the focal interval with $\frac{f}{8}$ be $\frac{1}{4}$ inch, with $\frac{f}{16}$ it will be $\frac{1}{2}$ inch, and so on.

To express this mathematically—

Let a = aperture of lens in inches (A B in figure).
b = distance from optical centre of lens to picture of object being photographed (O′ X in figure).
c = constant value representing least circle of confusion that will give sharp picture (E F in figure).
v = focal aperture $= \frac{b}{a}$.
γ = focal interval = (2, O′ D in figure).

Then, by similar triangles, it will be seen that—

$$\gamma = 2c \times \frac{b}{a} = 2vc.$$

For example, suppose—

a = 2 inches, b = 8 inches, c = ·005″.

Then— $v = 4''$

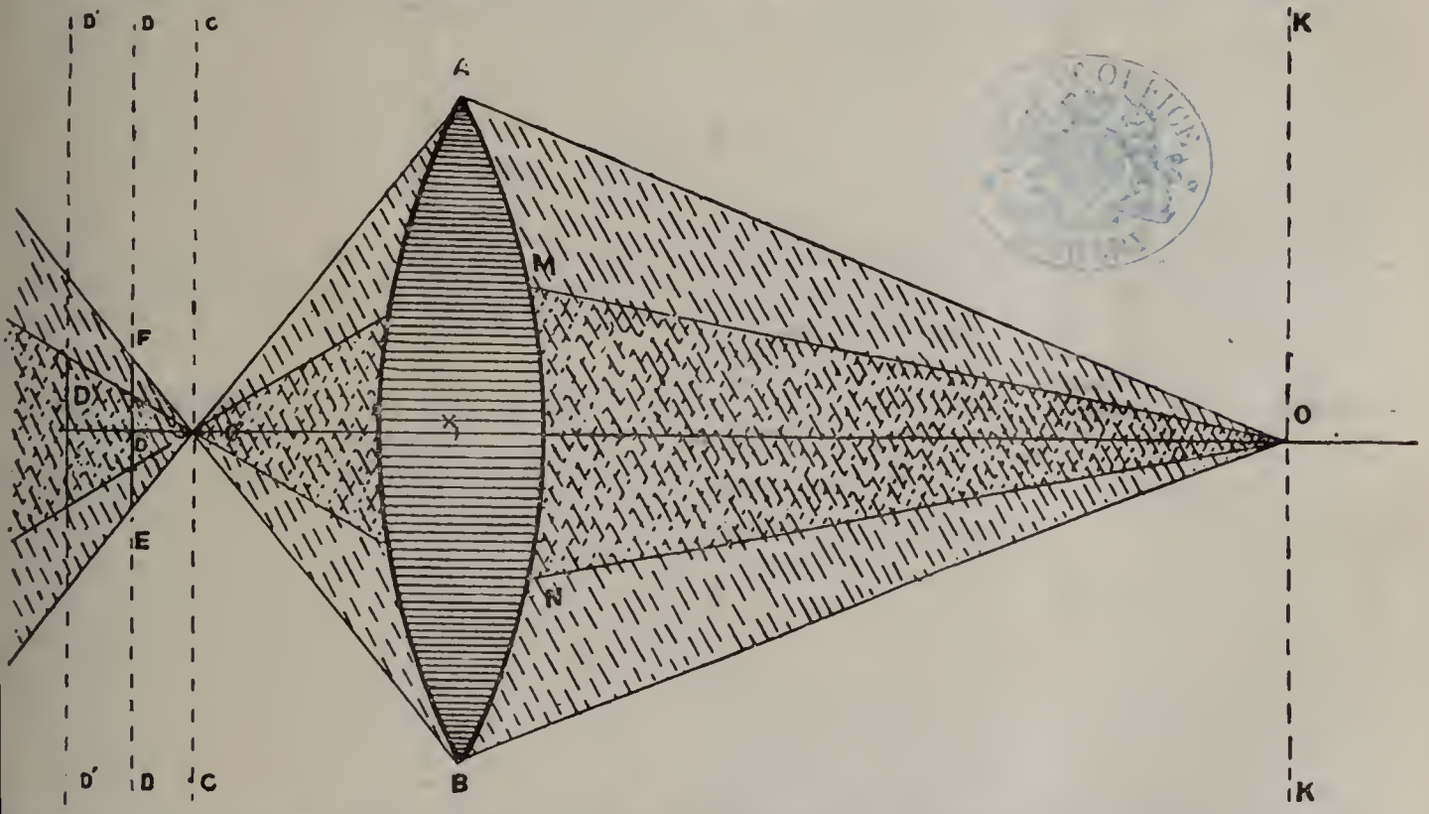
$\gamma = \cdot 04''$

* A communication to the Conference.

It is evident that where we are photographing objects at a distance, the distance b becomes the focus of the lens (f), and the focal aperture of our lens is expressed by the stop of our lens on the recognised system. If we use an aperture of $f/v = 8$, &c. When, however, we are photographing near objects, the distance b is greater than the focus of the lens, and the rapidity and focal aperture must be calculated from this actual distance, and not from the focus of the lens, as explained above.

Now we come to the second great factor—the diminishing power of the lens—which, for distant views, depends on the focus. I have said that the focus of the lens does not affect the focal interval, which I define as the allowable interval between the picture planes, such that all pictures formed by the lens in this interval will be sharp on the photographic plate placed in the centre of this interval. No, it does not; the focal aperture alone affects it. But, according to the focus of the lens in use, so this focal interval will represent a greater or less interval between the objects whose pictures are included in it. That is to say, if we find that an aperture of f/v we e to give a focal interval of $\frac{1}{2}$ inch, with a very short focus lens we might find that the pictures of all objects between the distances of 3 and 300 feet were included within this $\frac{1}{2}$ inch interval, whereas, with a longer focus lens, this $\frac{1}{2}$ inch might only include the pictures of objects from 200 to 300 feet away from the lens. On investigating this matter, we shall find that it all depends on the diminishing power of the lens. With every lens it is possible to place our object in such a position that the picture formed is the same size as the object, and when this is the case—when there is no diminishing power—then the depth of focus is always ths same, and depends solely on the *focal interval*. Thus, for taking life-size portraits, no matter what is the focus of tho lens used, the depth of focus cannot be altered by any means except by stopping the lens down (of course, assuming the lens to be free from aberration, which, with good portrait lenses, is generally the case).

For distant objects the diminishing power of a lens depends purely on its focus. The shorter the focus the lens has, the more it will diminish, or the smaller the picture it will give; so that, in this case, the depth of focus will depend on the focus. Now we shall find that the amount of difference in the objects which the focal interval represents depends on the square of the diminish-



ng power, or, for distant views, on the square of the focus. The xact formula is as follows :—

$$\frac{x}{x'} = \left(\frac{y}{y'}\right)^2$$

x = focal interval.
y' = size of object.
x' = distance between objects whose pictures are included in the focal interval.
y = size of its picture.

Or, to carry on our previous piece of work. To find the nearest object that will be sharp when distant objects are also sharp, all we shall have to do is to find what is the distance from the optical centre of the lens of the object that has its picture at a distance of $f+\gamma$ (the focus of the lens plus the focal interval). The conjugate focus of $f+\gamma$ is $\frac{f^2}{\gamma}+f$. Thus, in example above, let

$$b = f = 8$$
$$a = 2$$
$$c = \cdot 005$$
$$v = 4$$
$$\gamma = \cdot 04$$

$\frac{64}{\cdot 04} + 8$ = say, 44 yards.

That is to say, if our photographic plate be in the centre of our focal interval, all objects from the horizon to a distance of 44 yards from the camera will be sharp enough to give a good photograph.

To sum this up. There is a certain allowable interval between our picture planes, which I have called the focal interval, dependant on the stop used, and all objects that have their pictures included in this interval will be sharp in the photograph. And the range of objects that have their pictures included in this interval depends on the diminishing power of the lens; or, put into definite terms, reducing the focal aperture of the lens one-half doubles the depth, and doubling the diminishing power of a lens increases the depth four times. For distant views, where the diminishing power depends on the focus, reducing the focus of a lens one-half increases the depth four times. For life-size or nearly life-size pictures, tho depth is only increased by cutting down the aperture of the lens.

Now we come to the consideration of the part that aberration plays in the question of depth of focus, depth of definition, diffusion of focus, confusion of focus, or whatever you may prefer to call it.

Let us take one of our candles and observe the image of it formed on our screen through this large lens, which has a very large amount of aberration. We shall find that at no position can we obtain a perfectly sharp picture of our candle, but that we get a fairly sharp image at any point in a small interval of space. Now, if this lens were a perfectly corrected lens, we should find that when we were moving our screen backwards and forwards to obtain the best picture, it would all of a sudden drop into a position where a sharp picture was formed like a bullet into a hole, and the least alteration of position one way or the

other would not give a sharp image. We lose in the brilliancy of our picture by having a lens with aberration, but we gain in range—that is to say, we increase our focal interval. For taking large portraits when depth of focus is of more importance than brilliancy of definition, it is advantageous to leave a large amount of aberration in our lens, but such a lens is useless for any other purpose, unless it has a means of varying the aberration, such as that possessed by Mr. Dallmeyer's portrait lens.

I consider that for lenses to be used for allround work, with an aperture of f or f the aberration must be very carefully corrected; but when the full aperture of a lens is f or under, provided the lens is of fairly short focus, a certain amount of aberration is an advantage, as it does not materially impair the definition, owing to the large diminishing power of the lens, and it does largely increase the depth of focus of the lens. There are, therefore, in the consideration of this subject three factors:—

1. The focal aperture of the lens upon which the focal interval depends.

2. The focus of the lens on which depends the range of objects which are included in this focal interval, and which will therefore be sharp and in the photograph.

3. The amount of aberration which the individual lens possesses, and this must be left to the skill of the manufacturer in making his corrections, so as to produce the lens best suited for the purpose for which it is intended.

Now let us take a practical example of how these facts apply to a particular case. Suppose we require a lens of, say, 6 in. or 7 in. focus for a detective camera. Let us consider three lenses of the same focus, all of which we will assume, for the sake of argument, will cover the plate equally well, one with aperture f, one with aperture f, one with aperture f, which would be best to select? The lenses with apertures of f and f, it will be found, in order to give sharp pictures, must have their aberrations very accurately corrected; the lens with aperture of f may have a quite considerable amount of error purposely left in the correction for aberration. Let us suppose then that with these three lenses such is the case. The first obvious choice would be the f lens, because the additional rapidity might be sometimes useful, or at rate, the f lens. Now I think all who have used detective cameras much will agree that, with a lens of focus 6 in. or 7 in., and an aperture f, a picture can never be obtained worth having, because of the small amount of depth the lens possesses, and that with f not more than once in twenty times can a picture be taken which is satisfactory, for the same reason. That is to say, the apertures f and f can very seldom be used for detective shots. But, we might say, stop all three lenses down to f and they will work equally well, and we have the advantage of our rapidity for special work, if we require it. No doubt but the fact that, in a lens with aperture f there can be a quite considerable amount of uncorrected aberration left without its impairing the definition, will insure that this lens has considerably greater depth of focus than either of the others when used at the same aperture f. Now, for my own part, I find that a large number of figures and instantaneous pictures can be taken at f which give, with a lens such as described, enough depth to make a good photograph; but that, unless the lens has a very short focus, this is about the largest aperture that can be used. For these reasons I should, therefore, say that a detective camera with a lens of 6 in. or 7 in. focus should not have a larger aperture than f.

This is, of course, only one of the obvious instances in which the question of depth of focus affects practical work, and I will not further occupy your time by enumerating any of the other interesting points connected with the same.

Discussion.

Mr. Dallmeyer said that he quite agreed with Mr. Beck's remarks, except on one point. It was an undoubted fact that the introduction of positive spherical aberration, whilst not improving the image on this side of the true focus, vastly improved it on the other side, and thus gave equal definition over a much greater depth; but, at the same time, he could not allow the introduction of any aberration in lenses to be used on detective cameras, as the picture obtained by these had frequently to be enlarged, and then any indistinctness would soon show.

Mr. Traill Taylor said that he was certainly most strongly in favour of lenses that had no really sharp focus. He remembered, many years ago, a lens that was made by Mr. Dallmeyer at the special request of Mr. H. P. Robinson and other gentlemen. It was a triplet, but the central combination was much larger than usual. This lens was introduced at a meeting of the British Association, and was not received with favour by the then president, the Rev. Chas. Pritchard. This lens had no focus at all at full aperture, but, by stopping down, the spherical aberration was cured, and the lens would define a single plane sharply. For large heads such a lens was invaluable, for it rendered the picture by soft lines, as if made with a soft crayon, and not sharp ones like the strokes of a pen.

Mr. H. P. Robinson said he never had, and did not think he ever would, understand the $x+fs$ that garnished the blackboard; but he certainly believed in a certain amount of softness, which ought to be introducible at will, but at the same time he strongly condemned the present movement, which appeared to be in favour of doing away with all focus altogether.

Captain Abney said that many interesting points with regard to depth of focus had been passed by; to begin with one, for example. Mr. Beck had assumed that the image of a point was always a point, but this had to be taken *cum grano salis*. For instance, if one measured the size of an image of a star given with a lens of 7½ in., working at f, it would be found to be $\frac{5}{10000}$ in.; if the lens were stopped down to f it would be $\frac{1}{500}$ in.; if the focus of the lens be increased to 30 in., you will find the size of the star to be $\frac{1}{100}$ in., so that it was very necessary to take into the account both the focus and the focal aperture before fixing a minimum size for a point, as the more one diminished the aperture the larger would be the size of the point, owing to this diffraction intervening; this would account for the fact that in some enlargements one could not get sharp pictures, do what one would. As a scientific photographer, he did not agree with Mr. Robinson; he wanted a lens that would give him a representation of a spectrum ultimately sharp, and he thought that this pointed to the fact that opticians should produce lenses to suit all kinds of customers,

Mr. Beck remarked, with reference to Captain Abney's instances of diffraction, that he had recently learned from an eminent photomicroscopist that he had found practically that the more he stopped down the worse was the definition of his lens.

SOMETHING NEW IN PHOTO-LITHOGRAPHIC WORK.

BY W. T. WILKINSON.*

The usual method of making photo-lithographic transfers is upon gelatine made sensitive with potassium bichromate. This is quite sensitive enough to daylight, or to electric light; but if transfers are required when neither day nor electric light is available, then bichromated gelatine is useless, and some other method is wanted. Try this. Make a print upon any of the ordinary bromide papers of commerce, using a good negative from a subject in line, by artificial light; and develop the image with alkaline pyro, then wash and place it upon the inking board (see fig. 16, p. 141, "Photo-Engraving, Etching, &c."); next, blot the water with a soft cloth, and dab all over with a sponge saturated with transfer ink, thinned with turpentine; let the turpentine evaporate, then take a glue roller, *i.e.*, a type-printer's roller, and roll until the whites are quite clear of ink. Now soak the print in the pyro again for a few seconds, and expose it to the light. Finally, wash free from pyro and hang the print up to dry. When it is dry the print is ready for the transferer, who treats it the same as he would any other photo-lithographic transfer.

The only way to fail with this method is to over- or under-expose the print, or to use a bad negative. The negative must show perfectly clear lines. Some of the newer papers of commerce contain too little gelatine to succeed perfectly; therefore, it is best to make the paper at home. It is not a very complicated process, as the colour of the image under the developer is not all-important. A good formula is—

Gelatine	800 grains
Water	30 ounces

When the gelatine is quite soft, melt it at 120° F., and add 320 grains of ammonium bromide; stir it until it is dissolved, then add ten minims of hydrochloric acid and stir well.

In ten ounces of water dissolve 450 grains of nitrate of silver, bringing this solution to the same temperature as the gelatine solution; now proceed to pour the silver solution into the gelatine in a very thin stream, stirring it vigorously all the time. Now strain it into a warm dish, and tilt the solution so that it is only along one edge of the dish. Having made a small roll of the paper, lay one edge of the roll upon the liquid, and as it curls take hold of it and lift it slowly up, when the paper will unrol

* A communication to the Conference.

itself and receive a nice even coat of emulsion. Hang it up to dry, and repeat until all the emulsion is used.

For half-tone transfers use the bromide and chloride of calcium with 200 grains extra of gelatine, drying the paper at as high a temperature as possible without meltiug the gelatine. Paper with this emulsion upon will be very hygroscopic, and must be kept very dry. Before use, always dry the paper, and warm again before developing, so as to encourage reticulation of the gelatine.

This paper is to be exposed under a half-tone negative, developed and washed, then inked up as directed for the line transfers, followed by immersion in the developer, and subsequent exposure to light, washing, and drying. To transfer to stone, trim with a pair of long shears, then put it into the damping-book until quite limp; then sponge the back of the transfer with a solution of oxalic acid 1 part, water 100 parts. Take great care that none of this solution gets on the front of the transfer. Lay the sheet in position upon a cold, dry stone, and pull it through the press, with plenty of pressure, five or six times, without lifting the tympan. The paper can be lifted off, leaving the image in ink on the stone. Gum it in, and leave it for five or six hours before rolling up.

ENLARGING ON PERMANENT BROMIDE PAPER.

BY G. D. MILBURN.*

The process of making bromide enlargements from small negatives is very simple. To the professional photographer it is a source of profit, and to the amateur a great pleasure; from a very small negative you can produce as fine a large picture as the finest engraving, and it is now well known that when a bromide print is properly made it is permanent in the full sense of the word. An easy way to construct a bromide enlarging apparatus, out of apparatus on hand, is to take your front focus view camera, place your negative in a proper size plate-holder kit, and adjust the negative and kit (upside down) inside of the ground glass camera—that is, negative and film of negative next the lens. Place the camera on a small table, and move the table and back of camera against the window in an ordinary small room (see figure 1). Shut out all the white light in the room except that which enters through the ground glass of camera. A magic lantern with oil-burner can be used instead of daylight apparatus described above. Extra quick bromide paper can be had for that purpose. Use most any good lens that is capable of covering the size plate you intend to enlarge from. Then you want an upright easel to suspend your bromide paper on, which is easily constructed out of two uprights, a flat board, and a box of suitable size to serve as a base. The face of the easel should be covered with white paper.

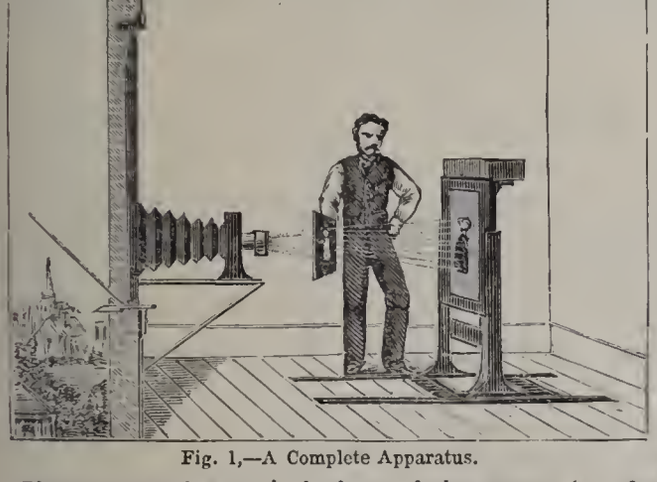


Fig. 1,—A Complete Apparatus.

Place your easel squarely in front of the camera (see figs. 1 and 2). The size of the enlargement will depend on the focus of the lens, and the distance that the easel is set from the negative. Move the easel back and forward until you have the required size. Then proceed to focus the enlarged image sharp. Now put the cap on the lens. At this stage of the operation it is necessary to have a ruby lamp in the room.

Another method to improvise an apparatus is to construct a shutter for the window, and cut a hole in the shutter two sizes larger than the largest negative to be enlarged from. Fit into the opening a frame about two or three inches deep, glazed on the outside with a sheet of ground glass. On the inside edges of the frame, top and bottom, arrange grooves in which to slide the negative. Now, on a table or shelf adjusted in front of the negative box, place an ordiuary camera, having the ground glass removed. Point the lens toward the negative, and connect the lens and negative box by means of a bag of opaque cloth, open

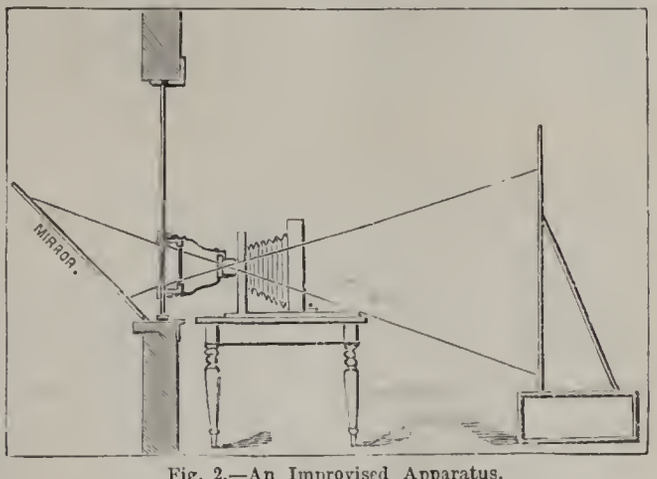


Fig. 2.—An Improvised Apparatus.

at both ends, and provide with elastic band to close it tight around the lens and negative box. This will prevent any light coming into the dark room. (See figs. 2 and 3.) If there are other windows in the room, they can be darkened with curtains. In case a portrait lens is used, it should be put in position so that the back lens will be next the negative instead of as shown in cut 2; the easel to hold the sensitive paper is described above.

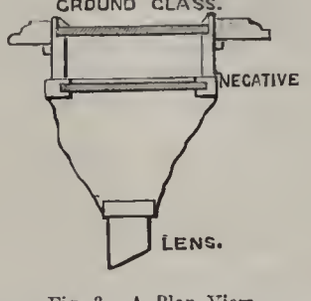


Fig. 3.—A Plan View.

The best bromide paper to use is of the Eastman Dry Plate and Film Company's manufacture. I find that this is the most reliable, as well as the most permanent bromide paper on the market. Take a sheet of the bromide paper, pin it on the easel, uncap the lens and give it the proper exposure, which will vary from a few seconds to several minutes, according to the strength of the negative and light. If you are uncertain about the necessary time of exposure, pin a small piece of bromide paper on the easel to cover the most important part of the picture, expose and develop.

This trial exposure ought to show you just how long to expose the full sheet of bromide paper, and will prevent waste. The best exposure is not less than twenty or thirty seconds. The lens can be stopped down to decrease the light if necessary. By giving the proper time of exposure, you can make a strong print from a comparatively weak negative, and *vice versa*. In fact, we have more latitude with the bromide process than any other photographic process known.

THE CHEMISTRY OF PHOTOGRAPHY.

BY J. C. WIGGIN.*

The next operation is to place the negative in the fixing bath, so-called, as it renders the image permanent, by removing the silver bromide unacted upon by the light; were this not done, of course the image would be impartially reduced on exposure to light. Hyposulphite of sodium is the fixing agent in general use, though other salts, as potassium cyanide and ammonia, can be used. This salt is properly called thiosulphate, it being con-

* Read before the Society of Amateur Photographers of New York.

* Continued from page 203.

sidered to be sodium sulphate (Na_2SO_4), in which one oxygen atom has been replaced by sulphur—

$$Na_2S_2O_3.$$

This salt acts by double decomposition—

$$Na_2S_2O_3+2AgBr=2NaBr+Ag_2S_2O_3.$$

This silver hyposulphite combines with excess hypo sodium, forming the soluble double salt—

$$Ag_2S_2O_3,2Na_2SO_3$$

There is another double salt formed when the hypo is not in excess—

$$Ag_2S_2O_3,Na_2S_2O_3,$$—

which is but sparingly soluble; hence it is of great importance that the hypo be not too much economized.

After fixation a clearing bath of acid and alum is frequently employed, but care should be taken to thoroughly wash off the hypo first, or the hypo will be decomposed thus:—

$$Na_2S_2O_3+2HCl=H_2O+SO_2+2NaCl.$$

An operation sometimes necessary to perfect or improve a negative is intensification. This is generally done by the application of a soluble mercuric salt (as the chloride) to the film, whereby a deposit of mercury by galvanic action takes place—

$$HgCl^2+Ag_2=AgHgCl_2.$$

The ammonia next applied converts the mercurous chloride into mercurous ammonium chloride.

$$2HgCl+2(NH_4)OH=NH_2Hg_2Cl+NH_4Cl+2H_2O\ ;\ \text{and}$$

$$AgCl+2NH_4OH=AgNH_4NH_2Cl+2H_2O.$$

On the other hand negatives may be reduced by application of a solution of potassium ferricyanide and hypo; the action taking place here would probably be reduction of the ferricyanide ($K_6Fe_2Cy_{12}$), to ferrocyanide (K_4FeCy_6), the oxygen formed combining with the silver of the image, would as silver oxide (Ag_2O) be removed by the hypo.

Having reviewed the various chemical reactions involved in the production of a negative, I now come to the consideration of positive prints, the end to which the negative is the valuable means. Printing on albumenized paper is probably the method with which the majority of us are best acquainted, and is entitled to first mention.

The ordinary sensitized paper of commerce is paper which has been coated with ammonium chloride and albumen, and then floated on a solution of silver nitrate, so that in addition to the silver chloride, formed by reaction between the ammonium chloride and silver nitrate—

$$AgNO_3+(NH_4Cl)=AgCl+NH_4NO_3$$—

silver nitrate shall also be present; this nitrate of silver is responsible for the milkiness noticeable when prints are immersed in water before toning, owing to the chlorides, sulphates, and carbonates present in ordinary water precipitating the respective silver salts.

At the same time when the paper is floated, a compound of silver and albumen, termed albuminate of silver, is formed; the albumen has also a mechanical action in keeping the layer of sensitive salts on the surface of the paper.

Albumen is, as we know, white of egg, and as eggs are seemingly more abundant on the Continent than here, the greater part of our albumenized paper is made abroad.

The commercial ready sensitized paper has also, I believe, a small quantity of acid added to improve its keeping properties.

Chloride of silver on exposure to light when in contact with organic matter, as albumenized paper, becomes darkened to subchloride.

$$2AgCl=Ag_2Cl+Cl.$$

This liberated chlorine, if nitrate of silver be present, combines with its silver, forming chloride of silver again and free nitric acid.

The albuminate of silver present is reddened by exposure to light to a suboxide (Ag_4O). This suboxide, when acted upon by hypo, is converted into metallic silver and silver oxide, which is dissolved to a great extent. The hypo also removes the subchloride of silver, leaving a certain amount of metallic silver from it.

Toning consists essentially in the deposition of gold or some other metal upon the silver of the print; before toning it is desirable to get rid of the free nitrate of silver, otherwise nitrate of gold and chloride of silver would be formed by double decomposition. The toning bath generally used consists of a solution of chloride of gold, and any salt in which a fixed alkali is combined with a weak acid. Acetates and alkaline carbonates are capable of precipitating gold from a neutral solution in the presence of organic matter, In the acetate bath the following change takes place:—

$$2AuCl_3+NaC_2H_3O_2=Au_2+NaC_2Cl_3O_2+3HCl.$$

Bicarbonate, phosphate, tungstate, biborate, and possibly other salts of sodium or potassium may be used, but the action in all cases is the same—viz., a gilding of the silver particles of the print with a deposit of gold; the varying tones obtained with different salts is no doubt due to the fineness or otherwise of the precipitated gold particles, as well as to the amount precipitated.

In addition to gold, other metals, as uranium and copper, may be used where uranic salts are. Used with gold they become reduced to uranous and precipitate gold, and are reconverted to uranic; but there are other processes in which uranium itself is deposited on the print.

In fixing prints the chemical change is mainly the same as that in fixing plates—viz., by formation of soluble double salts, but other reactions are involved as stated; it will also be noted that from the decomposing action of acids on hypo it is advisable that the alkalinity of the fixing bath be assured; this is, of course, easily ascertained by using litmus payer. The thoroughness of the subsequent washing is also of the utmost importance, as the slightest trace of hypo left in the print is fatal to its permanence, owing to the instability of this salt. A ready test for the determining its absence is to add a little of the so-called iodide of starch, made by adding a solution of iodine to starch paste, to some of the washing water, when if any hypo be present the colour will be instantly discharged, owing to formation of iodide and tetra-thionate of sodium.

The sulphocyanides of ammonia and potassium are also occasionally used for fixing. Other methods of silver printing are typified by bromide and alpha paper; in these gelatine is used instead of albumen, and subsequent development is necessary. The bromide paper is, as we should expect, from the superior sensitiveness of silver bromide to chloride, as well as to its conjunction with gelatine instead of albumen, much more sensitive to light than just referred to.

The alpha paper is gelatino-chloride, and though not so sensitive as bromide is, yet much more so than albumen chloride paper. The reactions occurring are of the same nature as described.

Platinum printing is a method having probably a great future before it, owing to its absolute permanence, and is already taking the place of silver to some extent. The *rationale* of this process is that the salts of platinum are reduced—*i.e.*, the metal is set free by ferrous salts—and that ferric salts, when exposed to light under favourable conditions, become reduced to ferrous. The reactions are thus represented—

Ferric oxalate. Ferrous oxalate.

$$Fe_23C_2O_4=2FeC_2O_4+2CO_2.$$

Chloro-platinite of potassium.

$$3K_2PtCl_4+6Fe_2C_2O_4=Fe_2Cl_6+2Fe_23C_2O_4+6KCl+3Pt.$$

Potassic oxalate.

$$Fe_23C_2O_4+3K_2C_2O_4=2Fe^{iii}K_33C_2O_4.$$

The ferro-prussiate process is another method of printing from the negative also much used; this also depends on the sensibility of ferric salts to light; a paper brushed with ferric citrate exposed to light, has its iron, where exposed, reduced to ferrous salt; now ferricyanide of potassium gives a blue precipitate (Turnbull's blue) with ferrous salts, but not with ferric; this re-agent is accordingly applied to the print after exposure, and the light-affected parts become proportionately coloured.

I have now another process to consider, one not in general use by amateurs, though our society has been fortunate in having a practical demonstration brought before it by Mr. Cadc. This, the carbon, or autotype process, depends upon the sensibility of the bichromates to light. The paper is prepared by coating with a solution of pigmented gelatine; it is then floated on a solution of bichromate of potassium or ammonium. By the action of light in presence of gelatine, these bichromates become reduced, some of their oxygen combining chemically with the gelatine, rendering it insoluble.

$$2K_2Cr_2O_7=2K_2CrO_4+CrO_3+O_3.$$

By the action of hot water, the soluble parts—*i.e.*, those unacted upon by light—are removed, and the image remains in pigmented gelatine.

The bichromates are dangerous poisons, and may be absorbed through the skin. I saw it stated in print the other day that half the employees of the principal carbon works suffered with this disease.

I hope that I have shown that the photographer who sets to work with an intelligent appreciation of the chemical changes he sets in motion, has a considerable advantage over one who views these interesting reactions as merely mechanical.

Reviews.

THE CHEMISTRY OF PHOTOGRAPHY. By Raphael Meldola, F.R.S. Crown octavo; 382 pages. Price not stated. (*London*, 1889: *Macmillan and Co.*)

OUR author seems to take special delight in a saying attributed to the late Colonel Russel, that "*Photography would be a most interesting subject were it not for the pictures.*" This sentiment forms the climax of a section of the introduction in which the claim of photography to be regarded as an important branch of chemical technology is insisted upon. We suspect, however, that the sentiment quoted above is only a sort of paraphrase of Sir Humphrey Davy's celebrated boast about his own genius being exaltedly higher than that of a mere artist—a boast which took the form of speaking of a picture gallery as a collection of fine frames.

Professor Meldola's work seems to be partly intended as a means of assisting in the generation of the very worst form of science teacher—the teacher who simply takes his matter and subject from a master, and retails it out to a class—generally in so mutilated and corrupt a form as to do far more harm than good to the cause of true education. To illustrate our point, we may quote the following from the preface:—

In order to facilitate the teaching of the scientific principles of photography, a number of experiments have been introduced, hints for the performance of which are given in the appendix to each lecture, the bracketed capitals in the text referring to these demonstrations. It is believed that the directions will be found sufficiently explicit to enable any lecture demonstrator possessed of ordinary skill in photographic manipulation to repeat them successfully.

In spite of the fact that the book is calculated to help in the evolution of a system by which teachers of technology may become rather copyists than true craftsmen, we are delighted with the excellent arrangement and accuracy of the work. There is not, we are sure, a photographic practitioner—whether mainly technologist, or essentially artist—who would not benefit largely by a careful study of Professor Meldola's work.

The first chapter deals generally with photo-physical and photo-chemical changes, and touches on that which chemists call "dissociation," in relation to the above; after which we have a chapter on the photo-chemistry of the silver compounds, and the nature of Mr. Carey Lea's photo-salts is considered. An important point in connection with this chapter is the analogy of silver haloids with the haloid compounds of mercury, copper, and thallium.

Other chapters deal with the function of sensitisers, emulsion questions, the nature of development, the reversal of the image, the composition of white light, the kinetic aspects of the absorption of light by sensitive bodies, orthochromatic photography, photochromy, image transference, theory of toning, and the nature of the reactions in the bichromate process.

It is interesting to quote from p. 320 in reference to what may afford a key to future progress in orthochromatic photography. Prof. Meldola says:—

The chemical hypothesis of orthochromatic action rests upon the fact that the best special sensitizers are the most fugitive dyes. Now there is reason for believing that the bleaching of a colouring matter by the action of light is due to photochemical oxidation. If this be the case atmospheric oxygen may be essential for the production of orthochromatic effect, and the formation of a second maximum in the less refrangible part of the spectrum might be prevented by immersing the dyed plate in a reducing solution, or in some inert liquid or gas which prevented access of air. Experiments of this kind might easily be made, and if the action in the green, yellow, or orange, did not take place under these circumstances, the chemical hypothesis of orthochromatic photography would be raised to the rank of a proved theory; while on the other hand, if the second maximum still appeared, this hypothesis would not be disproved, because it is possible that the breaking down of the complex molecule of the colouring matter by the action of light might take place in the absence of oxygen, and thus also give rise to the formation of products of a reducing character.

THE SULPHITES OF POTASSIUM.

BY JAMES H. STEBBINS, JNR.*

THREE sulphites of potassium, corresponding to the three sulphates, are known, viz., the neutral or dipotassium sulphite, $SO<^{OK}_{OK}$, which crystallizes with two molecules of water; the acid sulphite, or monopotassium sulphite, commonly called bisulphite of potassium, $SO<^{OK}_{OH}$; and the anhydrosulphite, which is now known in photography as the meta-bisulphite of potassium, $SO<^{OK}_{O}$ $SO<_{OK}$

Neutral Sulphite of Potassium, $K_2 SO_3$.

This salt is obtained by passing a current of sulphurous acid through a solution of potassium carbonate until the latter is saturated, and all the carbonic acid driven off. The liquid so obtained is allowed to evaporate over sulphuric acid until the salt deposits in a crystalline form. It crystallizes in octahedra, or six-side pyramids. These crystals have a sharp, sulphurous taste. When heated, the salt decrepitates, giving off some of its water of crystallization, and losing some of its sulphurous acid. When exposed to the air it absorbs oxygen, and is transformed into potassium sulphate. For this reason it is advisable to always keep your sulphite bottles well corked, in order to prevent the absorption of oxygen, and consequently, the deterioration of your sulphite. It dissolves in its own weight of cold water, and in a lesser quantity of warm water.

Acid Sulphite of Potassium, $KH SO_3$.

This salt may be obtained by sursaturating a solution of carbonate of potassium with a current of sulphurous acid.

On now adding absolute alcohol to the liquor so produced, a crystalline precipitate is obtained, which is collected upon a filter, washed with alcohol, and dried. Commercially, however, this method is not employed, as the alcohol is too expensive. The acid sulphite, when left exposed to the air, gradually gives off sulphurous acid. A saturated solution of this salt, when left to itself, gradually deposits fine rhombic prisms, having the above composition, and a sulphurous and disagreeable taste. The property of this salt of gradually giving off sulphurous acid makes it, in our opinion, a valuable ingredient in the compounding of developers, and we are surprised that it or its corresponding soda salt have not been more extensively employed for this purpose.

Anhydro or Metabisulphite of Potassium, $K_2 S_2 O_5$.

This salt, to which the photographer's attention has lately been called, may be prepared by passing a current of sulphurous acid through a boiling and saturated solution of potassium carbonate. On cooling, the salt deposits in a crystalline form. When heated, the salt is decomposed, giving off sulphur, sulphurous acid, and potassium sulphate. We have received a sample of this salt from Messrs. Herf and Frerichs, which, upon examination, proved to be perfectly pure. As to the rôle played by this new salt in developers, your committee is at present unable to give any information, but, if we are to judge by the experiments of such men as Professors Eder and Vogel, it presents no advantage over the ordinary neutral sodium sulphite, and, in fact, is not as efficacious as the latter.

We will, however, institute experiments in this direction at a future time, and hope to be able to report to you upon the same at our next monthly meeting.

* A report of the Chemical Committee of the Society of Amateur Photographers of New York.

Correspondence.

A PHOTOGRAPHIC PUBLICATION FOR JAPAN.

SIR,—It may be of some interest to your readers to know that a periodical devoted entirely to photographic matters has been started in this country. The name of the paper is *Sashin Shimpo*, which, being interpreted, means PHOTOGRAPHIC NEWS. The name of the chief editor is K. Ogawa; the publishing office is Hakubundo. The paper is issued monthly, and the price for a copy is 15 sen, there being between two and three sen to the penny.

I send you a copy of the first number, warning you that in reading it you must begin at the last page, at the right-hand side of that, and that you must read in vertical lines.

So far as I know, Japan is the only Eastern country in which a journal devoted exclusively to photographic matters has been published by the people of the country, but even this is not the first appearance of such a journal in Japan. The *Sashin Shimpo* was published during the years 1881-2. Ogawa was at that time, nominally, only assistant-editor, but the working of the paper so far depended on him that when, in 1882, he left his country for America, the publication had to be stopped. I have seen one volume of this early attempt; it contains, among other things, a very fair portrait of Daguerre.—I am, sir, yours, &c., W. K. BURTON.

Tokio, Japan.

AN EXHIBITION AT BERLIN.

SIR,—Will you kindly inform your readers that an exhibition will be held at Berlin in the autumn to commemorate the jubilee of photography?

The exhibition will open about the 15th of September, and last one month. Place: the Royal Academy of Science, Unter den Linden, Berlin.

There will be five divisions:—

1. History of Photography, and application in Science, Art, Industry, Engineering, &c.
2. Portrait and Landscape Photography of an artistic value.
3. Photographic Printing Processes, Autotype, Collotype, Zinco-block Printing, Photogravure, &c.
4. Apparatus and Chemicals.
5. Photographic Literature.

The exhibition will be open to all comers. There will be awards for specially valuable contributions and superior productions. Particulars to be published later on.

I have been appointed collector of contributions, and commissioner for Great Britain, and shall be pleased to answer all inquiries. Exhibits should be addressed to me, or if large packages, to the Photographic Exhibition, Koniglichen Academie Gebande, 38, Unter den Linden, Berlin.

Intending exhibitors are requested to notify their intention before the 31st of May to Dr. W. Zenker, Wichmann Str. 17, Berlin, W., or to me.

Exhibits must be at their destination by the 31st of August, and should therefore be forwarded not later than the 15th of that month.—I am, sir, yours truly,

19, *Buckingham Street, Strand, W.C.* J. R. GOTZ.

Proceedings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE ordinary monthly meeting of this Society was held at the Rooms, 5A, Pall Mall East, on Tuesday evening last, the 9th inst., the President, J. GLAISHER, F.R.S., in the chair.

The CHAIRMAN said that the very important question of whether or not medals should be awarded at the Society's next exhibition, and, if decided in the affimative, the manner of selecting the judges of awards, would come before the members in accordance with the rule bearing on that subject.

Mr. J. TRAILL TAYLOR said that he had merely to express an opinion that as a matter of principle he was against the award of medals, but as a matter of expediency he was in its favour.

Mr. W. BEDFORD said that he was one of those who last year was opposed to the granting of medals. It had been said that, in consequence of the absence of medals, the exhibition had proved to be a failure. It was difficult to decide that; other causes might have been at work. There was, at any rate, now a strong opinion that medals should be given. His own view was that an intermediate course would be best, and that, instead of medals, the Society should purchase the works most entitled to distinction, and form a nucleus for a very valuable collection, which would afford the means of artistic and technical education in photography.

Mr. W. S. BIRD differed from Mr. Taylor, in thinking that medals were not merely useful as expedient, but were right as matter of principle. The Society exhibition and progress medals stimulated good work and research, despite the ugly fact that the medal system had been used in an unworthy manner by the interested promoters of certain exhibitions.

Mr. FRIESE GREENE was altogether in favour of medals being given. The humblest would try with the prospect of that distinction, and though he would fail in obtaining it, yet the effort to do something worthy was beneficial.

Mr. CHAPMAN JONES said that Mr. Taylor had not put it fairly; it was not a mere question of expediency, but of opinion to be elicited.

The opinion of the members was then taken, and, by a large majority, was in favour of medals being awarded.

After a few remarks by Mr. T. Samuels, the SECRETARY read the proposal, which had been drawn up by Council, as to the manner of obtaining the decision of the members with regard to the judges who should be invited to make the awards, which was to the effect that a notice should be inserted in the Society's journal, requesting those members who wished to nominate judges to send in a list containing not more than seven names before 6 o'clock p.m. of the day of the next general meeting, and that such nominees should be written to, asking their acceptance of the office, beginning with those having the largest number of nominators, until seven acceptances of office were obtained; the jury, if possible, to consist of two painters of distinction, and five members of the Society. The proposal was carried with but one dissentient.

Mr. JOHN SPILLER then read extracts of a letter received from Colonel Waterhouse in Calcutta, relating to orthochromatic photography. The writer had observed the discussion that had been going on with regard to azaline, and had endeavoured to obtain quinolin red wherewith to experiment, but had failed to procure it. He enclosed two photographs which must be considered as very successful experiments in photographing the red end of the spectrum. They had been made, one with alizarin blue from the Badischer chemical factory, and one with anthracine blue from Schuchlardt's. Each had been employed as a bath in a solution of one in ten thousand, and with liquor ammonia added. There was a strong sensitizing action from lines C to A, and it continued as far as Z, but with considerable insensitiveness to yellow, owing to which, they could be worked in an ordinary dark room, though, doubtless, absolute darkness would be better. As well as spectrum photographs, the plates had been exposed to the image obtained from Winsor and Newton's colour chart. He had also been trying a very interesting new body, rhodamine; in colour it resembled the bluish shades of eosine, but there was a vivid scarlet fluoresceuce. It sensitised very strongly for yellow. His experiments were made with the view of finding a dye to replace eosine, the use of which was hindered by patents. With rhodamine, acetic acid appeared to be as effective as ammonia.

The CHAIRMAN said that he should like Capt. Abney's view on the communication from Col. Waterhouse. As the Captain was now in Paris, he proposed that any discussion should be adjourned to the next ordinary meeting. Meantime a vote of thanks to Col. Waterhouse was passed. The Chairman then handed round a photograph of stars by Mr. Isaac Roberts, of Liverpool, which showed great progress in that development of photography. In a former photograph of the same part of the heavens by the brothers Henry, only 3,124 stars appeared; a later one made by the same workers showed 5,000; but in the present picture there were no less than 16,206 stars depicted. The ellipticity of the images towards the margin of the field was very slight.

Mr. Friese Greene then read a paper on "Some Effects Probably Due to Phosphorescence, Electricity, and Colour Sensitiveness," in the course of which he requested the members to look at a flash-light which he ignited, and then, closing their eyes, to notice whether the secondary image which presents itself appeared to be in natural position, or inverted—some persons having stated that to them it appeared in the latter position. Those members who after the experiment stated their impression declared that the phantom image was erect, and not inverted. With regard to the photograph (which had been shown at a previous meeting) of the arc light made from his own eye after looking at the light, he said that Mr. Debenham had suggested that the eye should be inspected in the darkness immediately after the exposure to light, in order to see if there was any phosphorescence visible to account for the marking upon the plate. This inspection had been made, but no light was visible; the photographic effect, however, might be due to the ultra-violet rays produced by phosphorescence. The next subject introduced was the markings developed upon plates that had been subjected to magnetic currents of high intensity. The speaker then referred to some experiments that he had made in orthochromatic photography, and said that he had obtained plates more sensitive to red than to blue; indeed, he believed the time would come when plates might be prepared by blue light and exposed with a red light. The best formula for this work he had found to be as follows:—

No. 1 *Solution.*

Nitrite of silver	10 grains
Cyanine	10 ,,
Alcohol	2 ounces
Glacial acetic acid	2 minims
Decoction of horse-chesnut bark	1 ounce

For use take—

No. 1 solution	1 drachm
Water	20 ounces
Liq. ammon.	1 drachm

and immerse the plate for two minutes in the mixture, after which the plate is washed, and set up to dry. The difficulty was a tendency to spots and fog if the colour-sensitizing was carried too far. This formula would take you as far into the red as anything yet known. A small quantity of the No. 1 solution was placed at the disposal of some of the members who proposed to experiment with it, and a plate was put into a spectrum apparatus, and left till the conclusion of the meeting, when it was developed, and showed a strong image in the red, apparently more powerful than that of the blue and violet at the other end of the spectrum. In the yellowish green, however, there was a remarkable band of insensitiveness.

The Chairman, in thanking Mr. Friese Greene for the paper he had prepared at his request for this meeting, said that new ground had been broken and new prospects opened up. It was then announced that the discussion upon this and Col. Waterhouse's communication would take place at the next general meeting, when a paper would also be read by Mr. T. R. Dallmeyer. The meeting then adjourned.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 4th inst., Mr. J. J. Moran in the chair.

The Chairman read a letter from Mr. A. L. Henderson referring to his visit to Australia, wishing the members "good-bye" for the present.

Mr. A. Cowan showed two positives. Each had received the same exposure and developed for a given time, using pyro in one instance, and hydroquinone in the other. No difference could be detected between the two plates.

A question from the box was read:—"If many landscape negatives two inches square be enlarged in the camera to ordinary lantern size, and an equal quantity four inches square be reduced to lantern size, will there be any great difference in the quality of the transparencies when projected on the screen by the optical lantern?" This question bears upon the weight of tourists' baggage.

Mr. W. E. Debenham said there would be but little difference generally, but optically he should be in favour of the smaller size.

Mr. A. Cowan was in favour of using quarter-plates; this allowed lantern slides to be made by contact, and admitted of a little margin on the plate.

A question was asked:—"What is the most economical solvent for celluloid: parkesine or xylonite?"

A member suggested alcohol and ether.

Mr. W. England passed round some flash-light pictures of groups.

Mr. A. Haddon, referring to the remarks at a previous meeting respecting the construction of a siren, exhibited a small one—the invention of Latour—and explained its working. On the top of a metal air-chamber, holes at an angle of 90° are pierced, the inlet for the air being at the bottom. A metal disc, having holes pierced at a similar angle, is made to revolve by the air passing through the small holes of the air-chamber, the sound being caused by the holes in the disc and the air-chamber being coincident, the pitch of the sound being governed by the intensity of the pressure of the air passing into the air-chamber.

Liverpool Amateur Photographic Society.

An extra meeting of this Association was held on Thursday, April 4th, at the Club Room, Crescent Chambers North, the President, Mr. A. W. Beer, in the chair. The object of the meeting was to witness the exhibition of the slides sent by the Boston (U. S. A.) Camera Club, entitled "Illustrated Boston," the explanatory lecture being read by the Hon. Sec., Mr. W. A. Watts. The series is remarkably well got up, every arrangement for its successful exhibition being made with very great care, and is in that respect a model for imitation; the slides are, generally speaking, of good quality, and the whole lecture very interesting. The synopsis is too long to quote *in extenso*, but, beginning with Boston in olden times, the first map is shown, and contrasted with a map of the present day. The tourist is then carried round the harbour, the docks, and ferries; thence to "Odd Bits of old Boston," such as the old North Church, where the lantern was hung in the belfry as a signal of the movements of the British troops. The public buildings are then visited—Faneuil Hall, the State House, the Post Office; then the education and literary institutions, such as the High Schools, the Art Museum, Trinity Church; the avenues and parks; "Fair Harvard" follows, with its various buildings, the Longfellow House, the Silent Cities, the summer pleasures along the beach and elsewhere, old haunts and old houses, which include, for America, some venerable relics. Amongst the most picturesque of the slides sent are the beauties of the Charles River. There are some sixty-nine slides, and a reading of an hour-and-a-quarter. The series has been sent, as has been previously mentioned, to the Liverpool Association, in trust for the use of any photographic society on this side of the water desiring to exhibit it, and in the hope that societies in this country may be induced to prepare similar series of cities or scenery, and in like manner send them to America.

At the close, a number of slides by members of the Association were exhibited, and a hearty vote of thanks passed to the Boston Camera Club for their gift, and to the Hon. Sec. for reading the lecture; in acknowledging which he expressed the hope that Liverpool would actively get up a series during the coming summer and autumn, and offered his services in organizing and preparing the requisite description. "Illustrated Boston" will be exhibited at Manchester April 9th, Birkenhead April 11th, Camera Club April 18th, Glasgow April 23rd, and Warrington April 30th. Applications for the use of the series should be addressed to Mr. W. A. Watts, Highfield Road, Appleton-in-Widnes.

North London Photographic Society.

April 2.—Mr. J. Traill Taylor (President) in the chair.

The Hon. Secretary (Mr. N. P. Fox) read a paper on "The Three Modifications of Platinotype," and demonstrated the hot bath process. In reply to a question, he said that the hot bath process would be most useful to any one who only wanted to develop a few prints occasionally, as the platinum salt being in the developer of the cold bath, and not keeping well longer than a day, made it very expensive unless two or three dozen prints were treated at a time.

Mr. J. Oakley called attention to the fine effects obtained with the Eastman bromide paper when using the hydroquinone developer, the image being softer and of a warmer colour.

Mr. L. Medland found a great advantage in soaking dry plates in an old solution of hydroquinone to commence the development, finishing with a fresh solution.

The next meeting will be on Tuesday, April 16th, when Mr. Freshwater will exhibit a series of lantern views taken in India; there will also be a discussion on the hydroquinone developer.

Glasgow Photographic Association.

April 4.—Mr. William Lang, jun., in the chair.

Messrs. Wiliam Vórel, David R. Clarke, M.A., and T. Peat were elected members of the Association.

Mr. Lang then read the second and concluding portion of his paper, "Fifty Years' Photography" see page (228). As in the previous portion of his paper, Mr. Lang made use of the Association's lantern to show a very interesting series of portraits he had prepared of the various scientists to whose researches the present position of the photographic art is due.

Mr. Paton showed a very fine series of transpareneies of marine subjects. These were made by the collodion process, and toned with platinum.

The majority of the meeting concurred with Mr. Paton in the opinion that, although the collodion process was more troublesome to work than the gelatine, the results obtained, especially when the transpareucy has to he reduced from a large negative, are very much superior.

Camera Club.

On Thursday, 4th inst., Sir David Salomons read a paper on "Universal Formulæ for Enlarging and Reducing;" Mr. E. Ferrero occupied the chair.

Previous to the lecture Mr. Charlton Wollaston exhibited an ingenious hand camera from Messrs. Robinson's, constructed to carry the same spool as the Kodak.

The Chairman drew attention to a cheap and handy lantern-slide box, and the Hon. Secretary handed round some specimens of Mr. Blanchard's platinum black process. In his address Sir David Salomons showed the working out of his formula, which was devised to give the exposure for any variation of light and density of negative, factors being introduced to give the value (ascertained by previous experiment) of these variables. The formulæ were said to be most suitable for artificial light work where the light might be considered constant, but could be used for daylight by the working of an actinometer. Some doubts were expressed as to the possibility of fixing accurately and with facility values for light and density under different conditions, but the lecturer stated that the formula had been found of great practical value in actual working.

Messrs. Davison, Elder, Stroh, and the Chairman took part in the discussion.

Thursday, 18th inst,, will be a lantern evening. In addition to other work which members are invited to bring, the series prepared by the Boston Photographic Society, illustrating Boston, U.S.A., now in circulatiou in England, will be shown.

Coventry and Midlands Photographic Society.

The usual monthly meetiug of this Society was held on April 3rd, Mr. Councillor Andrews in the chair.

The Secretary announced the death of Mr. A. E. Rollason, one of the founders of the Society, and its first hon. secretary, and a vote of sympathy and condolence with his relatives was passed, and a copy of the same ordered to he forwarded to them, and also entered on the minutes.

It was decided that, weather permittiug, the first excursion of the season should be held on April 25th, and it was left to the Secretary to make the necessary arrangements.

The meeting then proceeded to the examination of the apparatus that had been brought for exhibition. Among other things, Mr. Beck's detective camera was showu by Mr. Sturmey, who gave a lucid and practical illustration of its working. The camera was much admired for its compact appearance and finished workmanship. Other articles showu were Messrs. Marion's vignette serrator (a practical lesson in vignetting being given hy the Secretary with its aid), Mr. Fell's mounting set, Optimus plunge shutter and wick trimmer, and improved dark-slide, and other articles of utility.

Through the kindness of the Proprietors of *Photography*, a number of the pictures sent in for the "Frost and Snow Scene" competition were on view, and were criticised and commented upon.

After the Question-Box had been attended to, a number of exposures hy the magnesium light were made, the President and Secretary being the sitters, and the results were to be shown at next meeting.

East Dulwich and Peckham Photographic Society.

At a meeting held at 76, Peckham Rye, on Friday last, April 5th, it was unanimously resolved that a society, named as above, be formed. A treasurer and secretary were elected, and a committee of seven formed, who, with the officers of the Society, proceeded to draw up a set of rules. The meetings will he held on alternate Fridays during the winter, and once a month during the summer months. The subscription is five shillings per annum. Duriug the evening the names of eighteen gentlemen were proposed as members of the Society.

The next meeting will be held on Friday next, April 12th, at 8 p.m, in consequence of Good Friday falling on the regular meeting night. Gentlemen wishing to become members should write to the Hon. Sec., Mr. S. W. Gardner, 7, Barry Road, Peckham Rye.

Society of Amateur Photographers of New York.

On Friday evening, March 8th, "Illustrated Boston," hy the Boston Camera Club, was shown before the Society, and comprised sixty-seven views, mostly of the interesting streets, squares, historical buildings, the public common, educational institutions, Harvard College, and scenery along the Charles River.

The description of the pictures was prepared hy Mr. Arthur H. Dodd, who was present to read it. Mr. William Garrison Reed has the honour of heing the member of the Club who suggested the idea of illustrating the city. As a whole the views, in showing the streets and buildings, were quite interesting, hut only a few were what might be called charming and attractive.

The dissolving lantern used was lent by Mr. George Marshall Allen, and operated by Mr. F. C. Beach and Mr. A. G. Tisdel. The hall was crowded to its utmost capacity, and sprinkled among the audience were many ladies.

On Tuesday evening, March 12th, the regular monthly technical meeting of the Society was held; Mr. F. C. Beach read a paper on the "Effect of Electricity on Dry Plates," describing a number of scientific experimeuts.

Mr. Charles Simpson exhibited a peculiar changing hag to he huug from the neck, and to be used when in a sittiug position.

Mr. David Williams explained his outfit which he intends to use during the summer on his trip abroad. He also had a new but simple maguesium lamp and a special canvas hox, divided into compartments, to hold the various articles needed on a photographic jaunt.

The Chemical Committee read a report on the "Sulphites of Potash."

Mr. G. D. Milburn exhibited an improved Bausch and Lomb shutter, having a special air valve device hy which the time of the shutter was very easily regulated. He also read a paper on "Enlarging on Bromide Paper," following it with a very successful demonstration, enlarging a child's head two inches in diameter to life size, and used for this purpose the Society's optical lanteru with a lime light. An exposure of twenty seconds was given. After the demonstration the meeting adjourned.

The President announced the election of Dr. J. M. Eder, M. Leon Vidal, M. A. Davanne, Dr. H. W. Vogel, Mr. J. Glaisher, and Mr. M. Carey Lea as honorary members of the Society. He also read a few proposed amendments to the Constitution, amoug which was one allowing amateurs or professiouals residing heyond the corporate limits of the City of New York to become corresponding members on payment of a fee of five dollars.

Sheffield Camera Club.

The usual monthly meeting was held on Friday evening, April 5th, Mr. Bartlett W. Winder, F.C.S. (Vice-President), in the chair.

After the adoption of the minutes of the previous meeting, a ballot was held, and the following gentlemen elected members:—Rev. C. Clementson, M.A., Mr. Frank Harrison, M.R.C.S., Mr. J. W. Charlesworth, and Mr. R. R. Neill.

Mr. E. Howarth, F.R.AS., then read a paper entitled, "Some Suggestions for a Photographic Survey of Sheffield." After having pointed out the work which was being done by photography in surveying the heaveus, he called attention to the recommendations made at the last meeting of the British Association, that local photographic and geological societies should be asked to make a collection of photographs of the geology of their respective districts. As this would require the combined action of geologists and photographers, it was scarcely possible for the Sheffield Camera Club to undertake this work at present; but there was another kind of photographic survey that might properly and successfully be undertaken by the Club: this was the prepa-

ation of a collection of photographs illustrating the chief historical, antiquarian, and topographical features of the town and district. Mr. Howarth mentioned many interesting relics of the past of Sheffield, that had disappeared, leaving no record, and urged the desirability, while others still remained, of ensuring their permanent record by means of photographic pictures. He then sketched out a plan for carrying this into effect, suggesting that the town and district should be divided into twelve sections, each section being allotted to two members of the Club, who should be provided with a map of their section, and a memorandum book giving a list of the places and objects to be photographed; and that the first year's operations should be confined to the immediate neighbourhood of Sheffield, but should be extended year by year to embrace all places of interest within a radius of about twenty miles.

After the reading of the paper, discussion followed, and it was unanimously decided to carry out the plan, and a sub-committee was appointed to arrange the details, so that the work could be at once commenced.

Photographic Section of the Perthshire Society of Natural Science.

The first meeting of this Section was held in the Society's rooms, Tay Street, on Monday evening last, Dr. F. B. White, F.L.S., in the chair.

There was a good attendance, including photographers professional and amateur.

The Chairman explained the connection of the branch with the parent society, and scope of its work. He expressed the hope that much would be done in elucidating the geology and topography of Perthshire by the members of the section.

He then introduced Mr. Frew, F.C.S., who read an interesting and instructive paper on "The Printing Processes," which he illustrated by numerous specimen prints, some of which were of great beauty. He referred in them to the ordinary silver print, the newer bromide paper, the autotype, the platinotype, and cyanotype processes, and pointed out the characteristics of each. A reference by Mr. Frew to the work done by Mr. Blair, a Perth man, in perfecting the autotype process, led to an animated discussion on the claims of that gentleman as an inventor.

Mr. P. Campbell proposed a vote of thanks to Mr. Frew for his paper, and this was seconded by Mr. J. Henderson, photographer. A limelight exhibition followed, the slides exhibited being the work of Dr. Urquhart, Mr. R. D. Pullar, F.C.S., Mr. Frew, F.C.S., Mr. Munro, B.A., and Mr. W. Ellison, the Honorary Secretary.

A hearty vote of thanks was awarded to the President, Dr. J. B. White, on the motion of Mr. Munro.

For the purpose of illustrating Mr. Frew's paper, a collection of beautiful prints by the various processes was kindly lent by the Autotype Company, the Platinotype Company, the Eastman Company, Messrs. Fry and Company, and also engineering plans and drawings by Mr. Reid, of University College, Dundee.

Bolton Photographic Society.

Monthly meeting held at the Baths, Bridgman Street, Bolton, April 4th, Mr. E. N. Ashworth presiding.

Mr. Percy Knott was elected a member.

Mr. R. Leigh, who has lately returned from an extensive tour in the United States, and who has made over 700 exposures with a Kodak, brought to the meeting some 60 or 70 slides which were most interesting, and which he (Mr. Leigh) described.

A hearty vote of thanks was proposed by Dr. Johnson, and seconded by Mr. Wm. Banks.

Talk in the Studio.

Lectures on Photography at the City and Guilds Institute.—A course of lectures, including "The Use of Artificial Light," "Photo-Mechanical Methods," and "Contact Printing Methods," is to commence on Wednesday evening, May 8th. The following is the announcement issued by the Institute:—"Course of six lectures on photography by T. Bolas, F.C.S., on Wednesday evenings, at 7.30, commencing on May 8, 1889. Lectures I. and II.:—'The Use of Artificial Light in Photography.'—The electric light; mercury stream; arc; conditions under which the incandescent light becomes available; reflectors; studio appliances for use with the electric light; magnesium lighting as introduced by Bunsen and Roscoe; band lamps; the use of magnesium powder; the magnesium lighting methods of the last two years; application to instantaneous photography at night, or in places where solar light cannot be used; use of photography for recording the evolution of the night-blooming cereus; combustion of magnesium in oxygen; pyrotechnic mixtures; combustion of sulphur in melted oxygenous salts; Böttger's light; Spiller's light; artificial light for special physiological work; photographing the vocal organs; photographing the retina; coloured lights for the studio and for special work; dark room illumination; gas and petroleum light for portraiture; use of orthochromatic plates; artificial lights for enlarging, or for printing by development. Lecture III. and IV.:—'Photo-Mechanical Printing Methods.'—Photolithography and photozincography; starch, asphaltum, and gelatine methods; use of albumen or gum in forming the sensitive layer; the *American Patent Gazette*; early photolithographs in half-tone; methods now commercially worked; Husband's process; typographic block methods; line processes; zinc etching or chemigraphic engraving; half-tone methods; Pretsch; Ives; Husnik; the 'gelatinotype'; flexible printing blocks; printing from metal intaglios; Woodburytype; later modifications; Pretsch's method; Talbot's method and its recent outgrowth (Klic); the Waterhouse process; etching on copper by means of the chloride of silver image; temporary surfaces for protecting the plate in printing (zinc, iron, nickel); the various collotype methods; chromo collotype; collotype at the power press; collotype for amateurs; impression dyes for ornamental reliefs; application to pottery; asphaltum, its special purification for photographic uses; original drawings for photo-mechanical reproduction; orthochromatic plates for old or yellow prints; bleaching prints; influence of photo-blocks on industrial printing, on mechanical details of impression, on the artistic side; reproductions of old types by photography; photo-relief maps; is the photographic newspaper to be a thing of the future? negatives for photo-mechanical printing; stripping methods; photography on the wood block; phototypic etching on the wood block. Lectures V. and VI.:—'Direct Contact Printing Methods.'—Iron, bichromate, and silver methods; powder or pigment processes: every-day sensitive materials; platinum methods; use of cloth for working drawings; white line processes and dark line processes; the repeating frame and its possible development. Tickets for this course of lectures, price five shillings, may be obtained of the Dean, Central Institution, Exhibition Road, S.W.—John Watney, Walter S. Prideaux (hon. secretaries)."

Action of Sunlight on Organic Compounds. By H. Klinger (*Annalen der Chemie*, 249, 137—146).—The action of light on ethereal solutions of benzil and phenanthraquinone has been previously investigated by the author (Abstr., 1886, 885). When a mixture of phenanthraquinone and acetaldehyde, isovaleraldehyde, or benzaldehyde is exposed to sunlight in sealed tubes, combination takes place resulting in the formation of acetylphenanthraquinol, isovalerylphenanthraquinol, or monobenzoylphenanthraquinol respectively. Phenanthraquinone appears to behave in a similar way with furfuraldehyde, salicaldohyde, and grape sugar. It is remarkable that exposure to blue light is much more favourable to these changes than the action of red rays. Anthraquinone, naphthquinone, benzil, and benzoquinone appear to yield ethers of quinhydrone when they are exposed to the light in contact with aldehydes.—*Journal of the Chemical Society*,

Gum Arabic, and its Imitations, formed the subject of a recent communication to a foreign pharmaceutical society, attention being called to the numerous and strange varieties of gum now to be found in the various European markets. Many of these in appearance pass muster, and sell readily for gum-arabic or gum senegal, and we are assured that they answer for most purposes pretty well. M. Petit, a French pharmacist, has shown, however, that, when the proper tests are applied, these products are most bewildering to the analyst. Alcohol, for instance, will not precipitate them when added in the usual proportion, and ferric salts will fail in many cases to produce the characteristic coagulation. Hence, he says, assays of preparations containing gum have become liable to suspicion. No analyst would now like to declare for certain that a specimen of syrup of gum, for instance, does not contain the requisite amount of gum. In testing gum solutions with ferric chloride, it must be as neutral as possible. We notice also a recent statement by M. Bonchardat, member of the Pharmaceutical Society

of Paris, to the effect that the term "gum" is at best very vague, and is applied indifferently to various substances. "Now-a-days," he said, "when we buy 'gum,' we hardly know exactly what we are getting." This statement would not find any echo in the British drug market, for every drug merchant who buys gum-arabic certainly knows what he gets.—*Burgoyne Monthly Magazine.*

Royal Institution.—Among the lecture fixtures after Easter are the following:—Mr. Eadweard Muybridge, of Pennsylvania, two lectures on "The Science of Animal Locomotion in its Relation to Design in Art" (illustrated by the zoopraxiscope); Professor Dewar, five experimental lectures on "Chemical Affinity."

England's Flash-Light Lamp.—We have received one of the above in a neat and compact form, as put upon the market, since our notice which appears on p. 161 of the present volume. A lid closes over the top, and the ball when not in use goes into the recess at bottom. Instead of cotton-wool being used as a wick, several perforated discs of a soft cotton fabric are provided.

Competition with Thomas's Plates.—Messrs. Thomas and Company send us a list of the awards issued by the judges in the exhibition of work done with their plates at the Crystal Palace. We quote the following from Messrs. Thomas's communication:—"Judges.—J. Gall, G. Davidson, Andrew Pringle, Esqrs. Class 1: Portraiture (including groups), silver medal, W. H. Banks, Esq., Trinity College, Cambridge; bronze ditto, Rev. F. C. Lambert, 62, St. Andrews Street, Cambridge. Class 2: Landscape (including figure subjects), silver medal, S. D'Arcis, Esq., 6, Brent Villas, Hendon; bronze ditto, A. M. Morrison, Esq., 10, Renfrew Street, Glasgow; honourable mention, Rev. F. C. Lambert. Class 3: Architecture (including interiors), silver medal, J. T. Hopwood, Esq., Hetton Hall, Stamford; bronze ditto, Rev. F. C. Lambert. Class 4: Instantaneous Photography, silver medal, no award; bronze ditto, Jerome Harrison, Esq., 365, Lodge Road, Hockley. Class 5: Lantern Slides, silver medal, Low Sargeant, Esq., South Norwood; bronze ditto, M. J. Harding, Esq., College Hill, Shrewsbury. Gold medal for the best photographic work, J. T. Hopwood, Esq."

A Judge on Photographs.—In the Westminster County Court on Wednesday, the 10th inst., the case of Mr. Robinson *v.* Mr. Dewar, came before his Honour Deputy-Judge Scott. The plaintiff is a photographer carrying on business at 56, Holloway Road, N., and the defendants are spirit merchants, of Charing Cross. The plaintiff, who conducted his own case, informed the judge that about Christmas last he was engaged photographing a number of stalls at the Brewers' Exhibition, which was at that time being held at the Agricultural Hall, Islington, when the defendant, who also had a stall there, asked him upon what terms he (the plaintiff) would photograph his. He thereupon agreed to execute a proof photo for the sum of one guinea, and if the defendant approved of it, he undertook to supply him with a dozen for the sum of £2 10s. inclusive. He had accordingly supplied the first copy and delivered it to the defendant, who had neither paid for it, or instructed him to supply the other eleven copies; hence this action. The defendant was called, and in defence said, the plaintiff undertook to produce a picture in every way equal to the one now before his Honour. He would ask his Honour to compare the two photographs, and to exercise his discretion as to whether the one done by the plaintiff was not very much inferior to the sample one now before him. His Honour: I am not an artist. Defendant: No, but your Honour knows a good photograph from a bad one, I presume. His Honour: Perhaps I do, and in this case I see no fault with the picture, and therefore the plaintiff is entitled to the amount claimed. He might have recovered the whole of the 50s. if he had tried, as he was clearly not the person who broke the contract. I shall give judgment for the plaintiff for the amount claimed, with costs.

Photographic Club.—The Bank Holiday outing will be to Twyford Station for Sonning. Train leaves Paddington at 10.30. The subject for discussion at the meeting on April 17th will be "Copying Silver Prints."

*** Everything relating to the Literary Department of the Photographic News, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," should now be sent to Mr. Spiller, who is alone responsible for all which appears under that heading.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, Photographic News, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

*** Correspondents are reminded that the News will go to press one day earlier next week.

P. S. J.—1. It would undoubtedly be possible to separate the lenses of a photographic combination and use that of greatest focal length for the object glass of a telescope, and in like manner a small stereoscopic or view lens might be made to do duty as the eyepiece; but one would hardly expect to get a really efficient instrument in this manner. 2. Chloride of calcium which has become damp by prolonged use may be dried down and employed again, but only a gentle heat should be applied, so as to ensure an open, spongy condition, and this end may be further facilitated by mixing in with it a certain quantity of asbestos fibre.

Photargus.—No. 2 lens is sure to produce distortion of features under the circumstances mentioned. You cannot go wrong in selecting the lens marked III in your list, which, although costing more in the first instance, is sure to give you satisfaction.

Dissent.—There cannot be any advantage in discussing the matter with us privately. Why not address the author direct, stating your objections, and meanwhile taking note of the remarks offered in the course of discussion? See the report of proceedings on page 174.

Work.—The most promising young colony is probably British Columbia, of which Victoria and Vancouver are the chief towns. Next to this is perhaps Natal or the Cape. We have no idea of the usual rates of pay offered respectively for the three kinds of service mentioned in your letter.

Justitia.—The usual guarantee is that 60 grains of crystallised chloride of gold should contain 28 grains of the precious metal. Dr. Lainer has just published a paper on the "Salts of Gold used in Photography" (Dingl. Polyt. Jour.), in which he shows that the amount of gold in German commercial samples varies 5 per cent. either way from the number quoted above; and that the composition of the sodium double chloride is often vastly below the proper standard. One sample contained chloride of copper, but the author holds this to be no disadvantage: on the contrary, he found it aided materially in stimulating the action of the gold toning bath.

Richard Parr.—Mr. Dallas is unable to give any fuller information about Hermann's lightning lamp, but refers us to Messrs. Tongue and Birkbeck, Patent Agents, Southampton Buildings, Chancery Lane, from whom you may get to know the latest particulars.

Tyro.—When using Mr. W. K. Burton's method of washing prints, as described in last week's News, perhaps it would be better to delay the use of hot water until the greater bulk of the hypo had been removed by cold washing. This done, the prints could not suffer any degradation by such a mode of treatment; and rest satisfied with water 100° Fahrenheit rather than go to the higher temperature named. The principle is so good that it ought to meet with general adoption.

Skylight.—Surely you have the power to decide whether or not the telephone cable shall be suspended over your premises? You may refuse permission to rear a standard for its support, and if you can show that the overhead wires would be prejudicial to your lighting, or cast a shadow, you can insist upon their adopting some other route.

D. C.—Methyl-rosaniline is the chemical name for Hofmann violet. It has been employed for tinting films, but was found to be less efficacious than the eosines, or a mixture of one of these with cyanine.

Plat.—We have no information beyond that which was published last week.

Box.—No such paper is on sale. The glass positive process may be in your mind, by which for one exposure in the camera you get only one picture.

Colonel J. Waterhouse.—Thanks for letter and photos. received. They came to hand just in time for the Photographic Society's meeting.

Stoke-on-Trent.—Answered by post.

Amateur Retoucher.—The disadvantage of using the cuttle fish powder or similar roughening agents is, that the surface of the varnish upon which it is applied becomes slightly abraded, and thereby more liable to be attacked by the silver salt during the printing. By using a H H or H H H pencil you may sometimes succeed without any preparation; or try oil of turpentine alone rubbed on lightly with the finger. Read the chapter on this subject in Mr. W. M. Ashman's "Elementary Lessons on Silver Printing," to be had of our publishers.

A. Jansson, Lanternist, Micro, Puzzled One. and J. G in our next.

THE PHOTOGRAPHIC NEWS.

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PATENT OFFICE

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A CAUSE OF FOGGING WITH OXALATE DEVELOPER.

THE ferrous oxalate developer, although not now so extensively employed for negative work as it was at one time, is in much general request for the purpose of developing gelatino-bromide prints upon paper, that considering the very large employment of this process, especially for enlargements of moderate dimensions, it is probable that more use is made at the present day of the iron method of development than at any time previously. It is on this account of great interest to have any peculiarities attaching to its use pointed out, especially when such peculiarities are of a nature that would not be easily suspected, and which, therefore, would be apt to mislead the photographer, and induce him to attribute to a wrong cause the failure which recognition of the true cause might prevent. We have been led to these remarks by an article in the *Photographisches Wochenblatt*, from the pen of its able editor, Dr. Stolze, in which he gives the results of his investigations made for the purpose of discovering a certain fogging which he had found sometimes to occur in developing images upon gelatino-bromide of silver paper.

Dr. Stolze has quite recently, he tells us, made some researches in the development of bromide of silver paper that have led to very surprising results, and concern not only the special work with this paper, but also the developing in general of films, negative or positive, when the agent in use is the ferrous oxalate. Fogging he found may arise from a cause not likely to be taken into account. The particular cause of fogging to which he refers comes into play when the film is softened in water before development, and, as this practice is adopted by some manipulators in the case of all films, and is general with paper films, being especially necessary in order to ensure even action when the latter are of large size, and have acquired a curl by being used in a roller slide, the interest of Dr. Stolze's observation thus covers considerable ground.

In the course of his experiments he found that when gelatino-bromide paper was exposed in the copying frame, and plunged without previous immersion in water into a ferrous-oxalate developer, composed of five parts of saturated solution of oxalate of potash and one part of saturated solution of protosulphate of iron, to the latter of which the $\frac{1}{1500}$ part of tartaric acid had been added, the lights remained clear and pure, whether the developer was used of full strength or diluted, and this even if the mixture of the iron and oxalate solutions had only been made at the last moment. When, however, the paper was previously softened in the ordinary tap water, a strong fogging set in with freshly mixed developer, whether the latter was of the strength before mentioned, or diluted even largely. An addition of potassium bromide moderated the fogging considerably, but did not suffice to prevent it entirely, even when so much was added as materially to interfere with the tone of the picture. If, however, the developer, after mixing, was left in the dish for about five minutes before being made use of, or if an addition of one-third of old developing solution was made to that newly mixed, the picture developed without fog, although in the latter case a freshly mixed solution was used, and the film was previously softened in ordinary water.

These observations pointing to the fault as originating in the water used before developing, an experiment was made of using distilled in place of ordinary tap water for the preliminary soaking. The picture then appeared as clear and free from veil as when no previous soaking had been given. Proof being thus afforded that the ordinary water contained some fog-producing substance, it remained to find the means of counteracting the mischief.

For this purpose additions to the washing water were made. As it seemed probable that lime was the agent that produced the fogging, the addition of oxalic and of glacial acetic acids were tried, of the proportion of one in a thousand, and oxalic acid appeared to be the less efficacious of the two; acetic acid almost entirely prevented the fog, but not quite. Increasing the proportion of acetic acid was without result. The farther addition of bromide of potassium one in 1·500, however, sufficed to prevent fogging entirely, even when the developer was used immediately after being mixed.

As, however, the water for soaking is mostly used in much larger quantity than the developer itself, experiments were made in the direction of adding the fog-preventing substance to the latter instead of to the water. To the solution of sulphate of iron, prepared with the addition of tartaric acid, as first mentioned, a further addition of glacial acetic acid, 1 part to 150, was made, and to the mixed developer ten drops of solution of bromide of potassium was made. (Dr. Stolze has omitted to state the quantity of developer to which the bromide is to be added, but we would suggest the experiment of adding a fourth of a grain to each ounce of the mixed developer.) These additions caused the picture to be perfectly clear, even when the developer was employed immediately after mixing. If mixed for a few minutes before use, the bromide of potassium may be dispensed with.

For general use Dr. Stolze recommends that whenever the film is soaked before development in ordinary water, the developer should not consist entirely of a fresh mixture, but that there should be present one-third of an old solution. All fogging is then prevented. If this is not practicable, the addition of acetic acid and bromide should be made.

Dr. Stolze remarks that, contrary to what has been stated, acetic acid does not hinder development at all, and with a freshly mixed solution the retarding

action of a small quantity of bromide is but very slight. The presence of acetic acid in the sulphate of iron solution is advantageous, and Dr. Stolze thinks it may be made to suffice by itself as a keeping agent for that solution. When smaller pictures than 12 by 10 made by contact are in question, there is no necessity for softening the film before development, and then there is no fear of fogging. The general rule that the more sensitive the emulsion, the greater is the liability to fogging, comes into operation, as it might be expected that it would.

A PHOTOGRAPHIC EXHIBITION AT YORK.

A photographic section will be organised in connection with the York Exhibition, and as somewhat active preparations are being made, it is expected that a good show will result. The Exhibition will last from June to October. The judges are Mr. Moore, Mr. Robinson, Mr. J. T. Taylor, Mr. Hastings, and Mr. Monkhouse, president of the Photographic Section of the Yorkshire Philosophical Society.

The following is an abstract of the rules, the full copy of which can be obtained by writing to Mr. Joseph Davies, General Manager, Photographic Section, York Exhibition.

Conditions and Rules.

1. Applications must be sent in by the 5th of May, and all pictures be delivered, carriage paid, besore the 25th of May, mounted and framed. No Oxford or oval frames.

2. The management will unpack, re-pack, and deliver the exhibits to the carriers for return at the close of the Exhibition at a charge of one shilling for each frame.

3. No name or other particulars except the title allowed on the front; all particulars must be attached to the back of the frame.

4. No exhibit can be removed during the Exhibition.

5. In Division A—the "Amateur" Competition, open to all—the negative must have been exposed, developed, and printed by a *bonâ fide* amateur.

6. In Division B, the Professional "Champion" Competition is open to all, but limited to one photograph from each competitor.

7. In Division D, Photographic Apparatus, medals and diplomas will be awarded for the best specimen and collection of apparatus, or for any appliance of special merit.

8. The charges in Division A will be 1s 6d. per square foot, with a minimum charge of 3s., any fraction of a foot to be charged as a foot. In Division B the entrance fee will be 10s. for each picture. In Division C the charge for space will be 1s 6d. per foot, with a minimum charge of 5s. In Division D the charge for floor space will be 3s. per square foot, the minimum charge being £5.

The promised awards are as follows:—

Division A (amateurs only).—Class 1. "Champion" gold medal for the best photograph which has not taken a champion prize elsewhere.

Prize medals in silver and bronze, and a certificate, will be awarded to the first, second, and third best photographs in the following classes:—Class 2. Architecture. Class 3 Landscape or Seascape. Class 4. Portraiture. Class 5. Instantaneous. Class 6. Genre, or Figure Studies. This class includes landscapes with figures.

Division B (Professional Champion Competition).—The exhibition gold medal, value 20 guineas, will be awarded in Class 7. To the best photograph which has not taken a champion prize elsewhere.

Division C (professionals only).—The exhibition silver medal and diploma, and a diploma, will be awarded to the first and second best photograph in each of the following classes:—Class 8. Architecture. Class 9. Landscape or Seascape. Class 10. Portraiture. Class 11. Instantaneous. Class 12. Genre or Figure Studies. This class includes landscapes with figures.

Division D (photographic apparatus).—Class 13. The exhibition gold medal, value 20 guineas, will be awarded to the best, and the exhibition silver medal to the second best, set of portable photographic apparatus, from ¼-plate to 10 by 8. Open to makers only. Class 14. The exhibition gold medal, value 20 guineas, will be awarded to the best exhibit of general photographic apparatus and appliances. Open to all.

Silver medals and diplomas will be placed at the disposal of the judges, for any new appliances of special merit.

PHOTOGRAPHIC OPTICS.

BY W. K. BURTON.*

Chapter I.—Light (*continued*).

We are to consider light, then, as one mode in which the energy of a body becomes known to us; and luminous bodies are those which are of themselves capable of changing part of the energy they possess or receive into this form.

The same definition may be given of heat as of light, and there are few cases when light is given off where heat is not given off too; and, in fact, there is no hard and fast line to be drawn between heat and light. Both are supposed to be phenomena of a very rapid vibration of particles, the light, on the whole, of a slightly rapider vibration than the heat; but, especially in considering photographic action, it would be well were no distinction attempted between the two, but were some such name as radient energy used to designate those forms of light and heat which may be capable of photographic action. It will be understood that when we speak of light we use the term in this meaning.

Light, then, we suppose, has its origin in the conversion of some of the energy of a body into an extremely rapid motion of the atoms of that body; but something more is necessary to account for the transmission of the light from its source to a distance. The theory of Newton, known as the "emission theory," was that the light-giving body threw off material particles which travelled in all directions in straight lines. Insurmountable difficulties were found to stand in the way of the general adoption of this theory, and the "undulatory theory" took its place. By this it is assumed that the whole of space is filled with a substance to which the name of ether has been given, this ether being imponderable, and being made sensible to us only when thrown into a state of inconceivably rapid vibrations. It is assumed that sources of light communicate the vibration of these atoms to the ether, which takes up that vibration and transmits it to a distance. Newton's difficulty in accepting this hypothesis lay in the fact that he could not explain, on the vibration theory, the rectilinear transmission of light—the fact that an opaque body (one which did not permit the passage of the vibration) should cast a shadow; that the vibration should not pass round the opaque body, as sound passes round a solid body which will not transmit it.

The rectilinear transmission of a vibration has, since Newton's time, been explained, and most, or all the phenomena of light which have been investigated have been found to be compatible with the undulatory theory. The explanation of the fact that light travels in straight lines only (with exceptions that will be hereafter considered) is too complicated to insert here. Those who wish to investigate the question further are referred to the book already mentioned in a foot-note.

The vibration which transmits sound through the air, or any other elastic medium, is supposed to consist of a motion of the atoms of the elastic body in the line of the direction of the travelling sound; that so long as the sound continues each particle of the medium through which it is passing keeps oscillating in the direction of and away from the source of sound. It is quite different, however, in the case of light. In this case it is necessary, to render the vibration theory compatible with various phenomena, to suppose a vibration of the ether transversely

* Continued from page 133.

o the direction in which the light is travelling. It should e here pointed out that we cannot talk of particles, atoms, r molecules of the ether moving transversely to the direction of the vibration, as the ether is supposed o be a homogeneous substance, one of infinite divi-ibility, and of complete indivisibility, which comes to he same thing. In fact, one of the theories of atoms is hat they consist of centres of motion of the ether, these centres of motion being in the form of vortex rings.

To render a transverse vibration conceivable, the follow-ng experiment is commonly performed. A flexible cord is allowed to hang freely from a high roof. Glazebrook recommends particularly an elastic (india-rubber) tube filled with sand as the most suitable. The lower end of the tube is held in the hand, and a sharp transverse motion is given to it ; that is to say, the tube is quickly moved in a direction at right angles to its length. A single vibration will now be seen to travel quickly up the tube, to, so to speak, strike the place where the tube is fixed, and to return to the hand, which will feel a distinct jerk. Now this vibration undoubtedly travelled in the direction of the cord, yet each part of the cord moved at right angles to its direction, or transversely to the direction of the vibration. This vibration is somewhat of the nature of that imagined for light, and, indeed, the return of the vibration down the tube may be taken as roughly typifying the reflection of a beam of light.

In the case imagined, it has been supposed that the hand was jerked in a straight line (approximately) in a direction at right angles to the length of the cord, but this jerk might consist in making the lower end of the cord rapidly describe a circle. The vibration would, in this case, travel along the cord just as in the other, and if the end of the cord were kept continually turning, so as to rapidly describe the same circle over and over again, there would be a continuous transference of vibrations along the cord. This is, perhaps, the nearest physical representation that we can get of the supposed manner of the transmission of light by transverse vibrations through ether.

The speed of light, and the smallness of the vibrations, are such as not to be really conceivable to the mind. Approximately, light travels 185,000 miles in a second of time, and in each inch of all these miles there are, for an average beam of light, about 44,000 vibrations. I say for an average beam of light, for all light that we know of is compounded of vibrations of different lengths. It will be understood that the length of a vibration is the distance between any point of one wave of the vibration to a similar point in the wave immediately before or in front of it.

I have already said that, in considering the radient energy which acts photographically, we can make no hard-and-fast line between what is commonly called heat and what is commonly called light, in that it is visible to the eye ; but as a general and approximately correct truth, it may be said that the greater part of heat phenomena are produced by waves longer than those mentioned (having fewer to the inch) ; the greater part of sight phenomena—in the case of human beings, and at any rate probably in the case of all the larger higher animals—by vibrations of about the length mentioned ; the greater part of chemical phenomena, such as are made subservient to photography, to vibrations shorter than those mentioned, that is to say, of which there are a larger number to the inch.

I have, in the foregoing brief exposition of the undulatory theory, carefully treated it as a hypothesis only, and it must always be borne in mind that it is nothing more. No human being has ever thoroughly even conceived of the vibration of ether, which is said to transmit light. It is, however, commonly said that the undulatory theory, if too subtle to be quite conceived by the mind, *explains* most of the phenomena of light. This it certainly does not do. It is really only a nearly conceivable hypothesis which is *compatible* with most of the phenomena of light which have been investigated, and without assuming which it appears, in our present state of knowledge, impossible to account for some of the phenomena. As such, it is very useful, because it may be assumed by analogy that it will be compatible with many others, and these may be first worked out on that assumption. Every problem worked out by this and of the hypothesis, and found to give results agreeing with facts, strengthens the said hypothesis, and renders it more likely that it is a true one.

Having thus explained that the undulatory theory is to be taken as a hypothesis only, I shall, to save continual repetition of this explanation whenever the words or expressions "undulation," "wave of light," and so forth have to be touched on, talk as if the theory were an established fact. Of course this includes the admission of the existence of ether, although it by no means involves even the assumption that the atoms which compose matter are formed out of this ether, in the sense of consisting of centres of motion of its substance (if one may apply the term *substance* to such a thing as ether) or in any other sense.

SILVER PRINTS ON ROUGH DRAWING PAPER.

BY J. H. BIGGS.

Some photographs I have lately printed on rough drawing paper, by a simple process which I practised years ago, having been much admired by those who have seen them, and as I have had many enquiries concerning the *modus operandi*, I think you may consider a publication of the details will be of interest to many of the readers of the Photographic News ; and with that view I append the following particulars.

Cut Whatman's rough drawing paper into convenient sizes, and coat each piece on one side, by floating, with a warm solution of gelatine, made by dissolving sheet gelatine in the proportion of 4 grains to 1 ounce of water, and 5 grains of chloride of sodium. After drying spontaneously, the paper is ready for use at any future time.

The sensitizing is a very simple and easy process, and a sheet may be got ready for the printing frame within a quarter of an hour. Fasten the paper by pins at two corners, with the prepared side uppermost, on a board slightly smaller each way than the sheet, and place this in a sloping position. Pour a small quantity of the sensitiser into a small vessel, such as a wineglass or an egg-cup, and, with a brush well filled with this solution, coat the paper by applying it in transverse strokes, commencing at the top, and working downwards. When coated, bring the paper to a vertical position, and suspend it by one corner, attaching a fragment of dry blotting-paper to the lower corner to absorb the superfluous liquid. The drying of the paper may be expedited by holding it in front of an ordinary fire. The printing should be carried considerably beyond the strength ultimately required, as much is lost in toning and fixing.

To make the sensitizing solution, dissolve 60 grains of nitrate of silver in 1 ounce of distilled water, and add carefully drop by drop, and with shaking, strong liquor ammoniæ, until the solution, which at first becomes muddy, just clears again. If this stage is accidentally passed, add a trifle more silver.

It is obvious that a brush set in metal would be unfit for this process, but one which is thoroughly efficient and presents the advantage of being renewable for each operation is that known as a Buckle brush (from the name of its inventor), made by taking a piece of glass tube, say eight inches long and half an inch in diameter, and drawing into one end of it, either with a piece of silver wire bent to form a hook, and long enough to pass through the tube, or with a piece of string, a tuft of cotton-wool, the fibres of which have been drawn out lengthwise, the wire or string passing round the middle. When the cotton-wool is partially drawn into the tube, where it should fit

tightly, it may be pulled into shape, and will be found an excellent tool for the purpose.

I have found a toning bath made with chloride of gold and bicarbonate of soda best suited for this paper, and with this, if the toning is carried far enough, and the negative is a good one, black tones, rivalling platinum, may be obtained.

This mode of printing is well adapted to bold and vigorous subjects, and, as the paper does not curl, the pictures may be printed with deep white margins, rendering mounting unnecessary ; the beauty of the photograph being, at the same time, much enhanced by the coarseness of the texture of the white paper.

INSTANTANEOUS STUDIES.

How Celebrities are Photographed Now-a-days.

(According to the *Telegraph*, several photographers planted their cameras in front of General Boulanger's windows at Brussels, and waited for his appearance. Photographic publicity is clearly a penalty which one has to pay for being celebrated.)

Celebrity (*to servant*). Are you sure no one has got a camera opposite the front door ?

Servant. No, sir; all the cameras are pointed at the windows, because it seems there was a paragraph in the papers yesterday that you generally looked out of the windows after breakfast.

Celebrity. Oh, they have found that out, have they ? Then, for the future, I shall only look out of the windows at night.

Servant. I'm afraid that would be of no use, sir. They've got something they call a flash-light, sir—takes you at night.

Celebrity. Bless me ! I thought that when your photograph was wanted by the public, the photographer invited you to his studio, and made his time suit your convenience.

Servant. Oh, that kind of thing's passed away. There's no need to trouble about special sittings now ; you can be taken as you walk along the street.

Celebrity. Really ! then I'll be even with them, for I'll go out with my umbrella up.

Servant. Certainly, sir ; a very excellent plan.

Celebrity. If the coast is clear, I'll start now. (*Does so, and proteets himself with his umbrella.*)

1*st Photographer.* How annoying ! See his umbrella ? Impossible to get at his face.

2*nd Photographer.* But we must. (*Coughs loudly to attract the attention of the Celebrity, who holds his umbrella lower than ever*).

3*rd Photographer.* It is all right. See, he is making for the dead wall, but he does not know it. We must keep him in that direction.

4*th Photographer.* Excellent ! If you will take the right of him I will take the left, and he cannot choose but go straight.

3*rd Photographer.* With all my heart. (*Loudly from the right of Celebrity*) Will you kindly give us one moment ? We will detain you no longer.

Celebrity (*to himself*). Hang it ! they have discovered me, but I am determined not to be taken in this unceremonious fashion and in the public street (*returns no answer, but plods steadily on with the umbrella close to his head*).

4*th Photographer.* Ah ! he is steering too much to the left. (*To the Celebrity*) You will pardon my making the request, but the public insist upon having your photograph, and—(*watches with malignant pleasure the Celebrity turn from the left and direct his steps dead upon the wall*).

Celebrity. There is nothing left for it but a bolt. Here goes. (*He does go, and comes in violent contact with the wall. Result a smashed umbrella, and himself deposited on the pavement in a sitting position*)

1*st Photographer* (*who has played a waiting game*). Thank you, sir. Keep perfectly still, and we shall have an excellent photograph.

3*rd Photographer* (*who has only a view of the back of Celebrity's head*). One moment, if you please. Would you kindly sit round a little more ?

2*nd Photographer* (*with same point of view as No.* 1). Pray don't move. The most favourable view of your face is the profile.

4*th Photographer*. No, no ! It must be three-quarter view, or nothing at all.

Celebrity (*desperately*). I apprehend, gentlemen, I must yield to your importunities. (*Wheels round and plants himself against the wall.*) There, do your worst or your best. You've fairly run me to earth.

Chorus of grateful photographers. Thank you, sir. Please to look as pleasant as you can ! (*Celebrity resigns himself to his fate.*)

PHOTOGRAPHY APPLIED TO MILITARY PURPOSES.

BY CAPTAIN A. M. MANTELL, R.E.*

It was with some diffidence that I accepted the invitation to read a paper at this conference. I have not as yet had much opportunity of studying the subject of photography applied to military purposes ; in fact, the useful and practical applications which have hitherto been made are but few in number, although many writers are of opinion that there is a wide field for progress in this direction. It may be well also to add that no new scientific principle is involved in anything which can be said on the subject.

The equipment for active service consists of a wagon fitted up as a dark room. There are two cameras—one to take pictures 12 in. by 10 in., and one 7½ in. by 5 in. The latter is so arranged that it can be carried on a pack horse or mule with lenses, plates, &c., in country where the waggon could not be taken. Development and printing must, however, be done in the waggon itself.

A battery of six lenses (one wide-angle, one rapid rectiliuear, and one single view for each camera) forms part of the equipment, and the chemicals, &c., supplied in the first instance are sufficient for preparing some scores of negatives and some hundreds of prints.

The printing process used is the hot bath platinotype, but in all probability this will shortly bo superseded by the cold bath process. Bromide paper is also taken to meet those cases in which proofs are required in great haste or at night.

Gelatine dry plates of various makes are used at present, and here again a change may perhaps with advantage be introduced. It is said that the stripping films have been found preferable in some foreign countries ; the saving in weight effected by their use would certainly be a great consideration.

The photographic wagon is attached to the head-quarter staff of the army corps. It would be in charge of an officer who might be called on to photograph fortifications, bridges, safes, entreuchments, &c., as required. He would be called upon, perhaps, quite as frequently to copy, enlarge, or reduce plans, reconnaissances, &c., af which a limited number are required for distribution.

In both the Abyssinian and Suakin campaigns a large number of photographs were taken of camps, the country generally, troops on parade, zareebas, prisoners of war, and other subjects. These were useful for illustrating reports ; still they are semi-official rather than official.

Permission was granted, after each campaign, that officers wishing for prints of any of the views might obtain them on repayment. The large number sold proves the interest taken in the series.

The bromide process has been found very useful for work of this kind. The blue process might be useful.

Photography would also be employed in connection with the field lithographic wagon for the reproduction of plans, sketches, &c., in greater numbers than could be rapidly executed by any purely photographic process.

The lithographic wagon is equipped for working Captain Abney's papyrotype process and Husband's papyrotint or half-tone process. The plan to be copied is fastened to the side of the wagon, and the camera supported on a stand provided for the purpose.

* A communication to the Conference.

The complement of non-commissioned officers and men is six. These would be selected from among those who have been trained at the School of Military Engineering at Chatham.

The principal use to which photography in put in peace time is for the photo-mechanical reproduction of plans and maps. This is principally done by the wet plate process, especially for line work. For such purposes the lines of the negative must be almost absolutely clear, and this condition is far more easily fulfilled in wet than in dry plates. The greater part of the work executed at the school at Chatham is of this kind, and does not differ from that done by various commercial firms in London and elsewhere. Although such work is not directly useful for active operations in the field, it is valuable as a training for the N.C.O.'s, and men employed on it. Also, when photo-mechanical work has to be done in great haste for some official purpose, there is no comparison between the cost of doing it by military labour, and giving it to a firm to execute. For instance, a part of General Gordon's diary was reproduced in fac-simile at Chatham for the Houses of Parliament; 140 negatives and 25 sets of photo-lithographs being taken and completed in seven days.

Photography is largely used at the headquarters of the Ordnance Survey at Southampton for the reproduction of maps. The maps are drawn in the field to a scale of 25 in. to a mile, and published of that size. For the smaller edition of 6 in. to a mile each map is re-drawn on the scale of 25 in. with the names shown of an exaggerated size. This drawing is reduced by photography to the scale of 6 in. to a mile, with the result that the names and details come out in proportion. From the negative so prepared, photo-zincographs are printed for publication and sale.

A further reduction to the scale of 1 in. to a mile is then necessary. For this purpose a blue print is taken from the 6 in. negative, and on it are shown in black such details as are required for the smaller scale. It is, of course, impossible to show all that is included in the 6 in. maps. The reduction is effected by photography, and reproduces only those portions which have been drawn in black ink, excluding those which are in blue. A transfer is made on a film of chromated gelatine, and laid down on copper. The copper plate is engraved with all the necessary detail and impressions taken from it as required.

This leads us to the consideration of photography as employed for the preparation of original surveys. It has often been suggested that the theodolite and the level should be replaced by a camera, and there is no apparent reason why this should be difficult. A base is measured in the usual way, and at each extremity views are taken all round the horizon. The camera is carefully levelled for the purpose.

By a simple mechanical arrangement in the body of the camera, the true horizon is drawn across the negative, and also the vertical line which represents the vertical plane containing the axis of the lens. The focal length of the lens is known, and by the application of the principles of plane perspective we can calculate or construct the horizontal angle between any two points in the view. This is what would be given by a theodolite, so that the country may be plotted in the usual way. A further calculation or construction will similarly give the vertical height of any point above or below the datum level. Similar rounds of photographs must be taken from other suitable positions; by this method a very large number of points may be fixed with considerable accuracy throughout the survey.

It is claimed by the advocates of this system (of which a full description is given by Lieut. Reed, of the U.S. Army, in his book on "Photography applied to Surveying") that the field work is much shortened; that there is no risk of topographical features being omitted; and that photographs give valuable additional information with regard to the country. It seems, therefore, specially applicable for military purposes—such as surveying an enemy's position, or the road followed by troops on the march.

Several forms of apparatus have been devised for preparing photographs specially for this purpose. The cylindrograph of M. Moëssard is a camera of semi-circular form, having a lens at the centre. The sensitive film is placed inside the circular portion, at a distance from the lens equal to its focal length. By rotating the lens, a cylindric perspective view of about 170° of the horizon is obtained.

Apparatus has also been devised by M. Chevallier and M. Mangin for obtaining radial perspective views round a given point.

It is stated that satisfactory results have been obtained in France and in America in the experiments made in photographic surveying. The attempts made in this country have, as far as I can ascertain, invariably been failures. The weather is so often unfavourable for taking views, especially views of distant objects, that it is difficult to recognise the same point in different photographs. If the sun should happen to be shining, it is impossible to work with the camera facing towards it; so that the method seems quite inapplicable for a country like this. The further disadvantages that a large amount of equipment is required, and also considerable skill on the part of the operators, render it very unlikely that it will be useful to an army in the field.

Balloon photography, on the other hand, seems likely to become of more importance. As long ago as 1862 the Union Army before Richmond succeeded in taking a view of the enemy's position. Two prints were made, one being retained by the army commander, and one by the æronaut. Rectangles corresponding in number and disposition were ruled on each, and marked with reference numbers. During subsequent ascents the æronaut was able to signal the movements of the army, and all important events which occurred in any rectangle. This information was found to be of great value.

It may be expected that balloon photography will be found of great use to a besieging army. A small balloon, capable of carrying a camera loaded with a number of plates, may be started from the windward side of the besieged town. No æronaut is employed, but by a clockwork arrangement the plates can be exposed in succession at any desired interval after the balloon starts. The gas gradually escapes from a valve in the balloon, or the valve may be released by clockwork after a certain time, and the camera descends in or outside the besieger's lines on the leeward side of the town. It is obvious that all this is not easy to carry out; the wind may be troublesome, or the clockwork fail at the critical point; the balloon may ascend too high, or descend too low, and so on. But this is, at any rate, one direction in which military photography will, no doubt, be developed.

Another suggestion for taking a series of views of a besieged fortress is, that a number of balloons should be released to windward, each carrying a camera, and attached by a cord to the one before it. The last balloon has a hole cut at the top, or a valve opened, so that it may descend after a certain time on the other side of the fortress, and enable the others to be recovered. Photographs would be taken from each balloon during the passage over the enemy's position.

A good account of the most recent experiments in balloon-photography is given in M. Tissandier's work "La Photographie en Ballon."

I have referred more especially to the use of free balloons. It is certain, however, that captive balloons may, at times, be very useful. The difficulty with these is that they oscillate so rapidly, especially when the wind is high. Also the cord by which the balloon is held is liable to obstruct the view when the apparatus is worked automatically. It is possible that a kite might be used instead of a captive balloon, or perhaps a series of kites which would tend to steady each other. It would be quite easy to raise a small camera, but it would be difficult to point it in any required direction; and the method has not yet been proved to have any practical value.

Mr. Arthur Batut claims to have obtained satisfactory negatives in this way. Mr. Archibald Douglas has also published a pamphlet on military kites.

Both in photography from a kite and from a captive balloon, electricity may be employed for releasing the shutters at any required moment.

With regard to the risk of a balloon being damaged by the enemy's fire, it appears, from experiments carried out at Tours, that a balloon is safe even from artillary fire at a height of 600 or 700 yards. At a much lower level it would have a good chance of escaping. Little is known of the trajectories of bullets or cannon balls at very high angles of elevation, so that ordinary sights are not of much use. Also, it is impossible to see whether the shot passes too high, or too low, or to one side, and so correct the aim, as can be done when firing at an object on the ground. In addition to this, even if the balloon is hit by one or two bullets, the escape of gas would be slow, so that there would be a good chance of its being saved. For these various reasons, the danger to which a balloon is exposed from hostile fire is not nearly as great as might be expected.

Photography has recently been used for obtaining views of a rifle bullet in flight.

The rifle is so arranged that the bullet shall pass in front of a camera placed in a dark room. Before reaching the dark room it completes an electric circuit, and causes a spark to pass between terminations connected with the two coatings of a Leyden jar.

The arrangement is such that the spark passes at the instant the bullet is in front of the lens. A sheet of white paper is placed so that the bullet may be clearly shown against the white background. This method is stated to have been worked with success both in America and Germany. The use of the electric spark as an illuminant renders an instantaneous shutter unnecessary. The bullet is seen to be surrounded by curves, those in front being approximately hyperbolic, and those at the sides rectilinear. Behind the bullet are seen eddies. These curves are similar to the waves and eddies produced by a vessel moving through the water, or those produced by the piers of a bridge over a river flowing with considerable velocity. It can be shown mathematically that these curves (which represent in reality waves of sound) can only be produced when the velocity of the bullet exceeds that of sound; and, in fact, the photographs of bullets moving with a lower velocity show no such curves.

The practical application of these experiments is, perhaps, not obvious. They are certain, however, to lead to a better understanding of the laws governing the resistance met with by a projectile in its flight, and will assist in the selection of such forms and sizes for projectiles of all kinds as will reduce friction to a minimum, and give the best and most accurate trajectory.

Herr Anschutz has succeeded in photographing a cannon-ball in somewhat the same manner. Daylight was used, and therefore an instantaneous shutter released by the projectile was necessary. It was found that it took 0·28 of a second for the shutter to move. During this period the projectile moved 113 metres, so that by allowing a distance of 113 metres between the camera and the point at which the electric circuit was completed, the exposure was made just when the projectile was passing between the camera and a white background arranged for the purpose. The length of exposure was 76 millionths of a second.

Herr Anschutz only succeeded in obtaining one good photograph in a number of trials, but he hopes to be able to reduce the process to a certainty. It would be interesting to know what kind of shutter he used, and how he measured the length of exposure, but no details as to these points are given in the paper from which I have taken this description.

Photography is constantly employed to record the results of experiments with ordnance of all kinds and with explosives.

The effect of shot and shell on earthworks, armour-plating, &c., is tried almost every year in England and elsewhere, and it is very useful to have a permanent and accurate record of the effect of each shot. In the explosion of submarine mines, it is interesting to be able to take to take a series of views at different periods of the explosion. The Americans have taken some most successful photographs of this kind at their military school at Willett's Point. We have tried similar experiments at Chatham during the last month.

The apparatus used is one devised by a brother officer of mine, and is most ingenious in its construction. Six photographs can be taken within about three seconds and a-half after the explosion. Unfortunately, all our photographs were more or less fogged, owing to a defect in the apparatus, which requires to be altered in several of its details. However, as this is the first time that it has been used, one can hardly as yet expect thoroughly good results. The time was registered electrically on an apparatus similar in principle to a Morse recorder, or to that used in an observatory for recording the passage of stars.

Photographs are used by military engineers (as also civil engineers) for recording the progress of works in course of construction at foreign stations, and for illustrating reports. It is a rule of the War Department that all prints shall be executed in some permanent process; silver prints are, therefore, inadmissible. Until a few years ago the carbon process was used; this has now been superseded by platinotype.

It will be remembered that photographic despatches were borne by carrier pigeons from Paris during the siege of 1871. All despatches were printed on a large sheet, which could contain about 300,000 letters. This was reduced to a negative about 2 in. by 1 in., and printed on a film of collodion. A pigeon could carry twenty of these films rolled up in quill, the whole not weighing more than 15 grains, and including some two or three million letters—or, say, the equivalent of sixty ordinary newspapers. On arriving at their destination the films were placed in very dilute ammonia so as to unroll themselves. They were then dried, placed between plates of glass and enlarged with the photo-electric microscope.

Photography has been used for illustrating various mechanical manœuvres such as infantry and cavalry drill, or the arrangement of blocks and tackle for moving guns. Also for placing on record details of dress and accoutrements, with the methods of keeping the same in the barrack-room and laying them out for inspection.

The camera might possibly be of use for estimating the distance to a parapet or other object of which the length is known. The length of the visage on the ground glass, the focal length of the lens, and the length of the object will give the distance required.

Another subsidiary use of photography is for taking the portraits of men dismissed from the army as worthless and incorrigible, and those who have deserted once and may be expected to do so again. Such portraits would, of course, be of use if it were required to identify the men at any future time. This has never been done in England, but I believe that on the Continent photography has been used for this purpose.

In concluding this paper I will only add that I should be very glad if any member of the audience would suggest any application of photography to military purposes which may occur to him other than those enumerated. I cannot hope to have exhausted all the ways in which photography has been or might be utilised.

Discussion.

Major Nott said that he felt in this instance that he could not only speak for himself, but for every member of the Camera Club present, in expressing the opinion that the paper Captain Mantell had favoured them with was of exceptional interest. He trusted the invitation therein given would lead to practical results, and some of the able photographers of the Club would assist Captain Mantell by drawing attention to any other points where photography could be utilised for military purposes. Captain Mantell's paper, however, in that respect appeared to be very exhaustive; still, there were one or two other ways in which photography might be made of practical value, or at least were worth the trouble of experiment. Time would not permit of any comprehensive discussion on this subject, but attention might be drawn to the fact that photography would be utilised for artillery purposes, such as the giving direction and adding to the effectiveness of shell-firing at night time or in misty weather. It was a good sign that the military authorities were keeping pace with the rapid improvements and advances being made in the art and science. This was all the more satisfactory, for in the Government departments the authorities were sadly behind the age in this way, and it amounted to a national disgrace that the Government of the greatest empire the world has ever seen should be so slow to utilise photography, or in fact any modern discoveries, and should give such niggardly encouragement to art and science.

THE EFFECT OF ELECTRICITY ON DRY PLATES.

BY F. C. BEACH.*

I was much interested a short time ago in an account of a demonstration given before an English society by a Mr. F. Greene, wherein he intended to prove that a facsimile of a coin could be impressed upon the moist film of dry plate by the action of a current of electricity passing between the terminals of a battery, one of which was immersed in an acid solution, and the other connected with and rested upon the coin laid on the film of the plate, the latter being also immersed in the solution. After the current passed for a short time, the coin was removed and the plate put into a developer. Soon a distinct negative image of the coin appeared. The experiment showed that by electric action, and without the aid of light, an impression was made.

Knowing from some experiments made by a friend of mine, Mr. John R. Paddock, of the Stevens Institute, on the electrical conductivity of the bromide film of gelatino-bromide paper, resulting in proving that it was nearly a non-conductor, I hesitated to believe that the result obtained by Mr. Greene was entirely due to direct electric action, but imagined that it might be the result of some secondary effect induced by the electric current.

With a view of investigating the subject further, I invited Mr.

* Read before the Society of Amateur Photographers of New York.

Paddock to carry on a series of experiments under my direction, and supplied him with a dozen 3¼ by 4¼ gelatino-bromide, and also the same number of gelatino-chloride plates, the latter being of English manufacture. He has recently handed me a report of some of his experiments, which is substantially as follows.

First Set of Experiments.

A bath of muriatic acid two drams, water ten ounces, was first made. Two gelatino-chloride plates were placed in the bath in a horizontal position, films upward, and on one rested a silver half dollar coin, and on the other a silver dime. The battery consisted of five Leclanche cells, connected in series. The electric current was then passed through the solution for thirty seconds, from the positive platinum pole in the solution to the negative platinum pole on the coin. After keeping the plates in a pyro and potash developer for from ten to twenty minutes, the image of the coins was faintly discernible. Plate marked No. 1 shows the result. Merely a faint outline of the coins will be observed. A third gelatino-chloride plate was immersed in the solution, having the coins resting on the film, but no current was passed through. No impression was obtained on development. A fourth plate of the same brand was suspended film side downwards, horizontally, in a bath of water. A rubber tube was carried under the solution until the mouth of it was one-fourth of an inch away from the centre of film; then a current of hydrogen gas was sent through the tube, and in emerging at the mouth gradually spread over the film. When placed in the developer the plate turned a deep black colour over the entire surface.

Second Set of Experiments with Gelatino-Bromide Plates.

The plates were all immersed in a muriatic acid bath as before, and connected in the same way. On the first plate was placed a half dollar silver coin having the edges and one face protected with wax. The unprotected face was placed in contact with the dry film, and cemented at the edges with wax, and then immersed in the acid bath, the negative pole being connected to the coin. The current could only act on the under side of the coin next to the film. The current was then passed through for two minutes.

In raising the coin from the plate a small portion of the solution worked in under the edge, which appears in the peculiar hook appearance shown in the resulting disc; but prior to immersion in the developer nothing was observed on the plate. After development, for several minutes, a dense black disc, with a faint marking of the dots on the coin, was obtained, but it was nothing like a satisfactory image or facsimile of the coin. In plate No. 2 the peculiarity of the disc will be observed.

Other coins of copper, a German coin (alloy twenty-five per cent. of copper), and an engraved copper plate resting on the film, with the electric current passing as before, were tried, but on being placed in the developer no impression appeared.

A third set of experiments included the immersion of chloride plates in a chloride of ammonia bath, using the same electric current and silver coins as above, but the results were not as satisfactory, only indistinct, blackened impressions appearing during development. A plate was moistened and coins of various kinds pressed down upon the film. On development the impressions came out as good as when no electricity was employed.

Plate No. 3 shows the effect very clearly. It should also be mentioned that if a chloride or bromide silver film be stripped from a support, and be subjected to a current of electricity passing directly through a cross-section, the film will blacken at the negative pole by reason of the silver salt in the film.

The opinion of Mr. Paddock and myself is that the blackening effect produced in the film is the result of the reducing action of hydrogen gas generated in its nascent state, in contact with the film, by the current of electricity passing between the two poles, and not to the current alone, as stated by Mr. Greene. This he in part proves by causing a stream of hydrogen gas to impinge against the film, immersed in water; when developed the film blackens precisely like the disc obtained with the waxed coin.

Passing next to the effect of a high tension current (such as is obtained by an induction coil) on a dry plate, I have been much interested in an article by J. Brown, "On Figures Produced by Electric Action on Photographic Dry Plates," published in the *London Philosophical Magazine*, and reproduced in the January, 1889, issue of the *American Journal of Photography*. In photographing the discharge between the electrodes of an induction coil, Mr. Brown was led to further experiment on the effect of the current when applied directly to the film. He obtained some interesting results, the most important of which was the discovery that an induced current so slight as to be invisible to the eye produced an impression on the film of sufficient strength to be developed out. He says: "The foregoing results would go to show that actual disruptive discharge over or in the film is not needed to produce an effect visible on development, but that the figures and markings are produced partly, at least, by direct electric action on the sensitive film, without the intervention of a visibly luminous action, or what would be usually understood as a purely photo-chemical cause. Possibly further investigation may show that we have here a new kind of experimental evidence on the relation of electricity to light."

It is presumed the experiments were carried on in absolute darkness, so that the eye might easily detect the least trace of the inductive current. Nothing in regard to this, however, is stated. If a faint red light was used, it might prevent the indistinct electric sparks from being noticed. Plates of extreme sensitiveness were employed, and it is possible they may have been impressed with the faint light not seen by the eye.

A short time ago, with the assistance of Mr. George M. Hopkins, of the *Scientific American*, I tried a few experiments, more especially with a view to determine, first, what the actual electrical resistance of a section of undeveloped and developed gelatino-bromide film is; and secondly, to satisfy myself as to what effect an invisible induced electric current has on a wet and dry surface of a gelatino-bromide film.

First, then, I prepared two sections of plates of exactly the same length and width (4 inches long by 1 inch wide), wrapping tin foils around each end, and marked respectively A and B. A is the developed and fixed section; B is the plain, undeveloped portion. These in turn were laid upon a block of pure paraffin wax, and then connected with a battery of six standard gravity zinc and copper battery cells, a Bergmann Wheatstone Bridge and a Thompson Reflecting Galvanometer (the most delicate that is made), and carefully tested as to the amount of current they (the plates) would conduct. After spending nearly two hours in conducting these experiments, the conclusion reached was that there is no conductivity in the gelatine film containing the salts of silver. The only measurement we did obtain amounted to over a million ohms resistance, which is equivalent to infinity. There was no difference either in a developed or plain film.

From an 8 by 10 gelatino-bromide plate of medium rapidity we cut off four strips, 1 inch wide and 8 inches long. These we respectively laid on a paraffine block, and experimented with an induction coil run by five cells of a medium sized bichromate plunging battery. We wrapped the tin foil about an eighth of an inch in width around the end of each strip, and connected them with the fine wires from the secondary poles of the coil. The by-pass points of the coil were separated about 2 inches to force the current to pass over the wires and across the section of the strip. The wires were covered with a piece of silk cloth to prevent any light that might come from them striking the plate. A very weak induced current was generated and kept up for two minutes. The strip marked C was thus treated. Next a strip marked D, subjected to the same current for the same time, was moistened with water. In each case no current in the darkness of the room was observable to the eye, but when looking closely at the strip the nose detected the peculiar odour of ozone.

A third strip, marked E, was then held in the air at right angles to the passage of the spark passing across between the two by-pass points of the induction coil, these being about 1¼ inches apart. Numerous discharges were allowed to play against it for a minute, and seemed enough to fog it badly.

Lastly, a fourth strip, marked F, was laid on the paraffined cake, the by-pass points drawn apart, and the full force of the induced current put on. A bluish light glowed all around it; the current was observed to leap across in the air, about half an inch above the strip, showing, beyond a doubt, that the film had no attraction for it. The distance between the wires connecting it to the strip was decreased one-half; still the current would prefer the air to the plate.

I placed all the four strips (C, D, E, F) in one tray, and poured over them a pyro and potash developer, containing 2 grains of pyro and 4 grains of carbonate of potash to the ounce. In about a minute and a half the films of all commenced to turn, and after three minutes' development they were all pretty well blackened.

C and D show no marking other than a general turning of the film. E shows the distinct tracing of the sparks as they flew over the film, the points of contact and departure being very foggy. F shows the effect of the light very plainly at the terminals where it was surrounded by the wires.

In the cases where there was no electric spark visible, and where the plate was in total darkness, I cannot account for the turning of the film in the developer, unless it was caused by some subtle influence of the current not fully explainable, or to chemical fog. I at first attributed it to the atmosphere of ozone, which must have been over the film, but to prove it I had Mr. Hopkins generate ozone by running a series of electric sparks between needle points inclosed in a paper cylinder. Rubber tubes passed from each end of the cylinder. At the end of the tube was placed a sensitive plate protected with a metal shield, having a star cut in it. After the electric current had generated sufficient ozone in the paper tube, air was blown in one end, which forced the ozone out against the sensitive plate at the end of the other tube. This was kept up for one minute, during which time the ozone was continuously generated. The experiment was carried on in total darkness.

The plate marked G was thus treated. After being kept in a pyro and potash developer for ten minutes the entire film simply darkened slightly, but no impression of a star was brought out. The mat marks on the edges of the plate developed out very distinctly, as they usually do. From this experiment I am able to conclude that ozone has no effect on a dry plate. Three other plates, marked respectively H, I, J, were next subjected to the induced electric spark by placing them on a cake of paraffine, and resting the terminals of copper wire parallel with the edges. Curious discharges of the spark across the plates were easily developed out, showing that a very faint electric light is sufficient to produce an impression. The sensitive plate thus affords a convenient means of recording the varying forms and shapes of electrical discharges.

In order to confirm my conclusion as to the effect of ozone, I supplied Mr. Hopkins with two other plates of one maker, Cramer 40, 4 by 5, and had him expose one in absolute darkness for five minutes to the ozone, and the other for two minutes. These I placed in a hydroquinone developer (10 grains hydroquinone, 15 grains carbonate of potash to the ounce), and kept them there for half an hour, covering the dish during development. Nothing appeared except a slight darkening of the film all over; not a sign of the star I had hoped to obtain was visible. Plates marked A and L was thus treated.

Taking into consideration the excellent electrical conducting qualities of metallic silver, it is rather surprising to note that its salts, when enclosed in a gelatine film, appear to be such a good electrical insulator.

If electricity is ever to be employed in transmitting photographs by telegraph, it will have to be done by some method of controlling the variations of light, and not by any direct action of the current. Mr. Paddock and myself are about to experiment in this direction. The field is an interesting one, and there is room for several useful experiments. What I have said is the latest in this line, and I trust my work may stimulate others to experiment further.

Notes.

The article by Mr. J. H. Biggs, on "Silver Prints on Rough Drawing Paper," which will be found on p. 259, is of very special interest, as not only does the process yield some of the most pleasing silver prints we have seen, but these prints are specially suited for conversion into platinotypes by the substitution method as described on p. 225 of our issue of April 12th.

The *Sun*, which is announced as a new weekly to be issued from No. 26, Catherine Street, Strand, is not to be a photographic paper, as might perhaps be supposed from its title, but a weekly review in size and general form similar to the *Pall Mall Gazette*, the pages, however, being divided into five columns. The price will be one penny, and possibly—by way of keeping touch with the title—photographic items may be given now and then.

A case which may serve as a hint to employers and assistants came on for trial in a provincial County Court on April 11th, in which a photographer sued an assistant for five shillings for hire of six cabinet photographs for six weeks. It appears that some time previous to the defendant leaving the photographer's employ, permission was given him to have some specimens of his work. Acting under that permission, he took six cabinet photographs with him when he left. The photographer, hearing of this, demanded them back, and when returned they were found to be spoilt. The Judge gave verdict for the plaintiff on the grounds that the permission was not in writing, that there were no witnesses, and that he considered the assistant ought to have submitted the photos for approval before taking them home, even if he had permission.

Employers would do well not to give general permissions with regard to specimens, and assistants should not take specimens without express permission with regard to the actual prints.

Foreign exhibitions are nothing if not systematic. In this respect they form a very striking and instructive contrast with those in this country. Just take, for instance, the programme of the exhibition just opened in St. Petersburg under the auspices of the Imperial Polytechnic Society. There are no less than twenty-two sections, namely :—(1) Objects which relate to the history of photography. (2) Literary works on photographic subjects. (3) Portraits from life. (4) Photographic views after nature. (5) Still life, architectural views—exterior and interior. (6) Artistic composition. Examples of combination printing. (7) Instantaneous pictures. (8) Portrait and landscape enlargements. (9) Photographs taken by artificial light. (10) Examples of the scientific application of photography. (11) Applications of photography to the industrial arts. (12) Stereoscopic pictures. (13) Vitrified photographs. (14) Photographs upon silk, iron, wood, bone, opal glass, &c. (15) Photo-mechanical processes, and the reproduction of photographs for the printing press. (16) Lenses, photometers, and optical apparatus. (17) Cameras, stands, and shutters. (18) Laboratory and studio accessories. (19) Photographic chemicals. (20) Plates, paper, pellicules, and sensitive preparations generally. (21) Mounts and photographic cards generally. (22) Examples of retouching. Different processes of retouching negatives and proofs.

This list seems to be so comprehensive as to render it difficult to suggest an addition. The fault of most English photographic exhibitions is the imperfect classification, so that the visitor who goes for information too often comes away with very confused notions. We seem to aim at an effective general effect, which is an exceedingly good thing, but may be carried to excess. A lesson in system might certainly be learnt from our friends on the Continent.

The jubilee year of photography will probably be marked in some way by most societies, English and Continental. At Christiana the Norwegian Photographic Society will hold an exhibition, at which instantaneous photographs will

form an especial feature. The Society has invited contributions from all inventors of instantaneous shutters, each specimen of apparatus to be accompanied by ten pictures obtained by its means. Each exhibitor is requested to send every particular relating to the production of the pictures, and is also to state the price of his apparatus. The Exhibition, therefore, appeals strongly to the commercial element. The medal question will cause no anxiety, as the king will defray the expense of the silver awards to be distributed.

In commenting last week upon the use of the photographs produced in the theatrical libel case, we had no idea the photographic evidence had been regarded by the judge in a serious light. This, however, appears to be the case. The judge used the following words: "It had been admitted by one witness for the defence that the photographs accurately represented the grouping at the final stage, and he asked the jury to study the photographs and decide whether they could be regarded as justifying the defendant's criticism." In other words, whether a photograph taken on Monday was evidence of what took place on Tuesday. This in itself is illogical, but the matter is made worse when it is remembered that the group when photographed was in absolute repose, while the alleged objectionable postures were the consequence of violent action. This, however, seems to have been lost sight of, and the photographs influenced the jury in favour of the plaintiffs. The latter are certainly to be congratulated on their good fortune.

Since the death of M. Desbaralles, M. Bué, a devoted disciple of his, is the leading professor of chiromancy in Paris; and he is said to make a large income not only by examining the hands of those ladies and gentlemen who consult him personally, but also by his written expressions of opinion as to the character and future fortunes of those numerous patrons who, unable to wait on him in person, send him carefully taken photographs of the open palm and extended fingers of their left hands. The fee for an examination of these photographs is never less than twenty-five francs, we understand; and if an exhaustive opinion is to be furnished, it often runs into three figures.

Now, the other day, some journalistic friends of General Boulanger induced that sensational individual to pay a visit to the photographic studio of M. Benque, who proceeded to take exceptionally large and detailed photographs of the General's two open palms. They then obtained from the photographer an assortment of photographs of the hands of other of his "sitters," and thus provided, they went home and resolved if possible to "take a rise" out of the chiromancer we have mentioned, M. Bué. For, having made up a packet of photographs from which those of General Boulanger's were carefully kept out, M. Cahu sent them to M. Bué, with a note, "the same with intent to deceive," seeing that it contained the words, "Amongst the enclosed photographs is one of the left hand of Genera. Boulanger; it is for you to find out which it is, and to send to me your opinion on it as a professor of chiromancy." But the Professor was not to be caught so easily; for within twenty-four hours he wrote back, "No, no! the hand of the General is not amongst those you have sent to me. You must have taken me for an infant to have supposed you would have tricked me so easily." On this the genuine photographs of the palms of "Le brav' Général" were duly sent to M. Bué, who, in his turn, sent back a most exhaustive summary of character, and of the fate awaiting him, which was published in the Paris *Figaro* the other day, with an enlarged copy of the original photograph on which it was founded.

Into the details we cannot enter, and will merely state that M. Bué came to the conclusion that the lines on the General's palm betoken that he will, in the year 1899, on the 14th of November, finally triumph over all his rivals and attain his supreme ambition, thus entering on what is to prove a long era of peace and happiness for himself and for France. It will be interesting to see if the General's friends, or enemies, or both, put in a copy of the photograph in question, and of the predictions founded upon it by M. Bué, at the trial of General Boulanger now going on before the French Senate.

SALTS OF GOLD USED IN PHOTOGRAPHY.

BY A. LAINER.*

The salts of gold generally in use among photographers are auric chloride, potassium auric chloride, and sodium auric chloride. If it be desired to substitute one for the other in the toning solution, it is customary to assume that the quantity of gold they contain will correspond to their equivalent weights. That such an assumption may be fallacious is shown by the fact that many preparations have a considerable residue when treated with ether-alcohol, consisting of alkaline chlorides. The subject presents three aspects: (1) analytical, as to the purity of the salts; (2) pecuniary, as to their money value; (3) photographic, as to their toning power.

With regard to (1): Auric chloride often contains free gold, actually, or potentially as aurous chloride; this is due to overheating in its preparation. On the other hand, by insufficient evaporation, hydrochloric acid may be left in, a hydrogen auric chloride, $AuCl_3HCl\ 3\ H_2O$.

Two samples of commercial "gold chloride" were found to contain 42·11 and 51·75 per cent., respectively, of Au, instead of 57.96 per cent., which is the proportion present in $AuCl_3\ 2H_2O$. The former contained a notable quantity of potassium chloride, while the latter was contaminated with no foreign metal except copper, of which the chloride was present to the extent of 0·5 per cent. A sample of potassium auric chloride was adulterated with 10·4 per cent. of added potassium chloride, which was easily detected on shaking with ether. Two samples of sodium auric chloride contained 17·73 and 20·55 per cent. of Au respectively, in place of 49·43 per cent., which is the quantity present in $AuCl_3NaCl\ 2\ H_2O$; these numbers correspond to the presence of 64 and 58 per cent. of added sodium chloride respectively. In the latter specimen a trace of copper was found.

2. In respect of the money value of the commercial gold salts, it was found that the price was fairly close to the actual quantity of gold they contained, as the following table shows:—

—	Sample. Grm.	Weight of Gold. Grm.	Value. Fl. kr.	Price. Fl. kr.
Auric chloride... ...	1	0·4211	1 15	1 20
„ „	1	0·5175	1 46	1 20
Sodium auric chloride...	1	0·1773	0 48	0 52
„ „ „ ...	1	0·2055	0 55	0 55

The weight of salt in the nominally 2-grm. bottles was generally nearly correct, though usually inclined to be a little low.

* An abstract from the *Journal of the Society of Chemical Industry.*

3. From the above facts it appears that the photographer cannot make up his toning solution of the right strength by taking equivalent weights of the commercial gold salts. This is in itself objectionable, but what is worse is the presence of such excessive quantities of sodium chloride as were found in the samples examined, as they have a tendency to produce a reddish tone on the prints. Hydrochloric acid is also most deleterious, delaying the toning and causing the formation of blisters; even after neutralization it is injurious, on account of its forming so much more alkaline chloride. The presence of cupric chloride, mentioned above, is found to be distinctly advantageous to the toning properties of the bath. The large variations in the proportion of gold in different preparations sold under the same name go far to explain how the almost innumerable receipts for toning solutions now extant have arisen.

Photographers who are in the habit of preparing their own gold salts are, of course, free from these inconveniences, but for those who buy them, the best plan is to purchase only definitely crystallized samples.

THE DETECTIVE CAMERA: A SUMMARY OF EXPERIENCES AND OPINIONS.

BY HARRY T. DUFFIELD.*

WHAT improvements in the construction of the detective camera can you suggest?

A. C. Abbot, Boston (Mass.) Camera Club: "A method of construction so that operator could observe the whole field of the plate and focus at the same time that the exposure is made.

Hon. A. A. Adee, Assistant Secretary of State, Washington (D. C.) Camera Club: "The ideal camera would be one carrying two lenses, of 7 and 4½ or 5 inches focus respectively, with an automatic arrangement to bring the plate to a fixed focus at the same time that the lens is changed. An automatic arrangement to bring a fresh plate or breadth of film into place after making the exposure, the shutter at the same time setting itself for a second exposure, would be a god-send. In other words, twelve pressures on the exposing trigger or bulb should expose twelve negatives, without the necessity of manipulating the internal arrangements, either by the clumsy process of opening the box, or by working slides, buttons, or levers on the outside. A strong spring, wound up at starting, could do this. A figure, seen through a slot, could visibly register the number of exposures made. A thoroughly self-contained automatic camera could be disguised in an endless variety of portable cases, and used without attracting attention, and so justify the name of a 'detective camera,' now so grossly misapplied in nearly all instances."

George Marshall Allen, Society of Amateur Photographers of New York: "A swingback that would work automatically when camera is tilted."

Robert Baker, Society of Amateur Photographers of New York: "A very difficult question to answer. A detective camera, to be useful, should not have any plate-holders, but should be so constructed that it carry within itself at least two dozen plates, and so arranged that these plates could be easily transferred from one part to another of the camera, with a slight movement of the box. Provisions for focussing lenses from 4 to 8 inches. A great luxury would be a movable or sliding focussing screen that could be brought into use in a moment."

Miss Catherine Weed Barnes, Society of Amateur Photographers of New York: "My objection to the detective camera is that not being able to focus sharply as with my regular view camera."

F. C. Beach, Society of Amateur Photographers of New York: "A detective camera should have a shutter of positive movement, balanced to prevent excessive shock, yet capable of moving fast enough to take a trotting horse passing the camera at right angle to the axis of the lens, without blur of image. Plate holders and slides should be dispensed with, and means provided for bringing the sensitive surfaces into position rapidly. There should be provided temporary means for preventing the light striking the plate when the shutter is set or a self-shutting shutter arranged. Special devices are needed for easily releasing the shutter without jarring the camera at the instant of exposure."

Sydney Bishop, Society of Amateur Photographers of New York: "1. That they be so arranged that at least six plates can be exposed without opening the box. 2. That the shutter can be timed accurately. 3. That it can have a practical double swing. 4. That the finder is actually in proportion to the size of the plate, and absolutely correct in position. 5. That the bellows have freedom enough in movement to take a wide angle or rectilinear lens."

The Rev. E. C. Bolles, D D., Society of Amateur Photographers of New York: "What I want for my own work. 1. A camera to carry fifty films (the new celluloid), with certain and rapid means of exposing them in succession. I prefer these films to roll-holder paper or films, and find that they work as well in the detective as glass plates. 2. Some easy and satisfactory way of focussing the image up to the very instant of releasing the shutter. The arrangement for focussing by estimating distance has been very unsatisfactory in my hands, and I invariably lose the view that I want the most, and estimate for most carefully. A camera thus fitted up needs no finder, of course. 3. A shutter release at once firm and delicate, not to be set off by a jar, and yet working so easily that you do not move the camera in operating it."

Wm. E. Bond, Society of Amateur Photographers of New York: "Anything that will contain a satisfactory substitute for glass plates, in a roll or otherwise, in quantity sufficient to make twenty-five or fifty exposures without opening camera to change holder, and consequently will be more light-tight than present cameras and holders. Also a focussing finder which will change, as the camera bellows change, so as to enable one to focus on an object instantly by looking in the finder."

Frederick Bruce, Society of Amateur Photographers of New York: "The shutter should work in the centre of the lens or back of it; a more noiseless shutter would be advisable."

William A. Bullock, Photographic Society of Philadelphia: "Slide to close the two finder eyes of camera when not in use. Shadowing hoods to the finders to keep the sunshine off the ground glass of same when sun is shining over your back or overhead. To have the top of the lid divided and hinged, so that you can introduce a holder quickly at any focus without opening entire camera box, and a means of withdrawing quickly the holder other than by your finger nails. Also an indicator to show whether or no the shutter is set without having to try the same. To have drawn on top of camera lines showing the angle of view included by lens, so that, without use of finders, you can be sure to have an object on the plate—a very necessary thing in quick snapwork on the streets. Also a small roll-holder to slide in place of plate-holders. The present roll-holders make the camera too bulky."

E. J. Carpenter, Cincinnati (O.) Camera Club: "Too many to write down this evening. I don't think the perfect detective camera can ever exist, except in the imagination; it requires 'too many more improvements,' many of which conflict with one another. My 'detective' and other camera experience has been quite varied, and has taken all my leisure time since 1881; but it appears to me that I have mainly learned how much there is to be done in this direction. There is a wonderful fascination about the work, however.

H. M. Grisdale, Society of Amateur Photographers of New York: "One that will take lens from five to eight inches; carry at least two dozen glass plates; set shutter and release from outside of box; expose plates without opening box or drawing slides; no external brass work; and lock so that it will be impossible to meddle with it without key; colour dead black."

W. J. Hickmott, Camera Club of Hartford, Conn.: "Make it less complicated, and so that it can be used instantly. When I need my detective most, my experience has been that there is not time to work a complicated camera. It usually happens that, by the time I am ready to shoot, the effect I particularly wanted cannot be obtained—the game has got out of range. One cannot usually sit around all day waiting for good things. They come suddenly and unexpectedly, and must be caught on the fly to be worth getting. This cannot be done if the camera will not admit of being worked quickly and easily. By the time a lens was changed, a swingback adjusted, the shutter regulated to a minute fraction of a twentieth part of a second, the slide drawn, &c., even a rheumatic mud-turtle would have crawled out of sight and been lost for ever. My experience points only in one direction, viz., to the need of extreme simplicity in construction of the camera, a fixed focus, a good shutter that will let in lots of light when open and none at all when closed, some means of pulling the slide without having to open the box, if possible—a flexible film that does not need stripping—and, when these are provided, it will be easy and pleasant work to get good pictures with a detective camera.

John Leshure, Springfield (Mass.) Camera Club: "I would suggest that the bellows of the camera should be made of longer

* Continued from page 170.

lraw, so that objects less than eight feet could be photographed eadily, and perhaps some copying done. The shutters on most detective cameras do not have the proper shaped opening, and I think that a shutter which works between the leuses is preferable to most of the shutters now used. I would also uggest that the lenses should be of longer focus than are generally used, say 7½-inch equivalent focus for a 4 by 5 plate. The ways on which my camera slides are made of soft wood, which in summer swell and make focussing almost impossible. f these were made of brass, the camera would work easier."

William H. Murray, Society of Amateur Photographers of New York. "Some invention to enable one to take many pictures without having to change plates or films, to avoid the veight of glass, and yet not have the complicatiou and expense f the roll holder. I think the celluloid film and the promised ontrivance for carrying the same in one holder to the extent f about four dozen films will solve the problem."

Isaac T. Norris, President of the Amateur Photographic Society of Baltimore (Md.): "If the future of plates is to be he ivory film, we want a case holding say twelve films, eparated by say ferrotype sheets, so that a spring may push ne at a time up into focus and make a dozen exposures at once. Vith all my admiration for the detective, aud after three years' se of the same camera, I am the more convinced that instan- aneous work is only an episode in the work of the amateur photographer. Time pictures are the cream of the camera, and owever careful to focus with the detective, there is that iffereuce between the two kiuds of work which adds to the ichness and depth of the time picture."

Albert H. Pitkin, Camera Club of Hartford (Conn.): "Dis- ensing with all clap-trap attachmeuts. Less bulk and weight."

Charles Quartley, Baltimore (Md.) Camera Club: "A camera n which can be carried films or other flexible plates without he necessity of independent plate-holders, where no stripping ould be necessary, would be the most desirable feature of any nprovement that I could suggest."

Miss Mary Thurston Rice, Worcester (Mass.) Camera Club: A lens which would remove any necessity of taking any focus. Guessing at your focus is very uusatisfactory in my experience, nd it is very inconvenient to have to go through the operations ecessary to look through your ground glass and take an accur- te focus. The plate on which handle of my focus works is narked 6 to 10, 60 feet, aud experience enables me to be pretty ccurate; but I have found several pictures ruined by being out f focus when I guessed at the distance being about 25 or 30 eet. I saw an English (?) lens this summer that entirely ob- iated this difficulty. Any object at a distance of 10 feet was n perfect focus, likewise any object at a distance of 100 feet or nore. This seems to me to be the chief fault and annoyance of detective camera. I think also an arrangement by which you ould carry more than three plate-holders in your box would be great improvement. I can carry but six plates in my box, nd any carried in any other way run the risk of being injured, nless one gives one's undivided attentiou to them. I ruined nany such this summer in going off for the day, wheu I wanted o take many pictures and carried ten or twelve plate-holders in bag. Of course it would add somewhat to weight of camera- ox, but I should think six plate-holders might be carried with- ut inconvenience."

Edgar Richards, President of the Washington (D.C.) Camera Club: "Not having any experience with the commercial arieties, I can only state what I find desirable, and have dopted in my own models. The box should be light, rigid, and trong. All parts to be easily accessible with a key. At least nc dozen, six holders, plates to be carried in the box. The ront of the box to have a hard rubber shutter or cap, properly peaking, which covers both lens and finder, and by one move- ient uncaps both; so that whenever you see an image on the round glass of finder you may be sure that the large lens is xposed. For the vertical finder I have a separate cap, but as this seldom used, the habit of moving the large rubber cap is not orgotten. Front of box to hinge and lock; allowing tension of hutter to be adjusted, if necessary, for slow work. Top of box rovided with handle, leather. In front to have a piece of plate lass, hinged, and closing level over pointer attached to lens hutter. Glass to be marked off with a diamond scratch into istances for 10, 15, 20, 30, 40 feet focus. Ground glass of orizontal finder to be at side, and protected from direct light by ood, right-hand side. The thumb screw for moving by rack, nd pinion, the shutter and lens to be levelled. Door running ne length of bottom of box, provided with lock, to compartment for storing extra holders. Small door, with lock, for the intro- duction and withdrawal of holder at back of camera; vertical finder. Back, locked door, width of box, for focussing when required. Left-hand side perfectly plain. Bottom string release to shutter. The shutter can be set, and the diaphragms rotated, through plate glass opening on top of box. A vertical pointer is screwed into centre of shutter, and works smoothly be- neath the glass. The exact distance for which the lens is in focus is thus always indicated, aud permits of the focus being rapidly changed without disturbiug the position of the box while viewing the object in the finder. The centre part of each plate is marked on the finder, which is a great convenience. The rack and pinion have a movement of 1¼ inch, so that a great range of focus is provided for.

Major George Shorkley, U.S.A., the Society of Amateur Photographers of New York: "That the focus be so arranged as to permit the use of the lougest and shortest lenses adaptable to the size of the plate, and to be quickly adjusted from the outside. A lens mount adjustable for moderately narrow and wide angles. Some manner of hood or cover over the aperture in front of the camera, aud be arranged to work automatically with the shutter as well as independently of it. It is presumable that all that one can suggest as real improvements have already been achieved by someone, and were all the best in one and the same camera, it would leave little to be desired; but unfortunately cameras, like other appliances, have pateuts upon them, and different stock houses have control of the excellencies."

Charles Simpson, Society of Amateur Photographers of New York: "First. Better mode of concealment than anything now in the market. Iu fact, I know of no detective camera that cannot be detected on sight—would recommend a satchel, as mode of concealment, but not of as cumbersome a pattern as the one now sold by one of our stock houses. Second. Means of removing the camera proper from the box or place of con- cealment, without loss of time, for the purpose of mounting it on a tripod for landscape work. Third. Arrangement for changing lenses without loss of time and attracting attention. Fourth. Rotary stops for the lenses, and for instantaneous exposures. Fifth. Larger finders, with lenses to correspond with the increased size of the finders. Sixth. Swing back, so adjusted as to swing from the centre sf the vertical side of the ground glass frame."

A. L. Simpsou, Society of Amateur Photographers of New York: "The general fault that I have found in detective cameras is the fact that the lenses do not cover with large open- ing the plate called for, and in consequence, it is difficult to obtain a fully exposed plate of any subject, except in very bright light. If, however, a much larger leus than was necessary was used, you could open it fully and have a finely cut and fully- exposed plate, and be able to take an object much further off in consequence of the focal length of the lens being longer. Of course this would necessitate the box being made a little longer; but what I think desirable is, that the result would be much better. The most iuteresting objects for the detective box are studies of every-day life, and as in many cases, they keep pretty well in the shade, &c., the foreging remarks are made applicable."

James H. Stebbins, Jr., Society of Amateur Photographers of New York: "I would suggest some simple means of carrying quite a number of plates, and some device for changing them conveniently iu the open air. In this way a large number of plates could be carried, with but few plate-holders.

E. Terry, Society of Amateur Photographers of New York: "The different parts requiring attention, focus, time, &c., are too scattered; they should, if possible, be so placed that they can all be seen at a glance."

W. T. Wintringham, Brooklyn Academy of Photography: "Should I ever build another for my own use, I would put in two shutters—one having a range from $\frac{1}{100}$ second upward would be placed between the lenses. The other, with, if pos- sible, a range from $\frac{1}{100}$ downward to say $\frac{1}{10}$, would be placed in front of the lens, and act also as a hood. What is wanted more than anything else is a plate-holder for the new films cap- able of carrying a quantity—two or three dozen—in small space, and some arrangement whereby they can be quickly changed."

ENLARGING ON PERMANENT BROMIDE PAPER.

BY G. D. MILBURN.*

To make a vignette picture, the operator, standing at the left and half facing easel, should screen the lens with a piece of straw

* Continued from page 249.

board about 16 by 20 inches. A hole of the proper shape for the vignette is cut in the centre (see fig. 1, p. 249, last week). Having uncapped the lens, the vignetter should be moved back and forth from the lens to the easel. Continue this movement through the entire exposure. Additional time can be given on any part of the image that may need it, by cutting a smaller hole in the same size straw board, and proceeding about the same as when vignetting. On landscapes extra time may be given on the sky by shading the balance of image with a piece of straw board of the proper shape; the most beautiful sky effects can be produced in this way.

My formula for developer is the same as that published by the Eastman Company:—

No. 1—Oxalate of potash	... ...	1 pound
Acetic acid	... ...	3 drams
Water, hot	... ...	48 ounces
No. 2—Protosulphate of iron	... ...	1 pound
Water, hot	... .	32 ounces
No. 3—Bromide potassium	... ...	1 ounce
Water	... ...	1 quart

To develop, take of No. 1, six ounces; of No. 2, one ounce; and of No. 3, half-a-dram. Care should be used in measuring No. 3, as an excess of bromide will produce too great a contrast, and too little will have tendency to flatness. If you prefer to have your picture come up slow, this developer can be diluted with one-third the amount of pure water. In a suitable tray, soak the exposed print in clean water until limp. Then pour off the water and flow with the developer. The image should develop up strong, clear, and brilliant. When the shadows are sufficiently black, pour off the developer, and flow the print with the clearing solution, which consists of acetic acid, one dram; water, thirty-two ounces. Use a sufficient quantity to flow over the print. Allow it to act for one minute, then pour it off and apply a fresh portion. Repeat the operation a third time. Then rinse in pure water, and immerse for about ten minutes in the fixing bath—hyposulphite of soda, three ounces; water, sixteen ounces. After fixing, wash thoroughly for about two hours, and hang your print up to dry. A good method to force an obstinate spot on the print, when developing, is to dip the fingers into the developer and slightly rub the obstinate part. Care should be used not to overdo it, and to have no other chemicals on the fingers, as it would leave a stain. Beautiful results on bromide paper are obtainable with the hydroquinone developer.

To mount, wet the print, brush over the back with a thin starch paste. Lay the print on the mount and rub down with a soft damp sponge. Some operators would like to see the print retain the gloss. When in the water this can be done by squeezing the print face down on a polished piece of hard rubber. When dry the print will peel off with a fine glossy surface. A higher polished surface can be attained by enamelling with the plain collodion on a plate glass.

FIFTY YEARS' PHOTOGRAPHY.

BY W. LANG JUNR.*

CONTINUING from where I left off in my previous communication, we will for a little consider the work done by the American philosopher, Dr. John William Draper. Allow me in the first instance to show you, by means of the lantern, a portrait of this distinguished experimentalist. Draper was undoubtedly the first to obtain a photograph of the moon. This was secured on a Daguerreotype plate on March 23, 1840. The size of the figure was about one inch in diameter, and the exposure was twenty minutes. This photograph is preserved in the New York Lyceum of Natural History. In Draper's memoirs, published in London in 1878, we find all his early photographic researches given in detail, but we need not go into these. We may, however, refer to his two photometres, the chlor-hydrogen and the ferric oxalate. In the former instrument the measurement of the intensity of the light source was sought to be arrived at by the chemical action which takes place when a mixture of hydrogen and chlorine gases is acted on by light, and in the other, as the name implies, ferric oxalate solution was exposed to light, the quantity of carbonic acid evolved in its decomposition being measured either by volume or by weight. Ingenious as these photometres undoubtedly are, they are nevertheless more scientific than practical. Dr. J. W. Draper may be credited with being the first to produce a print from ferric oxalate. This was in the year 1848. Draper occupied himself much with photo-spectroscopic work, and was the first to photograph what are known as the red lines on the spectrum. This he accomplished by the use of bitumen in India. He was Professor of Chemistry and Natural History in the University of New York, having been appointed to the chair in the year 1833. He died on the 4th of July 1882.

We come now to the collodion era in photography, and the name which is associated therewith, as most of you are all aware, is that of Frederick Scott Archer. We will have his portrait thrown upon the screen, while a few details regarding Archer's career may be appropriately given. In attributing to Archer the merit of originating the collodion process, it is not for a moment to be supposed that he was the discoverer of collodion. This substance was prepared, not long after the discovery of gun-cotton, by Schönbein, and was used in surgery to cover injured surfaces. Archer was in early life apprenticed to a silversmith, and subsequently took to modelling for the trade. He afterwards followed the profession of a sculptor, and many excellent busts were, it seems, modelled by him. In March, 1851, Archer published his account of the collodion process in the *Chemist*, though we have evidence that he had produced pictures by means of collodion in the autumn of 1850. The details of the process we are considering are so intimately associated with even present day operations, that we may be excused going into particulars. Suffice it to say that Archer's process was what really popularised photography. Talbotype and Daguerreotype had, of course, their votaries; but where one practised these processes, ten and more were to be found following the ever fascinating wet collodion process. As is well known, Archer did not in any way derive pecuniary benefit from his discovery. Unlike some of his predecessors, he gave the results of his experiments free to all the world, benefitting others, for it cannot be denied that many fortunes were made through the instrumentality of his discovery. Archer did not live many years after he had made his free gift to the world. In May, 1857, at the early age of forty years, Archer passed away. Mrs. Archer died very shortly afterwards, leaving three orphan daughters totally unprovided for. Through the exertions of the photographic community, a sufficient sum was raised to secure to the family sufficient for their education and upbringing.

The collodion process reigned supreme for many years, but it had its drawbacks as well as its advantages. It was not suitable for outdoor photography, inasmuch as it was necessary to take to the field of operations all the paraphernalia of the dark room. Hence the desire arose to produce a plate that could be prepared at home, having the necessary keeping qualities, so that it could be brought back after exposure for subsequent development in the studio. So much was attempted in this direction that we can do no more than simply refer to one or two of the more prominent processes. Abney, in his article on photography in the *Encyclopædia Britannica*, gives the credit to M. Gaudin as being the first to experiment with collodion dry plates. This was in the year 1854, and his researches are detailed in *La Lumière* for that year under the dates of April 23 and May 27. All the collodion dry plate processes devised had a strong family likeness, the plate being coated in the first instance with iodised collodion, afterwards sensitised in a nitrate of silver bath, and finally washed, had what was known as the preservative applied to it, and many were the preservatives put forward from time to time. We may refer to the following: tea, coffee, albumen, tannin, honey, gum-arabic, beer, and gelatine. Taupenot's process, which I know was worked by some of our members, was reckoned one of the most reliable of the dry plate processes—in this albumen played the part of the preservative. Again, the gum-gallic process, introduced by R. Manners Gordon, was also one giving good results. We will only refer to another, viz., Major Russell's tannin process, and this process leads us to speak of what we now know as the "alkaline developer," for it appears that in 1862 Major Russell introduced it in connection with the plates prepared by his method. In this developer we have, as is well-known, three bodies present—an alkali; a reducing agent, for the most part pyrogallic acid; and a restrainer, a soluble bromide. This developer placed a new power in the photographer's hand, but it was not till the gelatine rapid plate made its appearance that its real importance became manifest.

(*To be continued.*)

* Continued from page 230.

Correspondence.

HELIOCHROMY.

Sir,—Having disproved every statement by which Mr. Bothamley has tried to discredit my claim to the discovery of a new and true principle in heliochromy, I would like to drop the subject without another word. But Mr. Bothamley, who now says he does not propose to occupy any more space with this discussiou, precedes that statement with fresh charges against me, which I am forced to notice. First, he charges me with an "implied claim to be regarded as au authority on colour-vision," &c. I have repeatedly quoted A. H. Church and O. N. Rood as authorities for my statement of the principles of colour-vision. He then refers to a paper by one D. Winstanley, on the subject of heliochromy, as if he regarded said Winstanley as an authority upon that subject. A child could, with three pieces of coloured gelatine, prove that the arguments which Winstanley directs against my process are based upon a plaiu misstatement of facts. Winstanley is the man who once asserted that a newspaper exposed to sunlight and then removed to the dark room would emit enough phosphorescent light to print out a picture on chloride of silver paper. Finally, Mr. Bothamley tries to produce the impression that I have been unfair to Vogel and Becquerel in my claims regarding my chlorophyl process of orthochromatic photography. I am unable to believe he is really ignorant of the fact that I have repeatedly in my writings given Vogel and Becquerel due credit for the discoveries referred to, and that my own claims were unqualifiedly endorsed by the Franklin Institute. which awarded me the John Scott Legacy Medal for the discovery and publication of "the first working practical process of photographing colouis in their relative degree of light and shade as they impress the eye."—Respectfully, F. E. Ives.

Philadelphia, April 3, 1889.

HONOUR TO FOX-TALBOT.

Sir,—As an English amateur and lover of the beautiful art of photography, may I ask for a small space to endorse the expression of opinion of Messrs. Ashman and Lang in your last issue, that "the labours of Fox-Talbot are as much entitled to public recognition by Englishmen as that accorded to" Daguerre in France. And I would venture to suggest the raising of a fund to erect a suitable memorial to one we have cause to thank for so many years of study and experiments. Surely among the thousands who now enjoy the pursuance of this delightful and intellectual recreation (to say nothing of the myriads of professional artists) there are many who would be glad to subscribe their mite towards defraying the cost of a monument that should be worthy of him to whom it is raised. And as Mr. Ashman remarks at the close of his interesting address, this jubilee year of photography offers a fitting opportunity to carry it out. I should very much like to see those gentlemen who have this matter at heart form a committee at once for this purpose ; and believing in the old saying that example is better than precept, I shall be pleased to forward 10s. at once, should my suggestion be put into practice, aud I feel confident it would be responded to throughout the length and breadth of the kingdom. Apologising for this intrusiou upon your valuable space, I remain, sir, G. Battershell.

37, St. Paul Street, Islington, N.

Patent Intelligence.

Applications for Letters Patent.

5,114. Isaac Greenbury, 6, The Arcade, Edinburgh, for "Improved Apparatus for Displaying Phatographs or Cards."—March 25th, 1888.

5,173. Daniel Kindle Zumwalt, 45, Southampton Buildings, London, for "Improvements Relating to the Mounting of Photographs, and to the Preparation of Facsimiles of Public and Private Records, and the like."—March 26th, 1889.

5,207. Momme Andresen, 4, South Street, Finsbury, London, for "Improvements Relating to the Development of Photographic Pictures."—March 26th, 1889.

5,211. Karl Ramspeck and Barthold Schafer, 18, Buckingham Street, Strand, London, for "Apparatus for Automatically Producing and Completing Photographs."—March 26th, 1889.

5,234. William Hugh Reubens Kerry, 6, Lord Street, Liverpool, for "Improvements in or Relating to Photographic Cameras."—March 27th, 1889.

5,295. Louis Edmond Perken, Frederick Louis Perkin, and Arthur Rayment, 34, Southampton Buildings, London, for "Improvements in the Arrangement, Construction, and Mounting of Photographic Cameras."—March 27th, 1889.

5,324. John Price, 137, Wellington Road, Dudley, for "Improvements in the Construction of Easels or Rests for Holding and Exhibiting Portraits, &c."—March 27th, 1889.

5,337. William Henry Smith and William Willis, 45, Southampton Buildings, London, for "Improvements Relating to Photographic Cameras and to Apparatus for use in Connection therewith.—March 27th, 1889.

5,374. William Walker James Nicol, Mason College, Birmingham, for "An Improved Method of Photographic Printing."—March 29th, 1889.

5,409. John Hancock, Akenside Hill, Newcastle-on-Tyne, for "Improvements in the Production of Photographic Pictures."—March 29th, 1889.

5,449. Herbert John Allison, 52, Chancery Lane, Londou, for "Improvement in Photographic Plate-holding Boxes and Cameras." (*Carl Paul Stirn*, United States.)—March 30th, 1889.

5,513. David Alexander Pearson Anderson, 1, Livingstone Place, Edinburgh, for "Apparatus for Containing Photographs or other suitable articles, and for Displaying the same."—April 1st, 1889.

5,525. Denis McNamara, 25, South Terrace, Inchicore, Dublin, for "Improvements in Photographic Hand Cameras."—April 1st, 1889.

5,530. George Corpe Whitfield, The Woodbury, Kent Gardens, Ealing, for "Improvements in Photographic Dry Plates."—April 1st, 1889.

5,542. Arthur Richard Wormald, Sutton, Surrey, for "An Improved Stand or Frame for Exhibiting Photographic Lantern Slides, Negatives, and other Transparencies."—April 1st, 1889.

5,610. Algernon Charles Pemberton, 21, Commercial Sale Rooms, Mincing Lane, London, for "An Improved Photographic Camera."—April 2nd, 1889.

5,650. James William Thomas Cadett, 33, Southampton Buildings, Holborn, London, for "Am Improved Combination Receiving, Delivering, and Distributing Apparatus for Photographic Coating Machines."—April 2nd, 1889.

5,713. David Alexander Pearson Anderson, 1, Livingstone Place, Edinburgh, for "Apparatus for Containing aud Displaying Photographs or other suitable articles, or to form a Photographic Dark Slide."—April 2nd, 1889.

5,920. Claude Raymond, 55 and 56, Chancery Lane, London, for "Improvements in Photographic Cameras."—April 6, 1889.

Specifications Published.

1,504. Edmund Edwards, of the firm of Edwards and Co., Patent Agents and Engineers, of 35, Southampton Buildings, Chancery Lane, in the County of Middlesex, for "Improvemeuts in Spirit Lamps for the Rapid and Perfect Combustion of Magnesium Powder without Perceptible Smoke for Photographic Purposes."—Dated 28th January, 1889.

The lamp consists of a hollow metal or glass body filled with compressed sponge or spongy matter, and having an opening closed with wire gauze. To the body of the lamp is fixed by means of a pin a small brass tube bent up rectangularly, and widened to a small conical receptacle at its end, and connected at its other end with a pneumatic ball or other apparatus by means of an india-rubber tube.

The sponge of the lamp being saturated with spirits of wine and the lamp ignited, it will burn with a long blue flame, using very little material, and on account of there being ouly enough spirits of wine to saturate the sponge, the lamp will, if knocked over by accident, go out immediately, and in no case will any

spirit of wine run out, and cause any danger by ignition. By turning the small brass tube round its pin, the funnel is brought out of the flame, and a small quantity of magnesium powder (about two centigrammes) is filled into it, and then the whole is turned back again into the flame.

At the moment in which by pressure on the pneumatic ball, or equivalent apparatus, air is sent through the brass tube, the magnesimm powder is blown through the axis of the flame, and the latter itself is at the same time by the strong current of air sent through its whole length greatly augmented, and its heating quality is at this instant so increased as to reuder the combustion of the magnesium powder complete, and more perfect than in any other lamp, especially of the kind having a circular wick and current of air through the centre, as in these lamps the blowing through of more air than is necessary for the flame in order to increase its heating quality only diminishes it, and so widens the opening in the circular flame that a great part of the magnesium powder is blown through this opening without being ignited.

5,462. Anketell Matthew Henderson, of 11, Elizabeth Street, in the City of Melbourne, in the Colony of Victoria, Architect and Licensed Surveyor, for "An Improved Dark Slide for Photographic Cameras and Improvements in Cameras to be used therewith."—Dated 12th April, 1888.

A reservoir camera in which the carriers containing the plates hinge down in succession on separate pins controlled from the outside, so that they are brought into use in order. A number of special adjustments are claimed.

6,992. Michael Tayleure, of Market Place, Pocklington, in the County of York, Photographer, for "Improvements in Dark Slides or Plate-Holders for Photographic Cameras."—Dated 10th May, 1888.

The claim is:—

1. A dark slide or plate-holder in which the orifice of the slot into which the shutter or shutters are passed is closed by elastic or springy material when the shutter is not in position, but which yields to the pressure of the shutter when the latter is pushed in, and swells out filling the slot, and keeping the light excluded as the shutter is withdrawn, whereby the shutter can, if it be desired, be entirely withdrawn without permitting the entrance of light through its slot.

2. A dark slide or plate-holder for photographic cameras, in which a flat frame divided into separate compartments by the removable partition, and having guides or channels, and an elastic roller or spring, is adapted to receive the sliding shutters on each side of the partitiou aforesaid, whereby said shutters can be completely drawn out when it is desired to uncover the sensitized surface of one of tho plates without the risk of lighting the sensitized surface or film of the other plate, substantially as described.

Proceedings of Societies.

London and Provincial Photographic Association.

The usual weekly meeting was held ou the 11th inst., Mr. A. Haddon in the chair.

The Hon. Secretary read a letter from Mr. J. Matthews expressing his inability to be present to exhibit the Douglas burner, and a telegram also from Mr. Varley was received, stating that he was prevented from giving his proposed paper that evening.

Mr. J. Traill Taylor spoke of the experiments that were being made by Mr. Valentiue Blanchard, and also by Mr. Lyonel Clarke in platinum toning. Mr. Taylor said in former platinum experiments made by Mr. Willis the salt commercially sold was used. It had, however, been found from the present experiments that the best results were obtained with the platinous salts.

Mr. A. Pringle said he believed that Mr. Willis had used silver and platinum in his early experiments, which had not proved altogether satisfactory.

The Chairman suggested using cyanide for fixing in connection with these experiments, as being a more energetic and powerful fixing agent.

A question was asked: "Has anyone experimented with Dr. Hill Norris's process?"

Mr. A. Pringle said some three or four years ago he made collodio-bromide emulsion registering 15 on the sensitometer, but it would not keep twenty-four hours.

Mr. J. Traill Taylor gave some particulars of a method adopted in America of leaving a good surplus of soluble bromide in the emulsiou, and immersing the plate in a silver bath. Plates made in this way kept indefinitely.

Mr. J. B. B. Wellington had obtaiued sensitiveness by pouring over the collodion bromide film a strong solution of erythrosine and ammonia. The plates were exposed dry. Very great density was easily obtained. He had been able to take a picture with the flash light on them.

Mr. A. Mackie referred to the experiments that had been made by coating a coloured bromide plate with rapid gelatine emulsion.

Mr. A. Pringle asked what advantage there was in going back to collodion. He had a vivid recollection of comets and other drawbacks, that persistently cropped up at every stage, to the disgust and annoyance of the operator.

Mr. J. Traill Taylor said the perfection of films was albumen.

Mr. W. H. Harrison was doubtful whether platinum toning resulted in a perfect conversion of the image; he believed it was a surface action only. He had tested a silver print toned with platinum by immersing it in a weak bath of nitric acid; the shadows remained, but the half-tones of the pictures were altered in colour. He believed the cold bath process would be found to be more permanent, and that toned pictures would be liable to fade.

Mr. Traill Taylor said silver prints toned with platinum had been successfully burnt in; if the platinum toning was a surface action, only a disagreeable yellow would have resulted.

The Chairman said he had tried Mr. Friese Greene's recent experiments of the effect on a sensitive plate from the radiations given out from the eye after exposure to a strong light, but had totally failed. He had used a flash-light, and had afterwards kept his eye to the plate for two minutes: no effect whatever on the plate was produced.

Mr. J. B. B. Wellington showed a detective camera partly completed. He had commenced it from designs of his own, but found in working it out that it proved very complicated; there were, however, some very good points iu it which, he thought, might be taken up and improved upon, and with that view he exhibited it.

East Dulwich and Peckham Photographic Society.

The opening meeting of the above Society was held on Friday last, Mr. L. Warnerke in the chair.

The minutes of the preliminary meeting having been read and confirmed, the Secretary read the rules and bye-laws which had been drawn up. Six gentlemen were proposed as new members.

The Chairman then addressed the gentlemen present as to the necessity of making the Society a really strong one, and on the manner in which to accomplish that object, giving them some good, sound, and practical advice, after which the meeting took a conversational turn. A portrait taken by the flash light, the work of one of the members (Mr. Herbert), was handed round and met with general approval, it having been taken by a lamp of his own construction.

A hearty vote of thanks to the Chairman closed the proceedings.

Mr. Warnerke kindly consented to take the chair at the next meeting, which will be held at Mr. Seaton's Music Warehouse, 76, Peckham Rye, on Friday, May 3rd, when he has promised to explain flash light photography with experiments, and also to give some other interesting communication to the Society.

Leicester and Leicestershire Photographic Society.

A meeting was held on Wednesday, April 11, in the Mayor's Parlour, Old Town Hall; Mr. George Bankart in the chair.

Three members were elected, and two nominated for ballot at next meeting.

Mr. Pierpoint gave notice of his intention, at next meeting, to offer a silver and bronze medal for enlargements to be competed for by the members, and also invited discussion as to the suitability of the subject.

Mr. Thos. Scotton, of Derby, then proceeded to give his demonstration on "Bromide Printing and Transfer to Opal," which

was eagerly watched by the members, and the manipulation being all that could be wished to recommend a new process, Mr. Scotton thoroughly established the transferotype in the estimation of the members present. The paper used was that made by the Eastman Company, and the ease with which the various processes were effected was evident to all. The bromide printing, as exemplified by Mr. Scotton on Morgan and Kidd's paper, showed what excellent work could be turned out by anyone who accustomed themselves to that make. Mr. Scotton exhibited several enlargements kindly sent for the purpose by Messrs. Morgan and Kidd, which were admired by all.

At this meeting the bronze and silver medals were presented by the President to the successful competitors at the late exhibition of prints and lantern slides, viz, Messrs. Geo. Baukart, W. T. Tucker (2), J. Porritt, A. W. Wilson, and W. Taylor.

West London Photographic Society.

An ordinary meeting of the West London Photographic Society was held at the Addison Hall on the 12th inst.; the President in the chair.

After the usual business was disposed of, Mr. Charles Whiting read a paper on "Lantern Slide Making." The lecturer, in the course of his opening remarks, said he wished to impress upon his hearers the necessity of being exact with their formulæ, clean in their manipulations, and, further, he urged them not to be disheartened by failures; there was more to be learnt from one failure than from a great many successes. He hoped they would not rest satisfied with mere mediocre results, but would persevere until they could produce the most perfect work. Working by the wet-collodion process, which was the one he particularly wished to bring under their notice, it was necessary to resort to reduction in the camera, and, in order to work with comfort, a suitable copying apparatus was necessary. (The lecturer then described his own mode of working.) Good glass should be chosen, and thoroughly cleaned, and, in order to prevent the film from slipping, it should be albumenized. He had found nearly all the commercial collodions work well, but it was necessary sometimes to thin them by adding equal parts of ether and alcohol, otherwise the image was apt to be too dense. He made up a bath composed of—

Silver nitrate	1½ ounces
Distilled water	20 ,,
Nitric acid	5 minims
Iodide of potassium	2 grains

When the wet collodion process was in vogue, it was customary to attribute all failures to the bath, and certainly at times the bath would go wrong. It was, however, not necessary to go into the matter of curing disordered baths. The developer was composed of—

Protosulphate of iron	30 grains
Glacial acetic acid	½ dram
Alcohol	½ ,,
Water	1 ounce

If the negative was thin and flat, it was better to further dilute this developer with water, but with a hard negative an even stronger solution might with advantage be employed. It was desirable to wash the developer off directly the image was fairly out, otherwise the brilliancy of the slide might be impaired. The plate should be fixed in a solution of—

Cyanide of potassium	25 grains
Water	1 ounce

If, after washing, the slides were found to be weak, it might be intensified with—

Pyrogallic acid	3 grains
Citric acid	3 ,,
Water	1 ounce

to which, at the moment of using, was added a few drops of the silver bath. If, on the contrary, the slide was too dense, the application of Mr. Howard Farmer's reducing solution, composed of potassium ferricyanide and hypo, would soon effect reduction. The lecturer had made some rough experiments in toning by first converting the silver image into iodide of silver by means of a solution of iodine and iodide of potassium, afterwards treating it to a bath of sulphuret of ammonia. This changed the colour to a chocolate brown, and still warmer tones might be obtained by subsequent toning in a bath composed of

Chloride of gold	1 grain
Ferricyanide of potassium	½ dram
Nitrate of uranium	½ ,,
Water	10 ounces

In regard to this toning process time alone would show whether the results were permanent. Lantern slides could be made by the wet process by contact, the negative being put in the dark slide with four little pieces of blotting paper placed at the corners; the sensitive wet plates might then be laid face downwards on these, and the exposure effected. In this way it was quite possible to get absolute sharpness. The lecturer then proceeded to explain and demonstrate the production of lantern slides by the Woodbury process. It was advisable, in mounting slides, to use the best glass obtainable. To guard against the glass being either too large or too small, he recommended workers to cut their own glass, which might be done with great accuracy by employing a cutting gauge. In the matter of masks it was advisable to suit the shape to the subject, more artistic results being then obtained. The lecturer then gave a practical demonstration of the production of a lantern slide by the wet collodion process, the development being effected by placing the exposed plate in a non-actinic glass tank in the optical lantern.

Owing to the lateness of the hour, the demonstration having occupied a considerable time, the discussion was adjourned. On April 26th a demonstration on enlarging will be given by Dr. Harrison Low and Mr. John A. Hodges.

Birmingham Photographic Society.

Usual fortnightly meeting of the above was held at the Club Rooms, Colmore Row, on Thursday, the 11th inst., Mr. W. Jerome Harrison, F.G.S., in the chair. There was a large attendance.

The minutes of the last meeting were read and confirmed.

Mr. Alfred Reading was nominated for election.

The meeting was then made special for the purpose of a lantern display by the lantern committee of the slides lent by the Birkenhead, Liverpool, and Ulster Societies. They were shown on a 12-feet screen by powerful lanterns, and with few exceptions proved very fine slides; they were much appreciated, and gained much applause.

Mr. B. Karleese (Vice-Pres.) moved, and Mr. E. H. Jaques (Vice-Pres.) seconded, that "The best thanks of the Society be given to the three societies who had kindly lent these slides," which was carried unanimously.

The Chairman announced the subject for next meeting—"Cameras and Appliances."

Derby Photographic Society.

The usual monthly meeting was held on Tuesday, April 9th, Mr. R. Keene presiding.

Mr. E. J. Lovejoy (Hon. Sec.) gave a demonstration on "Developing and Intensifying Gelatino-Bromide Plates," which was much appreciated by those present.

The first outdoor excursion of this season has been arranged for April 27th to Ashby-de-la-Zouch, where the members of the Notts Association will meet the members of this Society.

Newcastle-on-Tyne and Northern Counties Photographic Association.

The ordinary monthly meeting was held on the 9th inst., Mr. H. R. Procter in the chair. Mr. G. Proud was elected a member.

Mr. M. Auty exhibited a home-made hand camera to take half plates, which was much admired.

Mr. J. P. Gibson read an interesting paper on the "Intensification and Reduction of Negatives." A discussion followed.

The out-door meetings of the season were arranged as follows: Richmond (Yorkshire), Wooler and district, Warkworth, Howard le Perl, and Castle Eden.

Photographers' Benevolent Association.

At committee meeting held on 10th inst., after confirmation of the minutes of the previous meeting, the committee were occupied with consideration of an application for assistance, with result that a grant for the amount asked for was made.

The correspondence having been dealt with, it was reported that the action taken *re* the contributions to the proposed

Orphan's Fund had resulted in the following amounts being transferred to the general fund:—Photographic News, £21; Mr. H. M. Smith, Huddersfield, £10 10s.; Mr. F. York, £5; Mr. F. Bedford, £2; Mr. W. Bedford, £2; Messrs. R. and J. Beck, £1 1s.; and Mr. C. E. Elliott, 10s.

Camera Club.

On Thursday, April 11th, Mr. Valentine Blanchard gave an address and demonstration in reference to his platinum toning method. Sir George Prescott occupied the chair.

Previous to the lecture Mr. Noel-Cox exhibited two cameras, and explained their points, and the Hon. Secretary showed two ingenious bits of apparatus constructed by Mr. Webber—one an adjustable sky shade, and the other a series of pinhole apertures arranged very conveniently, so that any sized aperture from $\frac{1}{20}$ to $\frac{1}{80}$ of an inch could be used in taking diffraction photographs.

Mr. Blanchard, in his address, referred to the serious difficulties attending ordinary platinum methods of printing, particularly for artistic work, where it was so neeessary to see the printing throughout. Several well-known workers had expressed a desire for the production of his process. He then described his method of toning the plain salted silver paper with his special toning rolution, and went through the actual work, handing round the prints in the condition as taken from the frame, and at different stages in the toning, and before and after fixing. The processes generally were the same as ordinarily used with gold toning, Mr. Blanchard recommending a warm toning bath and rather concentrated solutions.

A discussion followed, in which questions were freely put to the lecturer. Additional interest was given to the demonstration by the exhibition of a large number of pictures printed and toned by the process, chiefly from collodion negatives. These showed in most cases a vigorous black colour.

On Thursday, April 25th, Mr. Seyd will read a paper entitled "An Old Printing Process Revived."

Society of Amateur Photographers of New York.

Lantern Slide Exhibition.

President Canfield, stationed near the screen, made a few preliminary remarks, and after the lights were lowered, announced the titles of the pictures. Mr. F. C. Beach, Mr. A. L. Simpson, and Mr. F. F. Cobb, of the Lantern Slide Committee, attended to the working of the lantern, while Mr. Charles Simpson acted as usher. The exhibition represented the work of about twenty members of the Society. There were so many fine views it would be difficult to particularize.

Talk in the Studio.

Photographic Society of Great Britain. – Technical meeting, Tuesday, April 23rd, at 5A, Pall Mall East, at 8 p.m.

"May an Operator Reasonably Expect a Reference from a Late Employer?"—The following letter was received too late for insertion under the heading "Correspondence": "Sir,—I should not think I had done my duty if I did not write and express my indignation at the conduct of Mr. W. J. Byrne, of Richmond, in refusing to give his late assistant, Mr. H. Bell, a reference. As I was in the employment of Mr. Byrne for over twelve months, I knew Mr. H. Bell, and I think all who have met the latter, and worked with him as I have done, will testify to his straightforwardness in business, and will feel surprised that J. H. K. does not know better than to refuse him an engagement through the vindictiveness of an employer.—I am, sir, yours obediently, S. Butler."

*** Everything relating to the Literary Department of the Photographic News, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," (but not letters intended for insertion under the heading "Correspondence") should now be sent to Mr. Spiller, who is alone responsible for all which appears under the heading "Answers to Correspondents." Failure to attend to the above instructions may lead to disappointment.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, Photographic News, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

J. Taylor (Toronto).—In addition to the names given last month, we are requested to state that all the photographic views and maps published in connection with the Palestine Exploration Fund may be had of Mr. Stanford, 26, Cockspur Street, Charing Cross.

Lanternist.—1. You should be able to obtain a 6 ft. disc on the further wall of the second room under the circumstances detailed. 2. To overcome any disagreeable smell arising from the Pamphengos lamp when worked in small apartments, it is recommended to mix with the burning oil a small proportion of oil of lavender, say half to one ounce per pint. The cheap French oil of lavender, which costs about one-third that of the "Best Mitcham," will answer the purpose.

Micro.—If you cannot get sufficient light to photograph through your one-eighth objective, try first the removal of the reflector, set the tube of the microscope in horizontal position, and employ direct lighting. In the event of this not succeeding, you must resort to a lime-light or small electric lamp.

Puzzled One (Shrewsbury).—Your print is not properly fixed, the silver not having been taken out by the hypo; try longer immersion—say ten minutes at least—or add a little carbonate of ammonia to the hypo, which should not be a weaker solution than four ounces to the pint. Have you used so much?

Yellow (Lowestoft).—See previous answer. Your seaside climate demands special care in the fixing and washing. Be sure to use enough hypo, and finish off in warm water. The reason of the better preservation of the prints kept in an album or in the dark may not be so much that the others have been affected by light, as that in the show-case they have been more freely exposed to sea breezes and damp air. A striking example of this difference has recently come under our notice, where, in a series of separately framed prints hanging side by side, one which chanced to have the glass broken turned yellow, whilst all the rest were preserved.

J. G. (Greenock).—In using a strong negative collodion for ferrotypes, especially as you say *new*, there would be great difficulty in getting half-tones in the lights. Try the addition of ether and alcohol to thin down the collodion, and use a more dilute developing solution. The silver bath need not then be stronger than thirty grains.

Alexandra (Redcar).—Highly-albumenized paper such as yours is sometimes liable to blister. The cure is to avoid too sudden transition from concentrated solution to pure water, or *vice versa*. You might transfer the prints from the fixing bath to a half-strength hypo solution, before putting them into the first wash-water. The use of an icy-cold (freshly mixed) hypo bath is said to cause blisters; if so, try warm water for dissolving the crystals.

Midlands.—The burner lighting tap is coming into general use for dark-room purposes. They are not expensive. Mr. Vevers, of Horsforth, Leeds, keeps them in stock, as do also nearly all the London dealers.

R. A. (Glasgow).—The Crystal Palace Photographic Exhibition closed last Saturday, but the prize lantern slides are still being shown on the great screen by Mr. W. Brooks. This display is unique as regards perfection of detail at a distance of over 100 feet from the lantern; the gases for the lime lights are stored in a pair of gasometers outside the building.

Postage Stamp.—Yes, there seems to be a demand just now for postage stamp portraits, and several advertisers are offering them at low prices. You cannot hope to compete without the special camera providing for at least twelve simultaneous exposures.

Flash-Light.—There are so many forms of magnesium light apparatus now in the market, that we should have a difficulty in advising you as to which is the best; probably Hart's or Leisk's for flash-light, and Fallowfield's or the "Optimus" for magnesium ribbon.

Insurance.—Apply to the North British and Mercantile Office, Waterloo Place, Pall Mall. The usual terms were stated to be 4s. 6d. per cent.

Adolf Jansson.—We do not know the camera about which you make inquiry, but will go and see it at the address given, and report to you next week.

Photo-Chemistry.—The price of Professor Meldola's new work is six shillings (382 pages), published by Macmillan and Co.

Enquirer.—Mr. Frieso Greeno gave his formula for orthochromatic solution (photographing red rays of the spectrum). See page 253 of last week's News. It is very possible that the acetic acid will destroy some of the cyanine, so you should try without it.

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THE PHOTOGRAPHIC NEWS.

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MR. C. WOLLASTON'S ARRANGEMENT FOR DETERMINING THE SPEED AND EFFICIENCY OF SHUTTERS.

At the last technical meeting of the Photographic Society of Great Britain, Mr. C. Wollaston described a very efficient, and by no means complex arrangement which not only accurately registers the total time of exposure given by a shutter, but also serves to record the length of time during which the shutter allows light to pass at any given point of the area of the lens.

In referring to the various arrangements in which irregular and uncertain movements have been proposed as standards for guaging the rate of shutters—such movements as the falling of bodies under the action of variable degrees of retardation by friction so as to render the ordinary laws of falling bodies altogether inapplicable—Mr. Wollaston intimated that a constant and uniform angular or rotary motion is almost the only available standard by which shutter speeds can be satisfactorily measured. Indeed, some years ago Mr. Arnold Spiller insisted on the same point when he suggested the use of a bright or light hand or index rotating on a dark dial, this being photographed with an exposure given by the shutter to be examined.

The apparatus for giving a constant rotation of known speed shown by Mr. C. Wollaston consists of a disc which carries a circular sheet of sensitive bromide paper, this disc being in a case which is equivalent to a dark slide; the disc being turned by gearing outside the case. With the gearing on the instrument shown by Mr. Wollaston it multiplies four times; the larger wheel being provided with a crank handle. A clock or metronome being now set to tick at a convenient rate—four times a second in this particular case—the crank handle is turned by hand, so as to keep time with the clock, a very easy matter indeed, especially if a little piece of spring brass is arranged to click over a pin at each turn of the crank. Under these circumstances the disc in the dark case rotates sixteen times in a second, this corresponding to an angular movement of sixteen times 360 degrees, or 5,760 degrees per second; a rate very well suited for ordinary measurements. The revolving disc used by Mr. Wollaston is about six inches in diameter.

In the front of the case containing the rotating disc bearing the sheet of sensitive paper, there is an aperture corresponding to the area of the shutter opening, and this hole is closed by a plug perforated with a row of small holes, the plug being so placed that the line passing across the holes corresponds with the radius of the disc. If, now, the shutter to be studied is mounted in front of the plug, a source of light being placed in front of the shutter, and the disc is now rotated at the specified rate, the time of exposure at each hole in the plug is recorded by an arc on the sensitive surface, which arc subtends an angle corresponding to 5,760 angular degrees for each second of time during which the exposure lasts; it being, of course, obvious that with the rotation-speed specified no record of more than 360 degrees, or one revolution, can be obtained, this corresponding to a time of one-sixteenth of a second. The apparatus, therefore, as now supposed to be in action, is arranged to record shutter exposures of one-sixteenth of a second or under; the exposure being determined when 5,760 is divided by the number of degrees in the angle subtended by the arc recorded on the sensitive paper, and then taking the number so obtained as the denominator of a fraction having the numerator 1. Thus an arc of one degree would correspond with an exposure of $\frac{1}{5760}$ of a second, although we need scarcely say that the mechanical arrangements in general use for shutters are quite unable to give so short an exposure; indeed, the shortest time Mr. Wollaston has recorded with his diaphragmatic shutters was, we understood him to say, about $\frac{1}{350}$ of a second, an exposure which would correspond with something between 16 and 17 degrees of rotation on the part of the disc.

When an exposure made by a shutter opening from the middle and closing to the middle is analysed by Mr. Wollaston's apparatus, it is interesting to notice the difference between the exposure at the centre and that given at the edges of the field, and a comparison of the records thus obtained with records of the action of a go-and-return shutter, or a simple drop-shutter, at once makes clear the practical advantages of the diaphragm form.

Mr. Wollaston exhibited a number of records made by various shutters; the angles inscribed in figures on the paper, and the various data were calculated out; and as he expressed his intention of continuing the work, we need say no more at present.

FRENCH CORRESPONDENCE.

UNIVERSAL EXHIBITION — INTERNATIONAL CONGRESS — FRENCH PHOTOGRAPHIC SOCIETY — PHOTOGRAPHS IN DIRECT COLOURS—DEVELOPMENT DURING EXPOSURE—PHOTOGRAPHIC SINGLE EYEPIECE—AQUEOUS VARNISH—AUTOMATIC PHOTOGRAPHY—COLLODION WITH ACETATE OF AMYL—PRACTICAL STANDARD OF LIGHT.

Universal Exhibition.—We are rapidly approaching the time for the opening of the Universal Exhibition, which promises to be very beautiful, and to yield in no respect to those which have preceded it in the Champ de Mars. The work of installation is superb and truly grand, without speaking of the famous tower, which everyone has already seen—at least, in effigy. The machine department is really worthy of admiration, and, in addition, everything is very handsome. The two palaces of fine arts and of liberal

arts have been planned as if with the ulterior idea of erecting permanent structures there; they are certainly vast, and will be filled to overflowing. Class XII. notably —which is that including photography and photographic apparatus—occupies a magnificent place in the palace of the liberal arts, but one quite insufficient to satisfy the applications for space, although the amount demanded has been cut down by one half. Fifty metres linear would, in fact, be required to display the works of those whose applications have had to be refused from not having sent in within the specified time. It is in this palace that will be found all the international photographic exhibits. England and the United States have already sent in numerous contributions, which we have seen beside the French photographic section, and particularly noticed the extensive and doubtless very interesting collection of the Eastman firm. The day for opening remains settled for the 6th of May; but that is far from proving that everything will be ready by that time. The fact is admitted on all hands that the Exhibition cannot be ready. Everyone will hasten, and towards the end of June it will be in full swing. Up to the present, nothing indicates the presence of photographic novelties of the first rank; but we shall certainly have a magnificent collection, representing the present state of photographic science, and of all the most beautiful applications of the art.

International Congress on Photography.—The preparatory labours of the International Congress of Photography are pursued with great activity by the commission of organisation; the several sub-committees charged with the study of the projects, and resolutions to be submitted to the discussion of the Congress, have nearly if not quite finished their work; there is, however, much yet to be done by the sub-committee on the standards of unity of light and others, where it appears to be difficult to arrive at any truly satisfactory result. We shall be under the necessity of contenting ourselves with incomplete solution, provisionally at all events, and perhaps something more complete will issue from the discussion by the Congress itself. The list of foreign associates has been settled and officially published; they include from England the names of Capt. Abney, T. Bolas, Christie, Common, Davison, Dallmeyer, England, Gill, Glaisher, Grubb, Harrison, Huggins, Knobel, Lang, Isaac Roberts, Robinson, Ross, Russell, Spiller, Gen. Tennant, Traill Taylor, Trueman Wood, and Col. Waterhouse—certainly a fine reunion of the select, which in itself promises very useful results if the greater number of them should actively participate in the work of international agreement that the Congress has to pursue. The associate members belonging to other countries consist, like the British members, of a most successful selection, calculated to guarantee the solid and truly scientific character of such a group.

French Photographic Society.—The last meeting of this Society presented nothing remarkable; the inevitable hand camera was produced, that of M. Lansiaux well constructed by M. Sermaisse. Unfortunately, it may be said of this instrument, as of so many of its congeners, it is not sufficiently portable. The angular cubical form of such cameras as the present one renders them awkward to carry about. If it is intended that photography should be in current employment, the necessary appliance should be a real *vade mecum*, such as might be carried without fatigue or embarrassment. These conditions are, unfortunately, not fulfilled with the greater number of detective and hand cameras, and one cannot move about with one of them without showing an ostensible something. The ideal notion is to be furnished with a photographic pencil without being evidently armed for warfare, even with a weapon of such a peaceful character as a photographic camera.

Photographs in Direct Colours.—M. Vallot, a very distinguished photographic amateur, has repeated Poitevin's experiments relative to the obtaining of images in natural colours on paper; this depends, as is known, upon the violet sub-chloride of silver. M. Vallot thought that he could utilise a coating of sulphate of quinine to which a little tincture of saffron has been added, in order to preserve the polychromatic images from the action of light for a longer period than customary. He exposed simultaneously to luminous rays two halves of the same photograph, one half of which was treated with the preservative just mentioned, and the other half not so treated. After two days' exposure the protected half remained intact, whilst the other was entirely faded. We possess specimens of the interesting trials of M. Vallot, and these will enable us to verify whether the effect claimed by him is real, and capable of more extended duration. The absorptive properties of sulphate of quinine with regard to light are well-known, and it is on account of its qualities in this respect that it has been chosen. The addition of the tincture of saffron is only made on account of its yellow colour, but this involves a disagreeable yellow colouration of the image, which appears to be bathed in this dominant tint. It seems to us that the experimenters dally too long on the repetition of experiments that are always the same. What the violet sub-chloride of silver gives is known; it has been proved that its remarkable property of undergoing transformation under the influence of coloured rays into analogous colours leads to nothing, in fact, but the reproduction of the solar spectrum, and that with very great attenuation of the vivacity of the tones. Why not break off decidedly from this path, which is only a blind alley? It is very probable that it will be with quite another compound that the solution of the problem will be made, if, indeed, this should ever be successfully performed.

Negatives Developed during Exposure.—M. Tondeur has again shown negatives developed during the camera exposure. He contents himself, in order to obtain this result, with immersing the plate in hydrokinone developer and draining it, then he exposes it in the camera. If the time of exposure is sufficiently long, the development is completed simultaneously; if, on the other hand, the negative has been taken instantaneously, it must be left the necessary time for development. What escapes us for the moment is, the practical application to be made of this method of action. However this may be, it is well to take notice of everything fresh, the question of application being one ulterior to that of the possibilities that may be in store.

Photographic Single Eye-piece.—The same investigator counsels the use of a single eye-piece formed of a plate of blackened metal, pierced in its centre with a very small hole. According to him it serves as a very simple auxiliary for recognizing the more or less actinic character of the luminous rays. This statement appears to us to require solid verification; without denying it at first sight, we want to be assured of the exactitude of such an assertion before yielding absolute credence to it.

Aqueous Varnish.—The water varnish presented by Mr. Schauffner offers the advantage that it may be flowed over the plate whilst it is still wet. An important gain in time thus results.

Apparatus for Automatic Photography.—Mr. Enjalbert, who has already furnished proofs of his ingenuity in contrivances, has worked out a very curious automatic apparatus, in which all the operations are mechanically effected by an electro-motive engine. This apparatus is prepared for the Exhibition, where it will be seen in work; but we have been favoured with an opportunity for inspecting it and seeing it in action. It is certainly a marvel of ingenuity. The apparatus is started by placing a 10 centime piece in it, and the subject having placed himself in the prescribed place, a ferrotype plate is coated with collodion, bathed, and adjusted to the focus of the lens, when the exposure is made. It is then led into a developing solution, fixed, and washed, and in a very short space of time the portrait comes out of an opening in the machine, accompanied by a small frame in which to place it. The ingenuity required to work out all these operations auto-

matically is truly astonishiug. An automatic apparatus of another kind connected with photography, which will be seen at work in the Exhibition, is one for carbon printing, by M. Teyssandier. In this apparatus the action of light is made to affect a mercurial index; after a certain amount of exposure to the luminous rays an electrical contact is produced, the effect of which is to looseu a catch connected with an appliance for stopping the exposure and bringing a fresh surface forward to be, in its turn, acted upon by light. It remains to be seen how this remarkable apparatus will perform its functions; it will certainly be one of the curiosities of the Exhibition.

Collodion with Acetate of Amyl.—The Photographic News published on the 8th inst. a very interestiug letter from Colonel Waterhouse on "Collodion with Acetate of Amyl." This product cannot fail to attract attention, especially at a time when pellicular films play such an important part in our art. Thanks to this collodion, we may in fact obtain very solid films which appear to be quite impermeable by water. To the suggestions that have been already published, it may be added that acetate of amyl being much less volatile than ether and alcohol, a much longer time must be allowed for the desiccation of the film of the collodion now in question. We should deceive ourselves if we thought to obtain a film in the same manner as with ordinary collodion, by pouring it upon a plate and allowing the excess to run off immediately. In the case of acetate of amyl collodion, it is necessary to carefully level the plate which has to bc coated, then the collodion is poured on to the thickness that is deemed desirable, and it is allowed to dry. According to the temperature, desiccation is completed in from twelve to twenty-four hours. This inconveuience of lengthy drying is partly remedied by using a mixture of equal parts of ether, rectified alcohol, and acetate of amyl. The collodion made in this manner dries much more quickly, as the two solveuts—ether and alcohol—are so much more volatile than acetete of amyl, and the collodion still retains the peculiarities which distinguish the acetate of amyl collodion from that made in the ordinary way. This preparation is worthy of serious study, and our thanks are due to Colonel Waterhouse for the indications which he has furnished in regard to it.

Use of a Practical Standard of Light.—It appears probable that the star candle will be the standard adopted by the committee of organisation of the International Congress of Photography as constituting the best practical standard of light; this being admitted, it has yet to be known what purpose will this standard serve. Doubtless, it will be employed for the comparative determination of plates of different makes; but in this case, for instance, how can such a comparison be arrived at? In principle everyone is agreed in recognising the impossibility of having everywhere and at all times absolutely identical scales for comparison. To give one instance, take the sensitometer of Warnerke: it is admirably executed, but no guarantee can be given of the perfect comparability of any two of these scales; a control for correction is wauting; therefore, for comparative observations, one is inclined to ask for the direct action of light upon uncovered plates, without the interposition of any graduated screen or scale. Having been charged with making delicate trials of this nature, we quickly found that iu order to obtain results capable of reaching the desired end, it was necessary either to work at a great distance from the candle, and in a very short time, or else to work with au opaque screen concealing the source of light itself, and employ only the diffused rays. The best plan appeared to us to be to avoid the comparison of tints, which is a very difficult matter; it is, on the other haud, very easy to verify at what length of time the luminous action begins to reveal itself, after successively exposing zones of the plate for periods of 5, 10, 15, 20, 25, &c., up to 60 seconds. This set of exposures being made, and the plates developed, if one of them reveals an action at the 15 second zone, whilst another does not show anything under the 25 second zone, we conclude that the inferior sensitiveness of the latter plate is evident, and there only remains to calculate the proportional differeuce. We indicate here ouly the principle of the method that we have studied with the idea of proposing it to our eminent colleagues of the preparatory commission, whose opinion may entirely modify our proposition. In any case, however, this is is one of those questions upon which it will, perhaps, be difficult to arrive at an absolutely satisfactory solution, but which it is, nevertheless, desirable to study without discouragement, because it appears possible, if not easy, to arrive at a method of satisfactory comparative experiment, even if failing to fulfil the desirable conditions of scientific rigour. We shall have occasion to return to the subject when reporting the solution that may be arrived at.

Leon Vidal.

PHOTOGRAPHY IN GERMANY.

BY HERMANN E. GUNTHER.

Photography on Wood—Fog with Bromide Prints—Photography and Weather—Photographing an Artillery Projectile—Jubilee Exhibition at Berlin—Phototypography.

Photography on Wood.—To conclude from the frequent questions for a reliable method of printing on wood for the purpose of wood engraving I receive from professionals and amateurs of this country, this branch of photography seems to be more generally used at the present time than before. I am, therefore, always glad to find a new formula which I can test on its practical usefulness. The following method, taken from the *Revue Photographique* (translated in the *Photographisches Archiv*) can be recommeuded as a good one:—8 grammes of gelatine are soaked in 500 c.c. of water, dissolved on a water bath, and 8 grammes of white soap are added to it gradually, well stirring all the time. The mixture is filtered through muslin, a little zinc white added to it, aud then rubbed well into the wood block and allowed to dry. The film should be as thin and even as possible. Whcu dricd, the following solution is applicd to the wood by the aid of a broad brush:—

Albumen	30 grammes
Chloride of ammonia	1·2 „
Citric acid	0·2 „
Water	24 c.c.

The albumen is beaten up to a froth, allowed to settle, and then is added the water, the chloride of ammonia, and the citric acid, exactly in order giveu here. When dry the film should be sensitized by pouring on the following solution, spreading it with a glass rod:—

Nitrate of silver	3·2 grammes
Water	31 c.c.

The excess of this sensitising solution is poured off and allowed to dry again. Printing is effected as usual in the printing frame. It is not necessary to over-print. When sufficiently printed the wood block is held with its surface for three minutes in a diluted solution of common salt. The print will become only slightly paler in it. Wash and fix for four or five minutes in a concentrated hypo solution, wash again for ten minutes in running water, and allow to dry.

On the Cause of Fog with Bromide Prints.—Dr. F. Stolze, editor of the *Photographisches Wochenblatt*, has recently made some interesting experiments on thc development of bromide prints, which have confirmed the fact that if bromide prints are soaked in ordinary water before developing, the constituents of this soaking water will generally give rise to fog, at least if freshly mixed ferrous-oxalate developer is employed. If the developer is allowed to stand for about five minutes in the dish before use, or if it is mixed with one-third of old ferrous oxalate solution, it

will give perfectly clear prints, even if they are soaked in ordinary water. Neither will fog appear if distilled water is used for soaking instead of ordinary water. Dr. Stolze suggests, therefore, to mix the fresh ferrous-oxalate developer with about one-third of old ferrous-oxalate solution in cases where the prints are to be soaked in ordinary water, and then developed with the freshly-mixed solution, or to add to the saturated ferrous sulphate solution (to 1 part of which is added $\frac{1}{1000}$ part of tartaric acid) $\frac{1}{150}$ part of acetic acid, and to the mixed developer (consisting of five parts of a saturated solution of potassium oxalate and one part of the mentioned saturated ferrous sulphate solution) 10 drops of potassium bromide solution. In cases where the size of the prints to be manipulated does not exceed 9 by 12 inches, it is, of course, best to entirely omit the soaking before the use of the developer, as then fog is never to be feared.

Photography applied to the Prediction of the Weather.—With regard to the accident which has occurred to the German Navy at Apia, it might be advisable to refer once more to the theory of Dr. Zenger, of Prague, who suggested, as it will be remembered, to make use of photography for the prediction of the weather. According to the doctor, photographs of the sun taken on orthochromatic plates offer a most infallible means to indicate with almost absolute certainty the approaching atmospheric and subterranean disturbances at least twenty-four hours before their setting in. In these photographs zones are often to be seen around the sun's disk—*i.e.*, rings of circular or elliptical form, of white or greyish colour—and if these zones appear of very large diameter, and of unusual heaviness, this indicates that violent storms, thunderstorms, or magnetical disturbances will soon set in at the place of observation. At every ships' station should therefore be established a small photographic laboratory, in which photographs of the sun could be taken as often as possible. A much more reliable prediction of the weather would be afforded by this means than by the aid of the barometer now generally in use for this purpose, and precautions could therefore be taken in good time.

Photographing an Artillery-projectile in the Course of its Flight.—Mr. Ottomar Anschutz, whose name is so well known to all who take notice of the progress of instantaneous photography, has recently successfully tried to photograph an artillery-projectile in the course of its flight. The experiments were made at Burkan, near Magdeburg, on the shooting-place of the works of Mr. Gruson, and though the locality was not at all favourable to the experiments, the place being too small for the purpose, Mr. Anschutz nevertheless succeeded in taking quite a sharp picture of the flying projectile. I have been favoured by Mr. Anschutz with a sample of this highly interesting photograph, and I hope to give a reproduction of it with my next letter. With regard to the fact that the rapidity of the flying projectile was 1,275 feet the second, the time of exposure must of course be an incredibly short one, it amounting to 0·000076 seconds, according to the exact estimates made with a Siemens' spark-chronograph by Dr. Arthur Kœnig, lecturer at the university of Berlin. The releasement of the instantaneous shutter was done by the projectile itself, which in the course of its flight broke a wire network, and by the interruption of an electric current effected by this, released the shutter of the camera. On this occasion it may be mentioned that Mr. Anschutz is about to introduce to the trade his small instantaneous camera, with which he has taken most of his excellent and well-known instantaneous photographs.

A Photographic Jubilee Exhibition at Berlin.—To celebrate the fiftieth anniversary of photography, the Berlin Amateur Photographic Society are arranging a jubilee exhibition, which will open in September and close in October of this year. It will be divided into five classes, embracing all branches of photography—historical, technical, and scientific—and promises to become a very interesting exhibition, as applications for space have already arrived from all countries. Her Royal Highness the hereditary Princess of Saxony-Meiningen is patroness of the exhibition. Applications for space are to be directed, before the 31st of May, to Dr. W. Zenker, Berlin, W., Bülowstrasse 5, Hof I.

Phototypography.—To the many establishments of this country in which photo-engraving has found its home, belongs the art establishment of Mr. Edm. Gaillard, of Berlin, S. W. Lindenstrasse 69, in which blocks for surface printing from line drawings, as well as letter-press blocks in half-tone direct from photographs from nature, are produced with great care and skill. As a sample I refer to a print which will be of special interest to the readers of the Photographic News, as it represents the portrait of one of the ablest contributors to the literature of photography—Mr. W. K. Burton, now professor at Tokio. The portrait was reproduced by Mr. Gaillard from a silver print taken from a negative by Mora, of New York.

LIGHT AND COLOUR.

BY CAPT. W. DE W. ABNEY, C.B., F.R.S.*

LECTURE III.

My first business to-night is to show you the third constant of colour. You will recollect that I told you that the hue is one constant, the luminosity of colour the second, and that the third is the purity of colour. The purity of colour is that which is, perhaps, the most difficult to measure, but not so difficult to describe. No colour is pure unless it is unmixed with white light. I propose to show you how you can get colour so impure that eventually the colour will entirely disappear, and will leave to your eyes only the impression of white. I think my first experiment will very likely demonstrate this.

The apparatus is exactly that which you saw before—viz., the colour-patch apparatus. I am only allowing a small beam of light to come through the prisms, to get a small round patch on the screen, instead of the big white patch square to which you are accustomed. Now, supposing I pass the slit in the card through the spectrum, that patch becomes coloured with any of the colours with which I wish to experiment. The reflected beam gives us a large square of white light, which I superpose over the small coloured patch. Let us see whether we can extinguish that coloured light or not. I may take red, green, or blue, and then if I place the rotating sectors in front of the coloured beam you will see that by making the coloured patch fainter it will entirely disappear. This is the case whether we have a blue, red, or a green patch. That the colour is still present I can demonstrate by cutting off the white light when you see the colour on the screen.

The lesson I wish to inculcate is this—that the blue, green, and red which you saw disappear, and which were mixed with more and more white light, are essentially impure colours, and most impure where the white light is strongest. It was by this method that originally the luminosity of the spectrum was measured. It was seen how much white light it took to extinguish a colour on a screen, and according to the white light it took, so the luminosity was supposed to be proportional to it. To my mind it is not a very satisfactory way of testing luminosity, and I think the way I showed you in the last lecture is far preferable.

There is another deduction I want to point out with reference to this, which is of importance to artists. In water-colour painting it is well known that in order to get what artists call a certain amount of warmth in the picture, a wash of yellow ochre is very often given to the white paper before it is worked upon. Those of you who are water-colour painters know very well that although you may appear to have a wash of water-colour on the paper when it is moist, yet when it is very dry apparently there is nothing but white left behind. The colour is so diluted with white that it does not appear to the eye, but the colour is there all the same, and if you increase but slightly the amount of pigment the colour will be visible. All the colours you place on that apparently white paper mix with the yellow ochre. Remember, then, that if you have a wash of water-colour on a sheet of white paper, and it does not appear to the eye, yet

* *Journal of the Society of Arts.* Continued from page 71, P.N.

bsequent washes of any colour will bring out that colour, and the case of yellow ochre will give that warmth which artists often desire to have upon their sketches.

Now, then, as to the question of diluting one colour with nother. We have, so far, only diluted a pure colour with white ght; but in diluting one colour with another we enter into a gion which has been traversed by a great many experimenters, mongst others by Clerk Maxwell and Lord Rayleigh, and there an immense amount of interest in the results which have been btained. Some of them I hope to show you in as simple a anner as I possibly can. But I want you to recollect that one n only touch on the fringe of the subject, as it were, in an our's lecture.

Let me pass some slits through the spectrum of this patch-rming apparatus. First we have a patch of white light, and y a simple means I propose to show you what colours come hrough the slits placed in the spectrum. If I put another lens n front of the big lens, which condenses the spectrum to form he white patch, you will find I can get the spectrum itself irly defined upon the same screen as that on which the patch formed. The second lens in reality produces an image of the rst spectrum which was formed on the focussing screen. Now ppose I pass a series of slits through this, you will see the ind of light I am going to use. I have here two colours, and will show you what is the effect of blending those two—blue nd red—together; I have only to remove this lens, and we see u orange patch; I will allow another colour to come through a hird slit (the card has several), and replacing the small lens we ee the three colours. If I blend those three I get a green, and o I may go on blending the colours by passing more slits hrough the spectrum. Here I have four, and I daresay we hall get a different result again—still it is a green. Perhaps ne of the most interesting ways of showing colour mixtures s to take away both lenses, and let different parts of the spec-rum pass through the slits, and paint itself upon the screen. Ve begin with the red, and here we have a red patch. Then I dd yellow, which forms orange, and then I shall add a third patch, nd pink is formed, then green and blue by adding others, until ve get nearly a white light in the centre; so I can keep passing hese slits through the spectrum, and get many varieties of olour.

Thus we see it is not necessary to have the whole spectrum in rder to get certain coloured lights. All we have to do is to ake certain portions of the spectrum, and if properly chosen heir combination gives us what we call a white light. For xample, I wish to show a crucial experiment. I believe every rtist will tell you that the combination of blue and yellow gives green. Now I want to demonstrate that blue and yellow do not give you a green in accordance with the artist's notion, but omething totally different. I form my white patch on the screen, as before, and by means of the small lens set a spectrum on the screen, passing through the spectrum two slits, cutting off in the one case all the spectrum except the yellow, and in he other all except the blue, which you see on the screen, and hen removing the small lens, instead of getting green we get white. You have seen two parts of the spectrum which must be combined in order to give white. In other words, blue and yellow give white, not green. This is a crucial experiment, because on this is based a great deal of the theory of colour mixtures, and I want you to bear that in mind.

I would once more ask you to remember that the eye only sees three colours really—viz., red, green, blue—and that all the other colours which are seen by the eye are composed of two or more of these three colours. There is a very little blue in the extreme red end of the spectrum, and a very little red in the

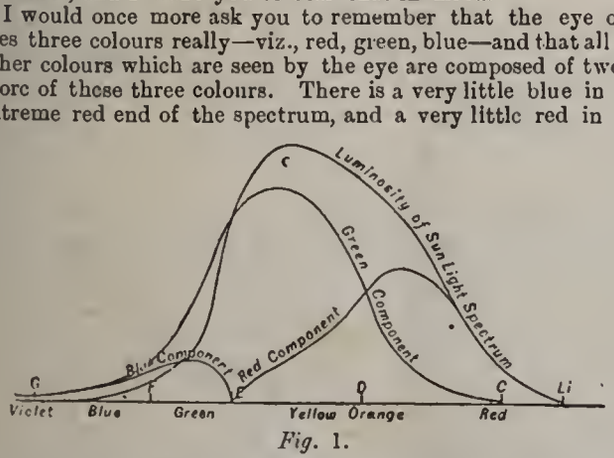


Fig. 1.

extreme violet. This is according to Clerk Maxwell. I told you the luminosity of the spectrum was greatest in the green. In the diagram (fig. 1) we have the luminosity curve on a normal or wave length scale; the maximum luminosity is therefore a little bit more towards the violet end of the spectrum than in the prismatic spectrum; the red component, the green component, and the blue component of the luminosity of white light are shown in the diagram. These three luminosities together make up the luminosity of the spectrum of white light. The blue, you will notice, has but little luminosity compared with the green and the red. The luminosity in the green is far greater than any of the other two sensations. This I wish to get firmly impressed in your minds, noting that the blue is a much less important colour than green or red; in other words, it is far preferable to be colour-blind to blue light than to green or to red light. This, of course, is founded on Clerk Maxwell's theory, and is derived from my own measurements. I think the researches which General Festing and I have made bear out in a very great measure, although they differ in some respects in detail, the results which Clerk Maxwell himself got. It may be said that we have been dealing with spectrum colours, and not the colours of every-day life. Is it possible that if you are not dealing with pure colours that yet you get the same result? The answer to this question I will give by experiment in a very simple manner, and we shall see that we do get the same result whether we are using the colours of pigments or the simple colours of the spectrum. Recollect there were only two rays combined to form white in the experiment I showed, whereas in the colour of a pigment you may have a great many colours combined, although they give the sensation of one colour to the eye.

The electric light illuminates a circular aperture, behind which is ground glass, and by a lens I can throw an image of this aperture upon the screen. Instead of a simple lens I have here a lens which is divided into two halves. The centre of one half lens is raised slightly above the other. Now every portion of the lens will give an image by itself, and therefore each half of

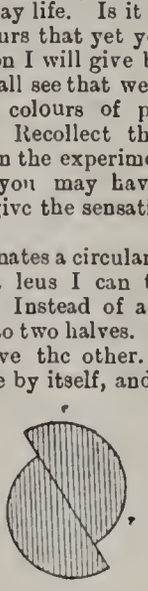


Fig. 2.

the lens will give a separate image, one overlapping the other. Thus on the screen we now have two images of the aperture which is in front of the lantern. If I put a piece of yellow glass in front of one half of this lens, I form a yellow disc, and if I put a piece of blue glass in front of the other I form a blue disc, and where the two overlap you have the real colour which a mixture of the blue and yellow lights will give. You can see that yellow and blue do not make green, but white.

But the artist, after all said and done, is not wrong in one way, because he often mixes his pigments together, and not the colours of them. Supposing I put the yellow glass in front of the aperture, I then get two yellow discs; if the blue glass be placed in front of the yellow glass, however, I get two green discs. The artist, after all, when he mixes his pigments in that way, is not wrong. In other words, he does get green when he mixes blue and yellow together, but he is wrong when he mixes the light coming from each separately.

Now let us see why this is the case. I must come back to my spectrum, to which we have always to refer when we are dealing with colour. I will put the two pieces of glass successively in front of the light passing into the slit, and ask you to notice what happens. With the blue glass a great deal of red is cut off, and a good deal of yellow; the blue is nearly as bright as it was before. If I substitute a piece of yellow glass for the blue, the blue is cut off, and the green left almost as bright as it was before, and the yellow and red are also left. In the one case, recollect, we had the blue and the green left, and the red cut off. In the other case we had the blue cut off, and the green and the red left. If we take one from the other we get the green left, so that if I put these two glasses together in front we ought to get the green left, which is the case. Now if I take away the small lens from the front of the big lens, and form a patch, we have that patch of the same green which you saw in our previous experiment. Here, then, we have the combination of blue and yellow making up the green. Now for one more experiment in relation to this. If a blue disc and

a yellow disc he rotated together, and if what I have said be true, instead of forming green they ought to form grey, *i.e*, degraded white. Let us see whether it does so. The two discs are now rotating, and we get what is not, at all events, far from grey. Thus, in every case we get a blue or a yellow forming a grey or white under certain conditions, that is to say, when the blue and the yellow are each presented to the eye separately.

Now, I shall have to show you why it is that when they are not presented to the eye separately they form the green. This is a yellow chromate solution in a cell. I place the chromate solution in front of the lantern; the yellow light falls on the blue sector, which is now at rest, and we have a green. The yellow is almost unaffected, but there is no doubt about the blue becoming green. Prussian blue used in a similiar manner leaves the blue sector nearly unaltered, but the yellow has now become green. If I take a still darker blue, the green becomes more pronounced than it was before. You recollect I proved to you, or tried to do so, that it did not matter whether a pigment was next to the paper, or away from the paper, so long as it was in front of the source of light. Now in the case before you, when you mix yellow and blue together, as an artist mixes pigments, you have one particle of yellow, say, in front of a particle of blue, and, therefore, the light which passes through the yellow is that which reaches the blue particle, and that they both absorbed I showed you in the spectrum. The yellow absorbed in the blue alone, and the blue absorbed in the yellow and red; green rays would, therefore, only come through the two.

For the same reason, when I held the yellow glass in front of the beam of light, the blue became green, simply because the yellow glass blocked out the blue, and the blue particles on the paper only allowed the green to pass through. This exemplifies again what I told you, that it does not matter where you have your colouring matter, whether it is miles away from the paper, or absolutely in contact with it, so long as it is between the source of light and the paper itself. But artists, whether they do so knowingly or not, employ both methods of mixture of colour. We know perfectly well that gamboge and indigo are a very favourite mixture for greens; but, on the other hand, you will find that in some of the most beautiful works of art broad washes, to obtain light and shadow, are not adhered to, but, as in the execution of portraits, stippling is resorted to. Now stippling means that different colours in fine dots are placed close to one another, so close that the eye cannot separate them, and the colours blend one into the other. Thus, if you have, for instance, a great many yellow dots distributed amongst a great many blue dots, the result is exactly the same as you saw on the screen—viz., instead of getting a green, the general effect is a grey. This is the whole principle on which stippling depends—viz., the juxtaposition of very different colours to give an effect which otherwise cannot be obtained. Now, the explanation may be new or it may be old, but from having examined a large number of stippled water-colour drawings, one can only come to the conclusion that where many of the tender greys which are often seen are simply due to the fact that you have two or more colours in dots and fine lines in juxtaposition one to another, which colours, when combined in a rotating apparatus such as you have seen, give the effect of grey to the eye.

I must now repeat the experiment with which I began my series of lectures, viz., that three colours will give you white; and I think that this will be a proof—at all events, a minor proof—that the three sensations which the eye distinguishes are green, blue, and red, and not yellow, blue, and red, as used to be thought. Here we have three colours rapidly rotating, and those three brilliant colours give the sensation of white. What proof is there in this that the three primary colours are red, blue, and green? Recollect that I showed you just now that blue and yellow made white, therefore red and green must make yellow. Is that the case? If that be the case, I think the point is proved. Let us see whether such is the case. We will go back to our apparatus consisting of the half-lenses. There is a reddish glass in front of one half-lens, green in front of the other half, the part of the discs which overlap is yellow; hence red and green make yellow. We have already seen that blue and yellow make white, but it takes red, green, and blue to make white; therefore yellow is equal to red *plus* green.

Let me further show this. I have a lens in front of the lantern which forms a slightly larger image of the aperture than before. Cemented alongside one another I have three coloured glasses—green, red, and blue. These, when placed in front of the lens, and in close contact with it, will, with a little manipulation, show a disc of light, something approaching white. The three colours combine to give this result.

I am next going to show you how we can get complementary colours. A patch of white light is now upon the screen by means of our much used apparatus. I have a card in which is cut a wide slot to allow the whole spectrum to pass through, and suspended from it is a little prism, which will cut off a certain amount of the spectrum. The part so cut off will be reflected on to a mirror, and by means of a lens, will form a patch on the screen. The rest of the spectrum will go through to the lens, and form another patch of white minus the colour reflected. The two patches when super-posed give white, but a rod placed in the front give two complementary colours side by side. The complementary colour is that which with the colour itself will give white. I will cut off the different parts of the spectrum, and you will see the real complementary colour. On cutting out the different colours you will notice I get almost every variety of hue, and the colours complementary to them. This seems a very simple way of getting complementary colours, and I think it is instructive, as at the same time it is seen that the background, where two overlap together, is white.

The next point we come to is one that is very germane to our subject, and that is how are we to measure the intensity of pigments in any satisfactory way? As far as I know, a paper which General Festing and I recently read before the Royal Society explains, the only method which has been satisfactory, so far, and I hope to show you how that is done.

The desideratum is to compare the intensity of any colour of the spectrum which is reflected from any pigments with that which is reflected from a surface of white paper. When you get that you know exactly the colour value of the pigment, and by certain methods which I shall show you bye-and-bye you can at any time make upon the screen without a pigment the exact colour of the pigment you have measured. In order to take these measurements it is necessary to have two similar spectra one above the other, and this we get in the following manner. Upon the screen a lens forms an image of an aperture placed in front of the lantern. Where the rays passing through the lens cross, I put what is known as a double-image prism, and by it we get two discs of light, which will rotate round a centre as the prism is turned round its axis. This double-image prism is of Iceland spar, made by Mr. Hilger with his usual ability. It gives us the means of at once getting two spectra one above the other having exactly the same quality of light.

In contact with the lens of the collimator, as it is called (which makes the rays which strike the prism parallel), is placed the double image prism; we thus get two sets of parallel rays, one set inclined at a slight angle to the other. Two spectra are formed by the prisms, one above the other, and separated by a breadth of about one-eighth of an inch. Passing a slit

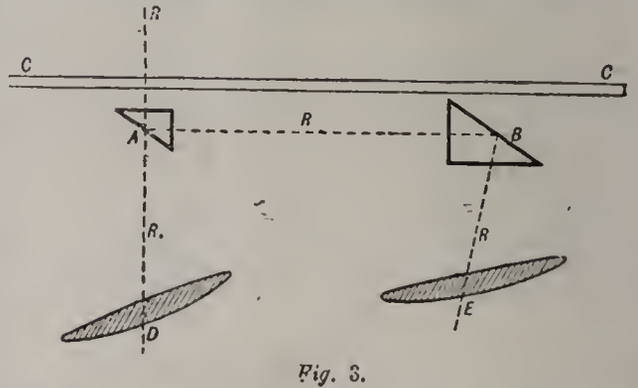
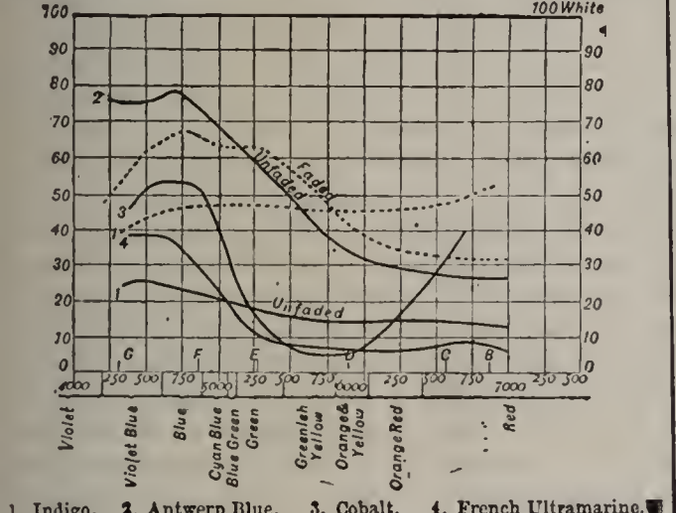


Fig. 3.

through those two spectra, the same colour is cut off from each when the double image prism is properly in adjustment. To the card, C, in which the slit is cut, two right-angle prisms are attached, as shown, and so adjusted that the beam, R, from the top spectrum is reflected first by the prism A, and then by the prism B, on to the screen. A lens, F, of about two feet focus, in front of B, makes a coloured patch on the screen, overlapping a patch of the same colour formed by the lens D, which comes from the bottom spectrum. By this means we get a parallax of lights of exactly the same colour, one from the bottom spectrum, and the other from the top spectrum. A rod placed in front of the patch will cast two shadows, one illuminated by one spectrum, and the other by the other. The colour which

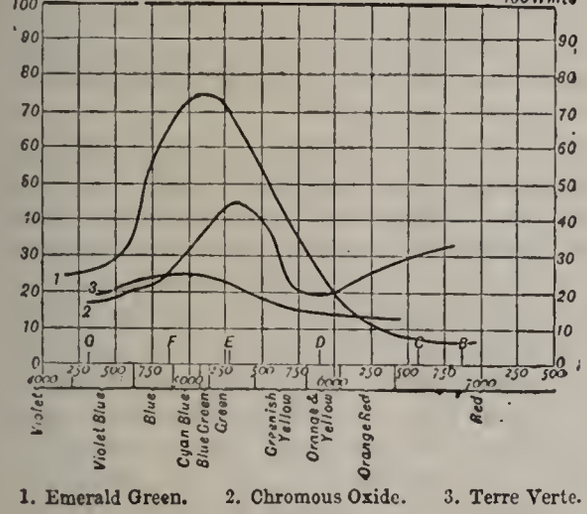
propose to measure is on this card, one half of which is ange, and the other half white, and is surrounded by a black ask, In the left hand shadow is the white card, and on the ght hand is the colour which we wish to measure. In front the beam which illuminates the shadows cast on the white rfaces are placed the rotating sectors, and by altering their erture I can make the two coloured shadows of exactly the me intensity. Stopping the motor, the angular aperture is ad off. With another part of the spectrum exactly the same ing is done; by that means we are able to compare the nount of light which is reflected for the pigment, and from ie white card.

It is on this principle that these particular colours were easured. You will notice the peculiar curves which some of ie colours on these diagrams give. Suppose, for instance, that r one spectrum to match the other in intensity throughout its ngth required an angular aperture of 100, and if for emerald reen at a wave length of (say) 5,500, it required an angular



1. Indigo. 2. Antwerp Blue. 3. Cobalt. 4. French Ultramarine.

Fig. 4.

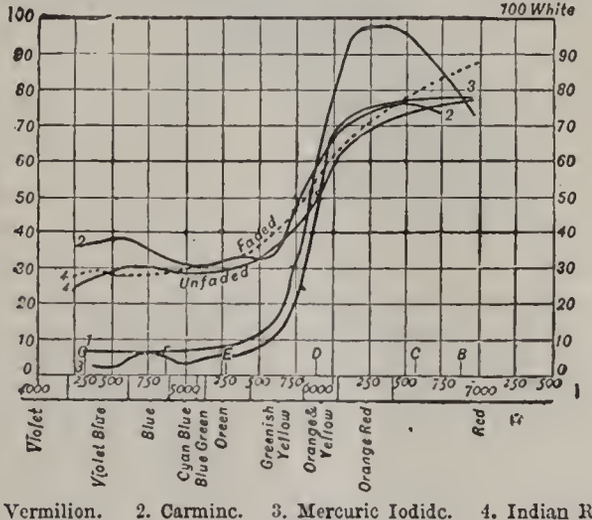


1. Emerald Green. 2. Chromous Oxide. 3. Terre Verte.

Fig. 5.

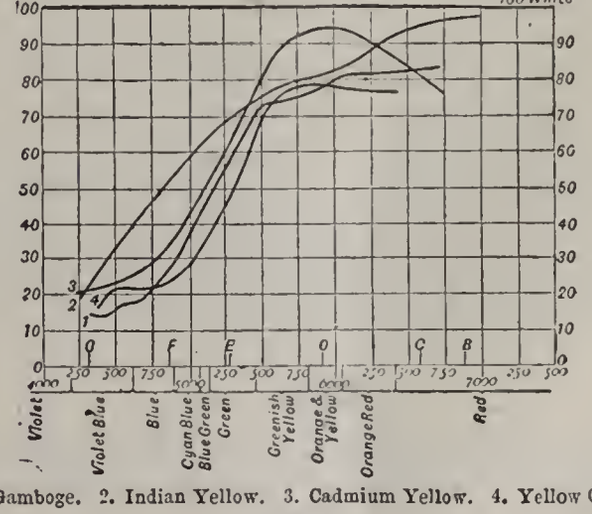
aperture of 45, then in forming this curve we set off the wave lengths as a base line, and at 5,500 set up this angular aperture, which gives us a point on the curve, whilst the light reflected from the white surface is represented by 100. Thus, at this point, emerald green reflects only $\frac{45}{100}$ths of this particular light. By that means you are able to build up a curve, which is an absolute measure of the light reflected from the pigment, as compared with that reflected from the white surface. In the same way the other curves were constructed. I want you to notice how very peculiar are the curves of the yellow pigments. There seems to be very little difference in the intensity of light reflected from them, but when you see them they appear of decidedly different hues. It is just these little differences in the curves which make up the difference in the hues which are so noticeable to the artist's eye. Again, I want you to notice cobalt. You see what a large proportion of red there is in cobalt, and what a little red there is in Prussian blue or Antwerp blue. In indigo blue also there is very little red. Some people think there is a great deal of red in indigo, but really the red that you see comes from the violet end of the spectrum, and not the red end. So, in French ultramarine, there is a little amount of red reflected, but nothing worth speaking of. If we take a line tangential to the bottom of these curves, and parallel to the base line, the height of this tangent shows the amount of white light which is reflected from the pigment, and is a measure of its impurity. For instance, if you take the curve of cobalt, you will see it has about 3 per cent. of white light mixed with it; whilst in the tint measured of Antwerp blue there is about 23 per cent. of white light mixed with the true colour of that pigment. You will notice that, in all cases, a certain amount of white light is reflected from the pigments, and therefore not one is really a pure colour.

Now I want to show you another method, and one which has never been exhibited before, by which we can obtain the



1. Vermilion. 2. Carminc. 3. Mercuric Iodidc. 4. Indian Red.

Fig. 6.



1. Gamboge. 2. Indian Yellow. 3. Cadmium Yellow. 4. Yellow Ochre.

Fig. 7.

intensity of colours in a very simple way. I use for convenience sake a rather short focussed lens in the camera, as I want to form rather a bigger patch of white light. Behind those black discs of the motor is a disc of white card, and I am going to measure the intensity of spectrum colour reflected from a coloured disc by a novel method. I can put any coloured disc I like in front of the sectors, and in contact with them. I rotate the sectors in the coloured patch, and I can alter the amount of white on the larger disc until I get it to match the luminosity of the colour in the centre. Knowing how much black has to be mixed with white, in order to bring the tint reflected from the colour in the centre, and the same value as that reflected from the rotating black and white, I can readily determine the intensity of the light reflected. (Several colours were measured in succession, in the manner described.)

Next on my programme is the method of producing on the

screen the exact colour of any pigment. The researches of Dr. Russell and myself on various pigments which have faded in light would be of little value, unless in, say, a thousand years' time those colours could be reproduced with the same accuracy with which they were measured. We have a means by which we can, without having the pigment itself, absolutely reproduce that colour from a card such as this. I will show you on the screen how it is done.

If we mark off the scale of the spectrum along the radius of a circle, and draw circles at the various points of the scale with the

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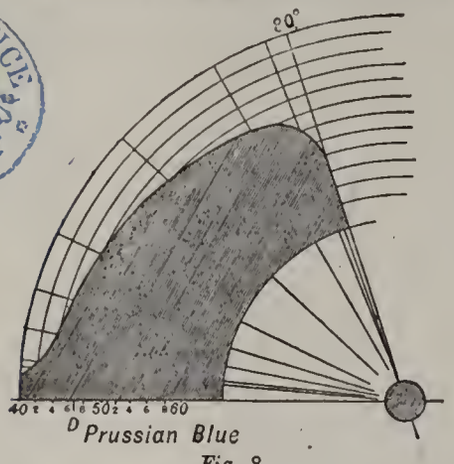


Fig. 8.

same centre, from the same centre can be drawn lines corresponding to the various angular apertures of the sectors required at the various points of the scale to measure the light reflected from a pigment. The point where one of these lines cuts the circle drawn through the particular point of the scale to which the aperture has reference, gives us a point on a curved figure, which, when rotated in front of the spectrum in the proper position, will cut off exactly the right amount of the spectrum at each part of it to give the colour required. I will show you one or two of these colours, and by that means you will see that we have literally templates by which our successors in science will be able to reproduce the colours which we have measured in our experiments, and to see whether any alteration has taken place in those particular pigments we have used, and which we propose to leave, either at the South Kensington Museum or elsewhere, for the benefit of those who come after us. (The colours of various pigments of blue sky, gold, and gaslight, were reproduced on the screen.)

Whenever you measure any colour in sunlight, gaslight, starlight—whatever light it is—by cutting out templates like these, and in your laboratory carefully making the necessary adjustments, you can always reproduce on the screen any colour you may have measured, and if you use the light in which the colour has to be viewed to form the spectrum, you will get on the screen the colour as it would be seen in that light.

Notes.

A remarkable use recently made of the magnesium flash light has been discussed by a scientific committee of investigation appointed by Government.

Not long ago it transpired that certain prisoners in one of our convict establishments were in the habit of communicating by tapping out Morse messages with the hammers they used in the prison workshops, and it has transpired that messages have been extensively transmitted from the outside world to prisoners, and from prisoners to persons outside.

In one case it was found that the magnesium flash lamp was the means used to convey information to the prisoners, this being employed to flash faint blushes of light upon the clouds over the prison on an overcast night, the lamp being operated from a house at a considerable distance. The Morse signalling system is capable of being carried out in so many ways that there is but little probability of all methods of communication being discovered and frustrated, although the matter has had the personal attention of Lord Salisbury—himself an accomplished physicist. The communication by Morse signals appear to be confined to prisoners who have been convicted on charges arising out of political considerations, and it is even rumoured that a school for Morse signalling exists in London, and that some able scientists are among those connected with it.

The President of the Institute of Chemistry, in his address at the last annual meeting, made the following allusion to the late Secretary of the Photographic Society:—"William Frederick Donkin, M.A., F.C.S., was born at Oxford, in 1845. He was educated at Eton, and in 1864, having obtained a scholarship, was elected a Demy of Magdalen College, Oxford. He specially devoted himself to the study of chemistry, and became in 1875 lecturer in Natural Science in Keble College, and in 1877 tutor of the same College. In 1879-80 he served as one of the Examiners in the Final Honours School of Natural Science. For some time he was assistant to the late Sir B. C. Brodie, and he also held the position of County Analyst for Oxfordshire. Coming to London in 1880, he was appointed Lecturer on Chemistry at St. George's Hospital. Professor Donkin was Honorary Secretary to the Photographic Society, and one of the most distinguished members of the Alpine Club; indeed, it was during a mountaineering expedition in the Caucasus in August last that the sad accident occurred which cost him his life. His photographs of Alpine scenery, which mark a distinct advance in the art, are full of artistic excellence."

Amongst the losses by death more recent than that of Mr. Donkin, we may refer to Mr. Warren de la Rue, who died on Saturday last. He distinguished himself greatly in celestial photography. Not only have his photographs of the moon made his name known to the general public, but in 1860 he went to Spain, and was successful in obtaining a series of photographs of the total eclipse of the sun of July 18th. The results form the subject of Bakerian lecture 1862. He took an active part in making the preparations for the photographic observation of the transit of Venus in 1874, and he established a private observatory at Ceanford, Middlesex. Mr. De la Rue for a long time carried on the business of a printer—in conjunction with others—at Bunhill Row, but he retired from this business a few years ago.

Another recent death is that of Mr. A. F. Janvrin, a gentleman well-known in Bath society, where he was staying. His death, by drowning, occurred at Jersey. Mr. Janvrin was an amateur who spent a good deal of money and time in the pursuit of photography and science generally. He was one of the founders of Bath Photo Society.

Among the useful and excellent things we have recently received for notice, we have pleasure in referring to the

enamelled iron dishes made for photographic use by Messrs. Jones Brothers, and Company, of Ablow Street, Wolverhampton, this firm having long made a special feature of enamelled ware. They are light, and scarcely liable to be damaged by falling or blows, reeded at the bottom to prevent adhesion of the plate, and provided with depressions for the fingers in lifting; the depressions also forming feet for the dish to stand on, rendering it easy to rock the plate during development. One excellent point is the hardness and porcelain-like character of the enamel, lead being absent. To travelling photographers these enamelled dishes will be specially valuable.

A correspondence has been going on in a Manchester paper on the subject of portrait painting, and one of the disputants has been very emphatic in holding the theory that a portrait painter has nothing to do but paint what he sees. "He need have no insight into character, no knowledge of what causes the surface indications; all he need do is to copy what he sees as a model before him." This is simple nonsense, and is nothing more or less than the old argument that portrait photography is a purely mechanical art. It is true a painter should paint what he sees, but the difference between a bad painter and a good one is, that the latter sees so much more than the former. The same distinction applies to the photographer. The appliances are identical in each case, but the man who selects the moment when the face is lit with expression will produce a picture which is almost an idealisation in comparison with that produced when the exposure is made haphazard, and where it is conceived that all artistic requirements are satisfied, provided only the sitter has not moved.

A rule which we have never seen laid down in any photographic manual should run thus: "Never let a boy into your dark room when you are operating." An amateur the other day told a nephew that if he promised to be very quiet he would let him see a negative developed. The lad was not one of the noisy, clumsy species, but exceedingly amiable and always zealous in helping anybody; indeed, he would go out of his way to be of any assistance. "I shouldn't let every boy into my dark room, Tim," said the photographer; "but I don't mind you, because I know you never break anything." The boy was only too delighted, and stood perfectly still in the wine cellar which formed the dark room, while the plate was taken from the slide and put in the bath. Scarcely was it covered by the developer than the photographer was horrified by a sudden blaze of light. "Confound it, you've spoilt the negative!" he exclaimed, in a passion; "what on earth did you do it for?" "I'm very sorry, uncle," said the boy humbly; "but I thought you couldn't see very well, so I opened the door of the lantern!" The amateur thinks now that your well-meaning intelligent lad often does more harm than the stupid clumsy one.

To adapt the words of Shakespeare, it may be said that one touch of photography makes the whole world akin. In Constantinople, as in London, the street hawkers of photographs drive a thriving trade, and as in London, the pictures most in demand are the portraits of the members of the Imperial family. The recent police order will consequently cripple their business seriously, for they are now prohibited from including such portraits in their stock-in-trade. It does not appear there is any political reason for this prohibition, nor does it arise from the badness of the copies sold, but is due, in all probability, to the fussiness of the police authorities. Anyway, politics were immediately introduced into the affair, for a rumour spread—to which we alluded in a recent number—that distrust had arisen in the Sultan's mind towards a member of the Imperial family, and that in consequence the photographs of this Prince offered for sale by Pera photographers had been seized and confiscated. As the matter has been deemed of sufficient importance to receive official contradiction, and has sent Reuter's telegrams flying all over the world, the police have done—as they generally do when they interfere in social matters—more harm than good.

Mr. Harry H. Marks proposes that the London County Council should secure power to control and regulate the business of advertising on hoardings in London, the profits to be applied in relief of the county rates. This would tend to a better regulation of a form of advertising which has long made London streets hideous; and, moreover, it is to be remembered that most of the hoardings used by builders actually stand entirely on ground belonging to the public. Photography is partly responsible for the present state of the metropolitan hoardings, as many of the ghastly portraits of actors and actresses shown are corrupted copies of originally indifferent photographs; these photographs having been dealt with by the retoucher before coming into the hands of the copyist.

The Judges at the Joint Exhibition of the Society of Amateur Photographers of New York, the Photographic Society of Philadelphia, and the Boston Camera Club, held at Philadelphia, made the following awards:—*Special Diplomas*—Landscape or marine, Mr. Tolley, Nottingham, England; portraits, Mr. Gutekunst, Philadelphia; genre and figure compositions, Mr. W. W. Winter, Derby, England; work by ladies, Mrs. S. M. Cleveland, Philadelphia; enlargements, Mr. William H. Rau, Philadelphia; lantern slides, Professor Henry A. Rowland, Baltimore. *Diplomas for excellence*—Mr. Sutcliffe, Whitby; Mr. Parry, Shields; Mr. Gibson, Hexham; Mr. Bartlett, Philadelphia; Mr. Mitchell; Mr. Wood; Mr. Lange, Liverpool; Mr. Redfield; Mr. Keene, Derby; Mr. Symonds, Portsmouth; Mr. Burnham, Lick Observatory; the Rev. F. C. Lambert, Cambridge; Mr. Latimer; Mr. Trask; Mr. Nelson; Mr. Hazzard; Mr. Moore; Mr. and Mrs. W. J. Anckorn, Arbroath.

In the British Section of the Paris Exhibition, photography is well, though not very extensively, represented. The following is the list of exhibitors:—Mr. James Burnside, Guernsey, photographs; Mr. W. J. Byrne, Richmond, photographs; Mr. J. H. Dallmeyer, London, apparatus; Mr. John Fergus, Largs, photographs and coloured opals;

Mr. F. Frith, Reigate, landscapes, &c.; Mr. J. P. Gibson, Hexham, landscapes; Mr. F. Hollyer, Kensington, platinum prints; Mr. James Lafayette, Dublin, large direct portraits; Mr. H. S. Mendelssohn, Notting Hill, portraits; Mr. J. Pellischer, apparatus; Messrs. Ross and Co., apparatus; Messrs. Sands and Hunter, apparatus; Mr. J. B. Scott, Carlisle, platinum and carbon photographs; Messrs. Shew and Co., London, photographic apparatus; Mr. Sutcliffe, Whitby, photographs; Mr. Thomson, Grosvenor Street, London, photographs from life; Mr. Vanderweyde, London, photographs; Count Walery, London, carbon and platinotype prints, photogravures, enamels; Messrs. Watson and Sons, London, photographic and other apparatus; Messrs. Werner and Son, Dublin, direct photographs and bromide enlargements; Messrs. West and Son, Southsea, instantaneous photographs of vessels in full sail; Messrs. Winch Brothers, Colchester, photographic views of Paris; Messrs. York and Son, Notting Hill, photographic optical lantern slides. The photographic items come under the general heading "Appliances for Education and Instruction."

A notion which we have advocated more than once is about to be carried out practically. A deputation of Manchester Liberals is now visiting the scenes of eviction in Ireland, accompanied by a photographer, who will reproduce on lantern slides photographs of the scenes in question. But the photographer does not appear to have been armed at all points as he should have been, as we read that permission to photograph the police battering ram was refused. Anyone who could ask permission to photograph this instrument must be extremely simple minded, and why in these days of detective cameras, noiseless pneumatic shutters, and instantaneous plates, the photographer did not take a picture of the "ram" without asking anybody's permission, puzzles us.

The Court of Common Council—at least, that portion of it represented by the Commissioners of Sewers—have been sorely troubled over some photographic apparatus purchased by the medical officer. The photographic items amounted to £26 5s., £6 6s., and £1 14s. 1d.; but the cause of anxiety was not the sums charged, but that the articles had been purchased without the authority of the Court. It appeared that the Sanitary Committee had given the medical officer authority to spend a sum not exceeding £50, and that the law had been broken because the Court had not been asked—to use the words of the objector, the things had been "quietly shoved" through the clerk's private account. No one seems to have controverted this assertion, hence we may assume that it was substantially true.

But whether true or not is a matter which does not concern us. What are of much more interest is the object for which the apparatus was bought, and the praiseworthy economy shown by the medical officer in the laying out of the money. As regards the first, it appears that the idea is to photograph bodies found drowned and taken to the mortuary, against which purpose there can be nothing to say. The medical officer's regard for the ratepayer's money is best shown in his own words. "He got," he said, "some secondhand things at about half the usual price, and for these he of course had to pay ready money." This opens up a wide field for speculation, and it would be interesting to know whether Dr. Sedgwick Saunders went poking about pawnbrokers' shops until he found what he wanted, or whether he looked in at Stevens' Auction Rooms and made a bid like an ordinary mortal. In either case, the proceeding is not quite in accordance with the dignity of the greatest city in the world. It seems hard that the Corporation should have to put up with second-hand photographic apparatus. What an outcry there would be if it were offered second-hand turtle soup!

Nor do we see that much has been saved by the medical officer's economy, because £33 seems to be a large sum to spend in these days of cheapness on a camera and lens and the usual et ceteras, simply for photographing dead bodies, since all that was required could have been bought brand new for much less. Although no one raised a question on this point, nor even asked the medical officer to mention what he had purchased, more will possibly be heard of the affair, for the question was referred to the Sanitary Committee.

In the meantime, now that the Corporation has got its camera, good use might be made of it when not engaged upon dead bodies. The dustbins, for instance, in the outlying and poorer portions of the City, might be photographed with advantage when the dust cart has omitted to call for a few weeks. If the members of the Corporation were themselves to be photographed (say) before and after a banquet much good would result, especially if the copies were on sale. On the whole, we congratulate the City of London on the possession of its photographic apparatus, even though it does happen to be second-hand.

ON THE BINDING OR FRAMING OF LANTERN SLIDES.

BY R. H. BOW, C.E., F.R.S.E.*

In my early paper on "Stands for Viewing Transparencies on Glass," I advocated very strongly the merits of these, and would refer you to what is there said. That was twenty-six years ago. Lantern slides have since then no doubt gone on growing in favour, but not so rapidly as might reasonably have been expected. However, I quite recently heard that American visitors to our city were showing a decided preference for these to even the beautiful paper photographs now so easily procured, as the form in which to carry away *souvenirs* of their visit to Scotland; and I fancy the preference for the diaphanous photographs would become very much more decided, and widely extended, if instruments for viewing them satisfactorily without the lantern were readily procurable at moderate prices.

But though much may be claimed for the permanence of the pictures on the slides, what can be said for the durability of the paper bindings? Used even carefully, I find they soon get into a frayed and loosened condition. Then what a troublesome business it is to gum on the four strips of easily torn paper; and these do not suffice, for to give a satisfactory outline to the picture it is necessary to insert a paper mask between the two glasses.

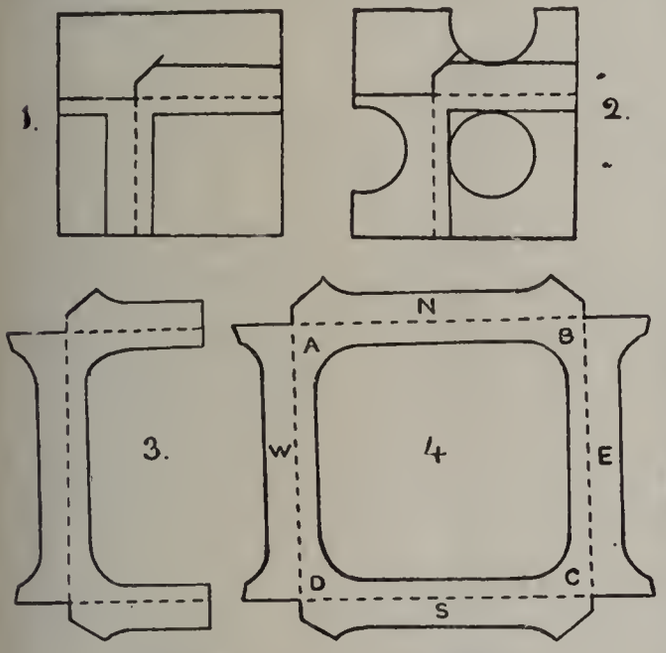
In the *British Journal of Photography* for 3rd January, 1868,

* A Communication to the Photographic Society.

in a paper signed "Bivalve," I suggested the use of *one* piece of paper, cut to a proper shape, as there figured, to do in a firmer way all that the mask and four strips of paper performed.

Eighteen years later the same idea had occurred to Mr. Thomas Gulliver, as he describes and figures exactly such a mount in the *British Journal of Photography Almanac* for 1886, at page 150.

I show on the table the different stages of the system of mounting I now follow. It will be observed that both faces of the slide are now similarly masked. The form of paper to effect this for the commonest shape of opening is shown by figure 4; this, after the face has been well pasted, is placed on a loose piece of thick flannel; the transparency, with covering glass tacked on with thin layers of sealing wax inside the corners, is then imposed face downwards upon the mount, and brought to coincide with the square A B C D. The sides marked W and E are then turned over upon it by lifting the edges of the flannel, one after the other, and the operation finished by next turning over sides N and S.



1. Folded and Marked. 2. Punched.
3. Trimmed. 4. Opened and Finished.

Now, what are the caterers of photographic materials about that they do not provide these things? Why should I have to cut out each separate mount with gun-wad punch and scissors, when one hundred could be stamped out at one operation, and in a few seconds, by means of a pair of proper steel cutters, after the fashion of envelope blanks?

It is desirable that these paper mounts should be cut from a smooth, thinnish, tough paper—in fact, a pure linen rag paper, if such can now be got; that there should be supplied varieties giving choice of differently shaped openings, and that they should be of some nice light colour to allow of writing on them the titles and particulars in ordinary ink, for I believe the advantage of making the framings black is illusory. It will be observed that the blanks I use are such that at the corners the paper crosses well over upon itself, thus securing firmness of hold, and also a mitre-like joint.

I confess that it is sometimes impossible to make with these single-piece mounts a very neat job at once. This arises from the glasses varying much in thickness, and often departing considerably from the exact sizes of 3¼ by 3¼; but a little after-trimming with a knife will seldom fail to give a satisfactory finish.

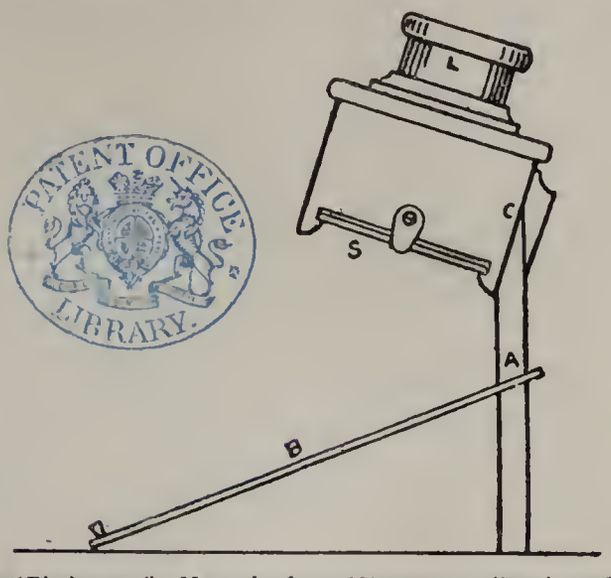
A SECOND NOTE REGARDING STANDS BY MEANS OF WHICH LANTERN SLIDES MAY BE SATISFACTORILY SEEN.

BY R. H. BOW, C.E., F.R.S.E.*

As indicating the diaphanous character of the lantern slides, &c., I would suggest that the instrument for viewing them should be called a diaphanoscope, or this shortened into diaphascope.

* Communicated to the Edinburgh Photographic Society.

In the earlier form of the stand, which I described before this Society twenty-six years ago,* I gave the preference to ground-



The "Diaphascope," a Monocular form of Stereoscope. *(Seen in profile.)*

glass as an illuminating background for the transparency, but placed several inches further away, so that the appearance of grain would be lost by being thrown much out of focus. And for the denser transparencies at least I still think this background the best, as giving a stronger illumination.

Shortly afterwards I had several instruments made, with paper substituted for the glass, not as being better, but from allowing a more portable form to be adopted. This is shown by the figure. The slide is at S; on B is laid the cardboard to form the background; the lens L is fitted to a draw-tube, which can be adjusted to suit different sights, being pushed further down for near-sighted persons. B has a dovetailed connection with A, and A with C, so that the whole can be easily taken to pieces, and packed in small compass.

Two coustructive details of the instrument in either form are —first, to provide a lens capable of giving a comparatively flat field over the extent of a lantern slide, and that with a considerable magnifying power; and second, to enclose the transparency, so as to get rid of the bad effects of light being reflected from its face.

As to the lens, I have usually adopted a simple plano-convex one of about 3¼ inches focal length, and 1¼ or more in diameter. This gives a fairly good result, and the picture is seen in the instrument much more perfectly, I think, than it ever is on the wall screen.

I may here offer a few remarks upon the conditions uuder which a plano-convex lens acts. First, let us proceed as if to take a photographic view with such a lens. The best position

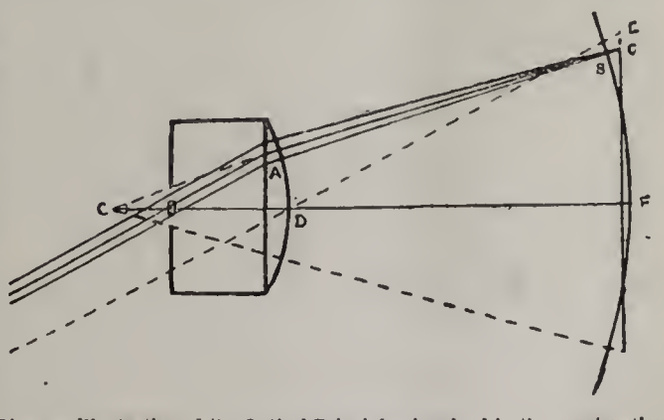


Diagram Illustrative of the Optical Principles involved in the construction of the Diaphascope.

for the stop (see figure) for the margined pencil of rays SA will be at S; arrived at thus:—C is the centre of curvature of the face AD, and AS is taken = AC ÷ μ. Now the pencil of rays SA will

* *British Journal of Photography* for 2nd March 1863, page 101.

pass into and out of the lens in the radial direction CAB, and will consequently have the longest possible focal distance AB. And for intermediate pencils this is nearly correct. The curvature of the field will have C for its centre, and therefore a radius of curvature equal to the focal length, augmented by the radius of curvature of the convex face of the lens.

On the table I place a transparency printed from a negative taken by such a lens.* It is better than might be expected, especially when we consider that little advantage can be got from using a very small stop. A very small stop would reduce the aberrations at the middle region of the picture, but would have very little ameliorating effect upon the chromatic confusion at the margins. The stop used in this instance was equal to one-twentieth of the focal length. Radius of convex face = 1·75, focal length = 3·3, radius of curvature of the field fully five inches; angle of view embraced by 3-inch width of negative = 52°.

In a paper I read before this Society on May 6th, 1863†, I described my plan of mapping down the curvatures of the field, and insisted that it was quite as important to keep the curves given by the primary and secondary foci from separating very far, as it was to approach to an average flatness of field. Now I attribute much of the comparatively good effects got by this simple lens to the fact that with it the primary and secondary foci are united, and consequently there is no astigmation.

Let us now consider the action of the lens when employed to view the photograph. Suppose that an eye is substituted for the stop in the figure, the centre of the eyeball should coincide with the point S; and let us now regard the pencils of rays as travelling back again from the picture. Thus the rays of the divergent pencil from point B are rendered parallel by the lens at A, and entering the eye at the same angle they had when in the first operation they were received from the landscape, they next became focussed on the retina. As the eyeball oscillates in its socket it receives in succession the other pencils, and thus the picture is viewed in perfect perspective, the distortions (as EG) being corrected by the reversed action of the lens, on the same principle as I explained in a paper read before you on October 21st, 1863.‡

I prefer using a high magnifying power in the diaphascope, even when this runs counter to the theoretical rule, which prescribes the adoption of a lens of the same focal length as was used in taking the negative in the case of equal or contact printing; or if the transparency be a reduced copy from a large negative, then a focal length reduced in the same ratio. Two advantages are gained by using the powerful lens—we see the minuter details more perfectly; and from the larger apparent angle of view, the picture gives a feeling of expanse.

I have placed on the table two diaphascopes, with lenses equal to 3·3 and 5 inches respectively. In these are shown identical transparencies, and I think any one on examining these, one after the other, will be struck with the contracted character of the view as seen by the 5-inch lens. The apparent angles of view will be about 52° and 34° respectively; the actual view as taken on the negative was, I believe, 37°.

In taking negatives specially for the purpose of printing lantern slides by contact, it would generally be advisable, for several reasons, to use a view lens of short focal length, and so do away with any objection on the score of false perspective. And although the non-achromatic lens, as applied to the diaphascope, behaves fairly well, it would no doubt be better to use an achromatic one, and the cost of such, if made in numbers, should not be great. The focal length I should prefer would not much exceed 3 inches; and there is this to be said in favour of the plano-convex, or moderately meniscus achromatic, that the eye may be placed very near to it, and consequently the diameter might be reduced to an inch or less.

Before concluding, I would call attention to the differently coloured papers or cardboards that may be used as backgrounds. For ordinary pictures the best effect is, I fancy, got by using a warm stone colour, or orange; for wintry or moonlight scenes a good effect is produced by the pale lilac; and for sunset effects use the crimson or red.

* "On the Management of Non-Achromatic Lenses." See my remarks in *British Journal of Photography*, 1866, page 221.

† *British Journal of Photography*, 1863, pages 228 and 254.

‡ "To make an absolutely correct Camera Copy of a Chart by means of a Single Distorting Lens."—*British Journal of Photography*, 1863, page 421.

DAGUERREOTYPE.

BY T. W. THOMAS HORTON.*

I WILL now give you Daguerre's original process of making his pictures.

The pictures of the Daguerreotype are executed upon thin sheets of silver, plated on copper. Although the copper serves principally to support the silver foil, the combination of the two metals appears to tend to the perfection of the effect. It is essential that the silver be very pure. The thickness of the copper should be sufficient to maintain perfect flatness and a smooth surface, so that the images may not be distorted by any warping or unevenness. The process is divided into five operations. The first consists in cleaning and polishing the plate to fit it for receiving the sensitive coating on which light forms the picture. The second is the formation of the sensitive ioduret of silver over the face of the tablet. The third is the adjusting of the plate in the camera-obscura for the purpose of receiving the impression. The fourth is the bringing out of the photographic picture, which is invisible when the plate is taken from the camera. The fifth and last operation is to remove the sensitive coating, and thus prevent that susceptibility of change under luminous influence which would otherwise exist and quickly destroy the picture.

First Operation.—A small phial of olive oil, some finely carded cotton, a muslin bag of finely levigated pumice, a phial of nitric acid diluted in the proportion of one part of acid to sixteen parts of water, are required for this operation. The operator must also provide himself with a small spirit lamp and an iron wire frame, upon which the plate is to be placed whilst being heated over the lamp. The plate being first powdered over with pumice by shaking the bag, a piece of cotton dipped into the olive oil is then carefully rubbed over it with a continuous circular motion, commencing from the centre. When the plate is well polished it must be cleansed by powdering it all over with pumice, and then rubbing it with dry cotton, always rounding and crossing the strokes, it being impossible to obtain a true surface by any other motion of the hand. The surface of the plate is now rubbed all over with a pledget of cotton slightly wetted with the diluted nitric acid. Frequently change the cotton and keep rubbing briskly, that the acid may be equally diffused over the silver, for if it is permitted to run into drops it stains the table. It will be seen when the acid has been properly diffused from the appearance of a thin film equally spread over the surface. It is then to be cleaned off with a little pumice and dry cotton. The plate is now placed on the wire frame, the silver upwards, and the spirit lamp held in the hand and moved about below it so that the flame plays upon the copper. This is continued for five minutes, when a white coating is formed all over the surface of the silver; the lamp is then withdrawn. A charcoal fire may be used instead of the lamp. The plate is now cooled suddenly by placing it on a mass of metal or a stone floor. When perfectly cold it is again polished with dry cotton and pumice. It is necessary that acid be again applied two or three times in the manner before directed, the dry pumice being powdered over the plate each time, and polished off gently with dry cotton. Care must be taken not to breathe upon the plate or touch it with the fingers, for the slightest stain upon the surface will be a defect in the drawing. It is indispensable that the last operation with the acid be performed immediately before it is intended for use. Let every particle of dust be removed by cleaning all the edges and the back also with cotton. After the first polishing, the plate is fixed on a board by means of four fillets of plated copper; to each of these are soldered two small projecting pieces which hold the tablet near the corners, and the whole is retained in a proper position by means of screws.

Second Operation.—It is necessary for this operation, which is really the most important of all, that a box be provided, hereafter called the iodine box; that is, the box in which the plate is iodised. To prepare the plate, the cover being taken out, the cup is charged with a sufficient quantity of iodine broken into small pieces and covered with gauze. The board is now, with the plate attached, placed face downwards in its proper position, and the box carefully closed. In this position the plate remains until the vapour of the iodine has produced a definite yellow colour, nothing more nor less. If the operation is prolonged beyond the point at which this effect is produced, a violet colour is assumed, which is much less sensitive to light; and if the yellow coating is too pale, the picture produced will prove

* Continued from page 150.

very faint in all its parts. The time for this cannot be fixed, as it depends entirely on the temperature of the surrounding air. No artificial heat must be applied, unless in the case of elevating the temperature of an apartment in which the operation may be going on. It is also important that the temperature of the inside of the box should be the same as it is without, as otherwise a deposition of moisture is liable to take place over the surface of the plate. It is well to leave a portion of iodine always in the box, for as it is slowly evaporised it is absorbed by the wood, and when required it is given out over the more extended surface more equally and with greater rapidity. According to the season of the year, the time for produciug the required effect may vary from five minutes to half-an-hour or more ; it is therefore necessary from time to time to inspect the plate. This is also necessary to see if the iodine is acting equally on every part of the silver, as it sometimes happens that the colour is sooner produced on one side than on the other, and the plate, when such is the case, must be turned one quarter round. The plate must be inspected in a darkened room to which a faint light is admitted in some indirect way, as by a door a little open. The board being lifted from the box with both hands, the operator, turning the plate towards him rapidly, observes the colour. If too pale it must be returned to the box ; but if it has assumed the violet colour it is useless, and the whole process must be again gone through. From description this operation may appear very difficult, but with a little practice the precise interval necessary to produce the best effect is pretty easily guessed at. When the proper yellow colour is produced the plate must be put into a frame which fits the camera-obscura, and the doors are instantly closed upon it to prevent the access of light. The third operation should, if possible, immediately succeed the second: the longest interval between them should not exceed an hour, as the iodine and silver lose their requisite photogenic properties. It is neccessary to observe that the iodine ought never to be touched with the fingers, as we are very liable to injure the plate by touching it with the hands thus stained.

Third Operation.—The third operation is the fixing of the plate at the proper focal distance from the lens of the camera-obscura, and placing the camera itself in the right position for taking the view we desire. This instrument reverses the objects, that which is to the right in nature being to the left in the photograph. This can be remedied by using a mirror outside. It is at an angle of 45°. This arrangement, however, reduces the quantity of light and increases the time of operation one-third. After having placed the camera in front of the landscape or any object of which we desire the representation, our first attention must be to adjust the plate at such a distance from the lens that a neat and sharply defined picture is produced. The adjustment being satisfactorily made, the glass is removed and its place supplied by the frame containing the prepared plate. The length of time necessary for the production of the best effect, varying with the quantity of light, is a matter which requires the exercise of considerable judgment. At Paris this varies from three to thirty minutes. It is very important that the time necessary is not exceeded. Prolonged solarisation has the effect of blackening the plate, and this destroys the clearness of the design.

Fourth Operation.—The apparatus required for this operation is a box as sketch shown. The board and the affixed plate being withdrawn from the camera, are placed at an angle of 45° within this box, the tablet with the picture downwards, so that it may be seen through the glass. The box being carefully closed, the spirit lamp is to be lighted and placed under the cup containing the mercury. The heat is to be applied until the thermometer, the bulb of which is covered with mercury, indicates a temperature of 60° Cent. (140° Fahr.) The lamp is then withdrawn, and if the thermometer has risen rapidly it will continue to rise without the aid of the lamp, but the elevation ought not to be allowed to exceed 75° Cent. (167 Fah.). After a few minutes the image of nature impressed, but till now invisible on the plate, begins to appear. The operator assures himself of the progress of this development by examining the picture through the glass by a taper, taking care that the rays do not fall too strongly on the plate and injure the nascent image. The operation is continued till the thermometer sinks to 45° Cent. (113° Fah.). When the objects have been strongly illuminated, or when the plate has been kept in the camera too long, it will be found that this operation is completed before the thermometer has fallen to 55° Cent. (131° Fah.). This is, however, always known by observing the image through the glass.

Fifth Operation.—This process has for its object the removal of the iodine from the plate of silver, which prevents the further action of the light. A saturated solution of common salt may be used for this purpose, but it does not answer nearly so well as a weak solution of hyposulphite of soda. In the first place the plate is to be placed in a trough of water, plunging and withdrawing it immediately; it is then to be plunged into one of the saline solutions, which would act upon the drawing if it was not previously hardened by washing in water. To assist the effect of the saline washes, the plate must be moved to and fro, which is best done by passing a wire beneath the plate. When the yellow colour has quite disappeared the plate is lifted out, great care being taken that the impression is not touched, and it is again plunged into water. A vessel of warm distilled water, or very pure rain water, boiled and cooled, being provided, the plate is fixed on an incline plane, and the water is poured in a continuous stream over the picture. The drops of water which may remain upon the plate must be removed by forcibly blowing upon it, for otherwise in drying they would leave stains on the drawings. This finishes the drawing, and it only remains to preserve the silver from tarnishing and from dust.

The shadows in the Daguerreotype pictures are represented by the polished surface of the silver, and the lights by the adhering mercury, which will not bear the slightest rubbing. To preserve these sketches, they must be placed in cases of pasteboard with a glass over them, and then framed in wood. They are now unalterable by the sun's light.

These constitute the substance of the directions given by M. Daguerre in his pamphlet and patent specification. The process was, however, much simplified and shortened, the enormous expense of the original apparatus having been found quite unnecessary.

Should any one possess a Daguerreotype which may have become tarnished, if they will carefully remove the plate from the mount, and pass a camel's-hair brush lightly over the surface, then pour over two or three times from a measure, some alcohol ; now plunge the plate into a cyanide solution (of fifteen grains to the ounce of distilled water), and rock it until all the tarnish has disappeared and the plate looks bright. This may take from three to six or seven minutes. The plate must now be well washed in clean water, and, finally, with distilled water, and dried in the following manner:—Hold the corner by a pair of pliers, and with a spirit lamp warm the back of the plate, at the same time blowing with the breath, without stopping, until the surface is dry. If care has been taken the picture will be as bright as on the day it was taken. Every care must be taken not to touch the surface except with a camel's hair brush should dusting be necessary. Great care must be taken in re-mounting the Daguerreotype ; it must be bound round with thin gummed paper, to prevent the air getting in between the plate and the glass, or it will soon show signs of tarnishing ; if well done it will have secured it a new lease of existence.

Simultaneously with the discovery by Niepce and Daguerre in France, our own countryman, Mr. Fox Talbot, had perfected researches upon which he had been engaged in the same direction since 1835, and the result was in 1839 made known by him, under the name of photogenic drawing, and which he perfected in 1842 under the title of the Talbotype or calotype. This process differed from Daguerre's inasmuch as it was on paper, and the picture being negative—that is, with the lights and shadows reversed—it possessed the power of a plate from which an unlimited number of positive proofs might be printed, the diaphanous texture of the paper used allowing the passage of sufficient light. But this process had likewise its disadvantages, although they were in another direction ; it was rather too slow in receiving the action of light to be applied to portraiture and the life, and was deficient in fineness and delicacy of execution when landscape, architecture, and still-life were treated by it.

Fox Talbot was certainly the first to publish his process. But it was proved at a trial, Talbot *versus* Laroche, in 1854, that the collodion process as invented by Mr. Scott Archer was no infringement of the calotype process, and that the Rev. Mr. Reade, vicar of Stone, near Aylesbury, had practised a similar method to that of Mr. Talbot as early as 1837.

Fox Talbot patented every process he practised, and intended to renew his patent, he having applied for a renewal when he entered an action against Laroche for infringement of his patent. The trial took place at the Guildhall, London, before Lord Chief Justice Jervis, and a special jury, and lasted three days, when Laroche was found not guilty of infringement. Fox Talbot's

patents were consequently upset; the result of the trial, therefore, being that photography was thrown open to the world for any one and every one to practise it.

In conclusion, I may say that the large specimens of Daguerreotypes I have brought for you to see to-night are the work of Silvester Laroche, the photographer before mentioned in the trial with Fox Talbot. He took a medal in the Exhibition of 1851 for Daguerreotype pictures, some of these being among them. He had the honour of taking several portraits of Her Majesty the Queen; he photographed the whole of the interior of Hampton Court Palace, copies of which Her Majesty, the Prince Consort, and other members of the Royal Family took sets. Also a series of the late Mr. and Mrs. Charles Kean in several of their historical plays at the Princess's Theatre, London, including his Macbeth. He was also an ardent worker in the laboratory of Scott Archer at the time he discovered collodion.

Patent Intelligence.

Applications for Letters Patent.

6,043. George Dixon, 15, Upper Grove Place, Edinburgh, for "An Improved Photographic Shutter."—April 9th, 1889.

,047. Thomas Wallis Gimson, Lane Delph Pottery, Fenton, Stoke-on-Trent, for "An Improved Porcelain Tray for the Development of Photographic Negatives."—April 9th, 1889.

6,053. Robert William Briggs, 8, St. Mary's Road, Ilford, Essex, for "An Appliance to Effect the Mechanical Mounting of Photographs, Prints, and Similar Pictures."—April 9th, 1889.

6,353. Samson-Albert Darier-Gide, 68, Fleet Street, London, for "Improvements in Photographic Apparatus for Tourists and Travellers."—April 13th, 1889.

6,374. Alfred Julius Boult, 323, High Holborn, for "Improvements in or Relating to Instantantaneous Shutters for Photographic Cameras." (*Ernest Antoine Werber*, France.)—April 13th, 1889.

6,385. Harry Ransom, 4, South Street, Finsbury, London, for "Improvements Relating to Stereoscopes and Cameras."—April 13th, 1889.

Specifications Published.

838. William Rooke, of 290, Caledonian Road, Middlesex, Draper, for "Improved Bath with Circular Flow of Water for Washing Photographic Pictures."—Dated 16th January, 1889.

A circular or other shaped pan or trough and supply water at an angle at the top for a circular flow. The side of the pan has a well, in which is a turned-up end of a pipe, this being in connection with a syphon. The bottom of the syphon pipe is in connection with perforated screens provided at the lower periphery, so that the draw-off by the syphon is in excess of the inflow.

Correspondence.

PROFESSOR MELDOLA'S CHEMISTRY OF PHOTOGRAPHY.

Dear Sir,—I feel compelled to trespass upon your space in order to express my strong dissent from one, at least, of the statements of your reviewer in his review of Meldola's "Chemistry of Photography." I refer to the statement that the book is "partly designed" to aid in the development of an inferior and injurious class of teachers. I imagine that this assertion has caused considerable amusement, mixed with excusable indignation, amongst those who are acquainted with Professor Meldola's views on science teaching and teachers. I am quite at one with your reviewer as to the evil effects of the existence of the class of teachers to which he refers, but I fail to see upon what evidence he bases the assertion that Professor Meldola wrote his book partly with a view to help in the multiplication of such teachers. I have gone somewhat carefully through the book, and have failed to find any reference to any examination or examining board—a rare, but admirable feature in a modern text-book. The subject matter was delivered in the form of a course of lectures at the Finsbury Technical College, and we owe its publication in book form to a request made by those who attended the lectures, and by others who felt that such a book would fill a distinct gap in photographic literature.

Your reviewer's statement seems to be based upon the fact that each lecture has an appendix containing an account of the experiments by which it was illustrated. But surely this is no evidence on which to make such an accusation. The author says in his preface that he introduced these descriptions "in order to facilitate the teaching of the scientific principles of photography," and this is an object with which your reviewer is probably entirely in sympathy. The further statement that "a large number of these experiments are believed to be new as lecture demonstrations" would, I think, be a sufficient reason for inserting them, without the necessity of suggesting any other motive. Very few, even amongst those who are in other respects competent and useful teachers of science, have a talent for devising suitable and workable experimental illustrations, and any help in this direction ought surely to be valued.

I am of course aware that a review must be taken as an expression of opinion by a competent critic, but I have thought it well to express my dissent, which I know to be shared by many others, from the opinion of your reviewer, because I know that the statement entirely misrepresents Prof. Meldola's views and intention, and I believe that it is calculated to prevent his book from having that wide circulation which your reviewer himself says that it deserves. With the latter half of the review I entirely agree. We have, in fact, for the first time in English a work on the chemistry of photography which is in keeping with modern chemistry, and fairly represents the present position of our knowledge, and in which, moreover, an endeavour is made to point out in what respects our knowledge is incomplete.—I am, your truly,

The Yorkshire College, April 18th. C. H. Bothamley.

Sir,—I beg to call your attention to the misrepresentation which your review of Professor R. Meldola's work ("The Chemistry of Photography") is intended to impress upon the reader. You state that it seems partly intended as a means of assisting in the generation of the worst form of science teacher. Your notion of such being the case must have been very far-fetched, as the book distinctly states in the preface that the lectures were given by Professor R. Meldola at the Finsbury Technical College, in the spring of 1888, and therefore are not, as you suppose, a course for science teachers to follow. And I am afraid that no matter how good the book, or how carefully written, people will take out some parts and retail them in so corrupt a manner that they do more harm than good.

The first paragraph which you insert to illustrate *your point* wants the following added as it appears in the book: "All the experiments described . . . . have been devised with the object of illustrating the various points which they are intended to elucidate with the simplest appliances, and in the readiest possible way."

You also remark with great length upon the sentiment of Col. Russell, and you *suspect* it is only a paraphrase of Sir H. Davy. Don't you think that as Col. Russell is no longer with us, you might give him credit for what he did say, and not try to bring Sir H. Davy into the case? We are all apt to give a quotation *very much like* some other great man when it suits the purpose.

Another point to which I wish to draw your attention is, that the first twenty-eight lines are devoted to the condemnation of the book, while the rest is in its praise—evidently the work of two reviewers, or else of the same reviewer when something out of the normal.

Hoping you will see fit to make the corrections, and so alter those peculiarities which I have pointed out, thus giving Professor R. Meldola credit for the new stimulus which he hopes will be the means of assisting to a better knowledge of the chemical aspect of photography, I am, sir, yours very truly, T. H. Norris.

Chemical Department, City and Guilds Technical College, Leonard Street, E.C., April 22nd, 1889.

HELIOCHROMY.

Sir,—Mr Bothamley, in his letter on page 188, did not refer to me as one who was to be regarded as an authority on light and colour, but merely as one who had shown (a very easy task) that such an authority Mr. Ives was not.

"Winstanley is the man," says Mr. Ives (p. 269), who once asserted that a newspaper exposed to sunlight and then removed to the dark room would emit enough phosphorescent light to print out a picture on chloride of silver paper." What I really said was this (p. 26): "Niepce discovered that if an engraving is exposed to sunshine and then left in contact with chloride of silver paper, it will produce its impression in the dark by the radiescence of the paper, and I have myself traced the discolouration of silvered paper, in some instances, to this cause."

Printing out a picture and producing its impression are different things, so are radiescence in the dark and phospherescent light, and Winstanley and Niepce are different men. That Mr. Ives should be ignorant of Niepce's fact, first published in 1857, is not a matter for surprise.

In another portion of his letter this gentleman informs us that the arguments directed by me against his process "are based upon a plain mis-statement of the facts." I invite him to quote exactly the words which I have used, to refer me to the page on which they may be found, and I will undertake that the words in question shall either be defended or withdrawn.

In conclusion, I would ask Mr. Ives, has he ever produced a single heliochrome on paper by "his" process, in which the colours could be mistaken for those of nature; and on which of the thirteen pages of his five shilling book a description of the method of production may be found?—Your obedient servant, David Winstanley.

Harpurhey, near Manchester, April 21st, 1889.

RAILWAY FACILITIES.

Dear Mr. Editor,—I would like to call the attention, through the medium of your valuable paper, of the Photographic Society to the advisability of agitating the railway companies for the granting to members of photographic societies, fare-and-a-quarter tickets (this privilege has been enjoyed by fishing clubs for some years, and why not amateur photographers?) I believe the Liverpool Society, some two or three years since, did take the question up, but do not remember with what results. If the Camera Club would take the initiative, and invite the co-operation of all societies, sufficient influence might be brought to bear upon the railway companies as would induce them to grant the concession. Trusting that some abler pen than mine will take this question up,—Yours, &c.,

P. E. Knight, Hon. Sec.

Nottingham Amateur Photographic Society.

PERSONAL.

Sir,—In anticipation of a threatened attack upon my position, here and in England, as a photographer, may I beg of you to state, in the columns of your valuable and widely-read journal, that I *entirely* disclaim pretensions to *posing as an amateur?* I put my work on the open market, and am, therefore, a *professional*—though inexperienced.

My name does not appear on the list of London workers as yet, but on my return to England this step will be taken. Thanking you, in anticipation, for inserting this appeal for fair play, I have the honour to be, sir, your obedient servant, George J. S. Graham-Toler,

c/o Messrs. Hamilton & Co., Santa Cruz de Tenerife, Canary Isles, April 4th, 1889.

Proceedings of Societies.

Photographic Society of Great Britain.

A monthly technical meeting was held on Tueseay last, April 23rd, at the Gallery, 5a, Pall Mall East, Mr. W. Benforn in the chair.

Mr. C. Wollaston showed the apparatus which he had successfully used in recording not only the speed of a shutter, as the term is generally understood [see article on page 273], but also the absolute duration of the exposure for the various stages of the openiug and shutting of the instrument.

Afterwards, Mr. Friese Greene showed how, by the action of an electric current, an exposed plate might be restored to its original condition, the effects of the exposure being undone. The expoeed plate was laid on a metal conducting plate in a bath of slightly acidulated water, aud au electric current was passed through the metal plate. Although at first sight it may appear difficult to see how the current, acting accordiug to the generally recognised laws, would chemically influence the film, it was suggested that possibly a derived current might pass through the water, and generate peroxide of hydrogen or other highly oxygenating agency at the positive side, and that this might obliterate the latent image.

It was suggested that Mr. Greene should make spccial experimeuts to clear up this point.

North London Photographic Society.

At a meeting held on April 16th, Mr. J. Traill Taylor (President) in the chair,

Mr. W. T. Coventon passed round some bromide prints developed with both hydroquinone and ferrous oxalate; the whites of the former being discoloured.

Rev. E. Healy advised an acid bath to remove the yellowness.

Mr. J. Oakley thought that hydroquinone gave much better negatives from over-exposed plates than pyro; he also considered it gave better results on bromide paper than ferrous oxalate.

Mr. F. G. Reader had found it stain bromide paper.

Mr. L. Medland showed a plate developed with hydroquinone covered with comet-shaped markings; it had also frilled.

Mr. W. Few considered the spots to be the fault of the plate.

Mr. Freshwater handed round a set of bromide prints from the same negative as the lantern slides he afterwards exhibited.

Mr. Newman showed his detective camera fitted with a changing box for twelve plates; it had an automatic cap for the lens, which it concealed; it was raised by the act of releasing the instantaneous shutter. The camera was also fitted with a focussing adjustment.

Mr. Freshwater then gave a lecture on "India," illustrated by numerous lantern slides projected on the screen.

The next meeting (technical) will be on Tuesday, May 7th.

Shaftesbury Photographic Social.

A meeting was held on Friday evening, April 12, at 8.30 p.m. Mr. Wills gave a paper on "Shutters," having several specimens on view, among which were drop shutters, sliding, rebounding, and revolving, explaining his practical experience on each.

On Friday evening, April 26 (this evening), the usual monthly social will be held at 8 p.m.

Visitors are specially invited.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 18th inst., Mr. C. P. Cembrano in the chair.

A set of rules was submitted to the membere by the competition sub-committee. The next competition was announced to be for prints on paper.

Rules.

1. That three negatives should be selected by the sub-committee, and to be the only ones used in the competition, with the exception that competitors may use their own cloud negatives or portions of any other negatives.

2. All the competiug prints to be made by contact.

3. Each competitor to be entitled to retaiu the negatives for printing purposes for a period not exceeding fourteen days, when they are to be handed over to the next competitor in rotation. The last competitor on the list to hand the negatives to the Hon. Secretary.

4. Each competitor, before partiug with the negatives, to remove any maskings, retouchiug, or other such marks which he may have made upon them.

5. A *nom de plume* to be placed by each competitor on his exhibits, aud a sealed envelope containing his name to accompany them, with the *nom de plume* written on the outside.

6. Competitors are at liberty to print from each negative in one or more processes.

The judging of the exhibits to be by the votes of the members present at a weekly meeting. Date to be duly announced.

This being an ordinary lantern night, it was devoted to the

projection of members' slides on the screen. Slides were contributed by the following members:—Messrs. Bridge, Pask, Atkins, Wellington, Hastings, and Briginshaw. Mr. J. Hargreaves Fulton was elected a member of the Association.

Notts Amateur Photographic Association.

The last open meeting of the season was held at their rooms, Cavendish Chambers, Market Street, on Monday evening, April 15th, Mr. Blandy, L.D.S., Edin., taking the chair.

Mr. G. A. Bull gave an interesting entertainment with his oxy-hydrogen lantern, showing 100 views of Paris, which was particularly interesting to those who anticipate a visit to the exhibition to be held there this year. A description of the slides as they were put in the lantern was given by Mons. M. Tuquet. The Mayor of Nottingham had promised to take the chair, but was not able to get to the meeting until the entertainment was nearly over. He however expressed himself pleased with what he had seen, and further said he was not a photographer himself, but he felt it was a very nice study for ladies and gentlemen, and he thought it would be well for parents to encourage their boys and girls in the art. He said he had received two very handsome photographic pictures from one of the members (Mr. H. Tolly), with which he was very pleased, and they now adorned the walls of the Mayor's parlour. The Mayor remained after the meeting, and sat for his portrait, which was taken by the magnesium flash-light, with a lamp constructed by Mr. T. Casnell.

On Saturday, April 27th, the members join the Derby Society on an excursion to Ashby-de-la-Zouch.

Photographic Club.

The subject for discussion at the meeting on May 1st will be "Weights and Measures." Saturday outing at Totteridge; train from Broad Street at 2·8.

Dundee and East of Scotland Photographic Association.

A meeting was held on April 11th, with Mr. John Robertson in the chair.

Messrs. Harben, Valentine, and D. Ovens were elected members, and the following were declared the prize winners in the lantern competition:—1st, V. C. Baird; 2nd, A. Wilson; 3rd, R. C. Henderson.

The American Exchange slides were exhibited, and much interest was manifested.

Manchester Amateur Photographic Society.

The usual monthly meeting of the above Society was held on Tuesday evening in the Lecture Hall of the Manchester Athenæum. Mr. S. F. Flower presided. Eight new members were elected, and with the fourteen elected at the previous meeting, the roll of members now numbers over 300.

Mr. J. A. Furnivel gave an exhibition of microscopic objects. He explained that with the oxy-hydrogen lantern microscope objects measuring three-eighths of an inch diameter could be thrown on a screen and magnified to seven feet diameter. His improvement consisted in a combination by which the power of the light was doubled, with an increased definition of the object.

The Chairman stated that the slides illustrating the city of Boston had been sent on loan by the Boston Camera Club, and they had been made by them during a photo. survey similar to that which the Manchester Amateur Photographic Society proposed to make of Manchester in the coming summer.

Mr. Parrott, the Secretary, read the description sent with the slides. If the committee succeed in securing slides from various parts of the globe in this manner, a very attractive feature will be added to the Society. Boston is particularly well adapted to the purposes of a photo. survey. Several public buildings were thrown on the canvas. But the interest of the exhibition lay in the scenes from old Boston. Perhaps the most attractive part of Boston and its surroundings to the photographer would be the "crooked river Charles." It abounds in shady nooks and tempting corners to "fix and focus."

*** Everything relating to the Literary Department of the Photographic News, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," (but not letters intended for insertion under the heading "Correspondence") should now be sent to Mr. Spiller, who is alone responsible for all which appears under the heading "Answers to Correspondents." Failure to attend to the above instructions may lead to disappointment.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, Photographic News, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

A. Jansson (Stockholm).—Having been to inspect the camera, we say unhesitatingly, that the workmanship is very inferior, and would give you no satisfaction, even if the lens offered with it were changed.

A. H. H. (Stourbridge).—Have you any iron pipes in your water service? If so, rust sometimes comes down with the first flush of water, and may account for the brown spots on some of your plates. The remedy in such a case is obviously to clear the tap every morning before beginning work, or substitute a leaden pipe throughout.

J. P. C. (Waterford).—1. The best way of enamelling silver prints is to talc the glass plates, coat them with plain collodion, then flow with warm gelatine, and squeegee down the wet prints. Allow to dry, and strip off. 2. The best way to save the silver is to throw down the first washings with common salt, and collect the precipitated chloride. For the waste hypo baths, add liver of sulphur (crude sulphide of sodium) out of doors until no more brown precipitate is formed; let it settle, and collect the deposit on a filter. Keep both kinds of silver residue separate, and either sell them as such, or reduce them to metallic silver by fusion with dry carbonate of soda, using some nitre in the case of the sulphide.

Rectory View.—The best course under the circumstances would be to screw on your quarter-plate lens, and make it do duty temporarily in your lantern, arranging the focus as for an enlargement.

Old Hand.—You are right; the so-called "potash developer" is merely an ammonia developer restrained with a considerable amount of chloride of potassium. Upon mixing 4 grains of caustic potash (sticks) with 4½ grains total ammonium salts (chloride and bromide), the free alkali existing in solution would be *ammonia*, not potash. The statement about its having no smell must be erroneous.

C. M. (Hull).—Dr. Hugh W. Diamond died on 21st June, 1886, aged 78 years, but it does not appear that any obituary notice was published in the *Photographic Journal*, the Society being then in recess. The *Athenæum* of July 3rd contains a short account of his life, and a portrait was inserted in the News of July 9th. Probably the Society of Antiquaries, of which he was a fellow, took official notice of his decease. Dr. Diamond was one of the jurors at the International Inventions Exhibition 1885, and regularly attended the meetings.

Chrome.—To get a more perfectly non-absorbent gelatine, try the bichromate of ammonia in thinner films, with a longer exposure to light, and if necessary use a larger proportion of the red salt. A subsequent immersion in sulphite of soda will easily remove any excess of the latter.

A. W. H.—Unfortunately, you have no written agreement; but the delivery of a notice of dismissal on a Sunday is certainly inoperative. If you presented yourself for duty on the following working days, you can at any rate claim wages in lieu of notice.

Amateur.—For bronzing lens mounts, shutter slides, diaphragms, and brass fittings generally, remove the lacquer with spirit, warm the metal, and brush it over with a dilute solution of chloride of platinum, wash with water, dry, and once more apply lacquer. An arsenical solution is sometimes employed, but does not give so fine a colour. For inside surfaces which requires to be dead black, use a weak shellac varnish heavily charged with lamp black.

H. D. (Tunbridge).—There are now to be had tiny forms of spirit level—one circular and another with tubes at right angles—which are intended to be rested on the camera at the time of adjustment.

Historicus.—Tannin rather than gallic acid was suggested by the Rev. J. B. Reade, the idea probably growing out of the earlier experimental results of Wedgwood and Davy, who worked upon leather which had been treated with nitrate of silver. H. Fox Talbot was the first to employ gallic acid (or gallo-nitrate of silver) for developing the latent image, of which he was undoubtedly the discoverer. Sir John Herschel has the credit of introducing hyposulphite of soda as a fixing agent. The earliest toning salt, both for paper prints and Daguerreotype, was the *sel d'or* of Fordos and Gélis.

R. S. and another correspondent answered by post.

E.G. and U.S.A. received.

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THE PHOTOGRAPHIC NEWS.

VOL. XXXIII. No. 1600.—*May* 3, 1889.

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DR. EMERSON'S "NATURALISTIC PHOTOGRAPHY."

DR. EMERSON is a photographer who knows how to follow his own judgment with confidence and steadfastness. He has the spirit of the craftsman of the period before the great industrial revolution of the second half of the Eighteenth Century—a spirit which prompts him rather to look upon his work itself and its relations to nature, than to look at it through the distorting glass of convention. To understand Dr. Emerson's work aright one must know this. We may, however, point out that although Dr. Emerson is, so far, true to his own instinct and feelings, not to be dragged aside by any convention of taste, he in no sense does what is often the case when an impulsive person rebels against a convention—whether artistic, social, or political: he does not so rush to the other side as to mar his work by straining himself to avoid that which has been approved by any convention merely because it has the stamp of such approval.

Indeed, we find Dr. Emerson honestly and candidly acknowledges the considerable aid he has received by a careful study of the works and writings of those who have gone before him, in the direction of efforts towards the production of pictorial results by photography; indeed, he has paid striking tribute to one of the best known of these gentlemen in recognizing the fact that his works and writings have served as a warning what to avoid. The excellence and truth of Dr. Emerson's work, and the lucidity of his views, are largely due, in our opinion, to the faults of others, by the fact that our present author has known how to take warning by such faults.

Truth in photography has two very distinct meanings, each being after a fashion reasonable and correct; but the confusion arises when both meanings are used indiscriminately. The man who, like Mr. Muybridge, brings to light, by photography, things hidden from the unaided senses, is an exponent of one phase of truth; while he who represents a scene as the eye perceives it, with atmosphere, light, and shadow, expounds the other phase of truth; and the latter phase is the sort of truth the artist seeks to realise.

In the work just issued,* that the author endeavours himself to look directly at his subject, without feeling himself bound by what others have said, constitutes the chief charm, and the reader soon finds he is not in contact with an author who is either an echo of others, or wishes to make his readers mere echoes of himself; indeed, the reader soon finds that his teacher is not one who expects and strives to mould his readers to his own image, but one who hopes to rather lead them to think and act for themselves. If our author's spirit were more current among the technical teachers of our day, we would probably be in a more hopeful condition as regards future progress in the arts and crafts.

The literary style of the work is excellent, and it contains a fund of useful information conveyed in a pleasant manner—a manner which contrasts agreeably with the overbearing dictatorialness of the teachers whose aim is to force all students into the same mould.

The author's series of connected essays on the influence of the study of nature upon art form the second chapter of the work, and give the key to the essential workings of the author's mind in relation to his subject.

Art has served as a peg on which to hang all sorts of fads—fine writing, very admirable in its place—morality, not to be despised—classical knowledge and literature generally, both of the highest æsthetic value, but in no way connected with the glyptic and pictorial arts. Naturalistic art has been found and lost and lost and found time after time, and it is because the Dutch, French, English, and American artists of to-day are finding it again that we feel hopeful for the art of the future, and towards the idealists we feel like the sculptor whom we heard remark, after reading an empty article on "Idealism" in Greek art, as shown by the Greek coins, "the fellow is either a crank or an imbecile, God help him."

He then reviews in a masterly way the history of art in relation to naturalism, from the Egyptian period to modern times. Speaking of a school of modern sculptors, and of the outlook in relation to this branch of art, he says:—

There is no nature in their works, but puerile realism which is still in vogue in Italy to-day in such work as a Pears delights in, "You Dirty Boy," and other trivialities. England, Spain, Holland, and America seem, up to the present, not to have produced a single sculptor, but, in our humble opinion, the young sculptors of England will lead the way in the twentieth century, and the world may look for the advent of an immortal master, and for work which will surpass the Greeks.

It may be worth while at this point to quote what our author has to say about the use of the word photographic, and we fancy he is partly driving at the PHOTOGRAPHIC NEWS, but Mr. Emerson never drives wantonly, or for the mere desire to take up arms. He writes on p. 24:—

Some of the best writers and journalists of the day have adopted the use of the word "photographic," as applied to written descriptions of scenes which are absolutely correct in detail and bald fact, though they are lacking in sentiment and poetry. What a trap these literary men have fallen into will be seen in this work, for what they think so true often is utterly false. And, on the other hand, photography is capable of producing pictures full of sentiment of poetry. The word "photographic" should not be applied to anything except photography. No handwriting can be "photographic." The use of the word, when applied to writing, leads to a confusion of different phenomena, and therefore to deceptive inferences. This cannot be too strongly insisted upon, as some cultured writers have been

* "Naturalistic Photography for Students of the Art," by P. H. Emerson, B.A., M.B. (Cantab.). Demy octavo, 308 pages. Price not stated. (*London*, 1889: *Sampson Low, Marston, Searle, and Rivington.*)

guilty of the wrong use of the word "photographic," and therefore of writing bad English.

The mass of the book is composed of valuable and thoughtful essays on the various branches of photographic work—both from the technical and the artistic aspects—embodying the author's own experience. Altogether "Naturalistic Photography" is a work which should be possessed and read by every one interested in the practice of photography.

FIRST VIEW OF THE "GROSVENOR" AND THE "ACADEMY."

Perhaps we should be going too far if we suggested that a photograph shop—such a shop as Mr. Spooner's, in the Strand—would be about as interesting and instructive as the Grosvenor Gallery this year; but at any rate portraits are the leading feature, and many are obviously not very much more than copies of photographs. Neither Sir Coutts Lindsay nor Sir J. E. Millais by any means shines, and we may emphatically say that Sir Coutts's (No. 68) "Lady May Lloyd" (presented to Lady May Lloyd by Sir Coutts Lindsay, with his affectionate regards) cannot be taken as an example of remarkably successful portrait work.

Miss Clara Montalba maintains her position as a producer on a large scale of Venetian views, but her sample in this case (No. 69), "Fishing Fleet at Venice," will not add much to her reputation.

One portrait (No. 103), "The Hon. Mrs. Bontine," by Mr. G. P. Jacomb-Hood, is worthy of very high praise, and it alone would well repay a visit to the Exhibition. A clever little study, with the black hood deftly placed, without resembling Greuze's "Young Widow," it certainly recalls the best features of this work.

Now as regards the Academy, the great show-place for the works of the "successful" artist, we again have a very striking predominance of the portrait element, and indeed on entering Gallery No I. the visitor is liable to be immediately struck, and indeed jarred by the peculiarly exaggerated brilliancy of the touches on the head of No. 24, a portrait of Dr. A. W. Williamson, by the Hon. John Collier. It is as if the artist had studied the head of his model while under the radiance of a strong electric light, and had not altogether succeeded in representing even this aspect. In contrast, we have the adjacent portrait of Sir Henry Roscoe (No. 30), painted by Mr. Herkomer. It is soft, in no way marred by burlesque exaggerations of light and shade, and altogether a fine example of portrait painting. Mr. Herkomer, however, is hardly to be congratulated on No. 201, in Gallery III., a portrait of Colonel Gamble, which, unfortunately, is large, and placed in a prominent position. The attitude of the standing figure is awkward and ungainly, and, indeed, it looks like a caricature; and, to make things worse, the figure is bedecked with a chain of office, and a trinket of the Forester or Freemason type. Perhaps we should rather sympathise with Mr. Herkomer in the matter, as an artist who undertakes to paint a portrait is bound to paint what he sees; but we sympathise still more with Mr. G. P. Jacomb-Hood in having to paint No. 612, a very offensive painting of a local mayor's robes and trappings, with a face thrown in as an incident.

Going back to Gallery No. I., we must pause before the President's "Sibyl" (No. 25), a fine work in which a dark-skinned but beautiful woman is figured as only this artist can figure woman. This, and the President's companion picture, (No. 31), "Invocation," will perhaps be the most admired works in the apartment; but those who care to look high and towards one corner may be much struck by Miss Blanche Mathewes' "Homeward Bound" (No. 29), the driving home of a flock of geese amid scenery which may be Suffolk.

The picture which is most notable in Gallery No. II. is Mr. Frank Dicksee's passing of Arthur (No. 150), which must be seen to be appreciated.

In the Architectural Room we were struck by Mr. Henry Holiday's fine studies of figures (No. 1824), forming five panels, and titled "Of such is the kingdom of heaven," and intended as a design for mural decoration; while on looking opposite, and seeing certain designs for new municipal buildings of Edinburgh, we could not help wondering whether the people of this city had committed some collective crime which was to be expiated by the constant sight of such things.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

BY W. M. ASHMAN.

Twentieth Article.

One subject which has occupied considerable attention during the last two years in most photographic circles is that of artificial illuminants—either to take the place of daylight, or to supplement the same when very little is available. Indeed, so much interest has been excited upon this point, that quite a large number of contrivances have been designed, many of them patented, to effect the combustion of some substance, or mixture of substances, by which sufficiently intense light is produced to impress very quickly an image upon a photographic plate. We therefore deem no apology necessary for devoting a chapter to that which will always be especially interesting to amateurs and to beginners who have not much time, and that only in the evening.

There are a great many instances in which such a convenience is of more or less value, and some in which it is quite indispensable. Among many may be cited the following purposes for which, in some form or other, it has been already employed. Copying can often be better done by artificial light, because, if the light be placed on the top of the camera, and the lens be not of short focus, there is little or no grain shown in the negative, owing to the direction of the light rays being nearly parallel with those entering the lens to form the image. Prints and drawings upon rough paper are easily photographed in this way, as the illumination is fairly even, and the light can be easily adjusted as to quantity or duration. Bright reflecting objects alone are more difficult, though they can be managed by a little care. Portraiture in studios at night, or in ball rooms, home pictures of interiors, with or without figures, stage performances and scenic effects, views of caves or mines, or other objects of interest underground, pathological and post mortem objects, and many others, can be secured photographically by such means.

There can be no doubt that unless instantaneity is required, the most efficient light is that produced by electricity, but both upon economical grounds, and those of convenience, it can rarely be employed. Sometimes the oxyhydrogen lantern can be made available, or even gas and mineral oil, &c.; but putting aside electricity for the moment on the score of costliness and non-portability, the next best agent for general purposes is the metal magnesium. This is sold in two forms, known as ribbon, and powder. The first-named has usually been burnt in a lamp provided with clockwork to keep it in motion at the rate at which it is consumed; but a much cheaper arrangement, lately issued, works satisfactorily, and answers nearly every purpose. The lamp, which is about twice the size of a large watch, is held in the hand and worked by the pressure of the thumb on the milled edge of a wheel (see fig. on page 776, vol. xxxii. Photographic News). The spool will hold a considerable length of ribbon, and a reflector attached permits of the light being directed toward any object. In practice, when a portrait lens is employed with full aperture, and a rapid

plate, only a few feet of the metal need be burnt within eight feet of the subject.* The same quantity can also be burnt in strands of shorter length. When one light is used, the position of it is of great importance. If the subject be a sitter, the position of the lamp should be a little higher than the head, and rather to one side. The other side can be lit by a reflector formed of white fabric or paper, at least two yards square, and as close to the subject as it can be without appearing upon the plate. If the light is too much on one side, the reflector will not be illuminated ; if too much in front, the shadows will be flat, and the whole picture be wanting in vigor. It is a great additional help if the same sort of reflector be suspended horizontally about two feet above the sitter's head, unless the ceiling be white and rather low. The background should be light, and sufficiently far from the sitter to avoid a shadow being cast upon it that would show in the photograph. There should also be a white reflector, such as tin, or cardboard, arranged behind the light.

To those beginners who are chemical students we may suggest the employment of a glass bottle containing about twenty cubic inches of oxygen gas, into which, at the right moment, a spiral of magnesium ribbon, lit at the end, can be plunged. There is scarcely any point of artificial light which rivals this in concentrated brilliancy, unless it be an extremely powerful arc light.

Whichever way the metal is burnt in the form of a ribbon, the light is always more or less of a point, and consequently more brilliancy than actual modelling is the result. But if we use the same metal in a finely divided state of powder, we can more easily obtain a considerably extended illuminating area, and reduce the exposure to a fraction of a second by firing the requisite quantity of metal at one flash. Not only is this so, but a given weight of magnesium in powder, if properly flashed, will have more actinic effect than the same weight of ribbon burnt in the ordinary way.

In the early experiments with flash-lights many years ago, magnesium was employed, but in conjunction with pyrotechnic mixtures of very doubtful safety, and resulting in anything but harmless fumes. Somewhat the same objections can be raised against many of the contrivances of recent date, in which compounds of magnesium and various deleterious or dangerous substances are recommended, chiefly because of the instantaneous character of the combustion, and the ease with which the charge is fired. As an instance of the intensity and instantaneity of a mixture of potassium chlorate, antimony sulphide, and magnesium powder, J. Traill Taylor says that "a few grains burnt before a print in motion produced a perfectly sharp picture upon a wet plate." This would probably not represent more than a thirtieth or a fortieth the sensitiveness of a commercial dry plate of to-day ; but the subject was plain black and white.

The majority of experimentalists have, however, found what they require in the simple metal reduced to a fine powder, a few grains of which, if properly burnt, will answer almost every purpose. It is only necessary to force the magnesium through a flame of sufficient size to obtain a vertical or horizontal column of incandescent magnesium of vivid brilliancy and powerful actinic energy.

It would be impossible in this chapter to describe even a few of the many lamps designed for this purpose, some of them already articles of commerce, but we shall better meet the case of a beginner by suggesting how he can best contrive, out of simple materials, an apparatus capable of producing practical photographic results.

A piece of glass tubing six inches long, and nearly three-eighths of an inch internal diameter, is bent in the centre, by means of a gas flame, to an angle of about 45 degrees from the horizontal, as shown in the rough sketch at A, Fig. 21. A piece of thin tin plate is turned up in the form of a tray, half an inch deep, and five inches long ; the width should be one inch at one end and two or three inches at the other, to allow for the spread of the powder. The tray should be filled with asbestos, or sponge, or cotton, and a

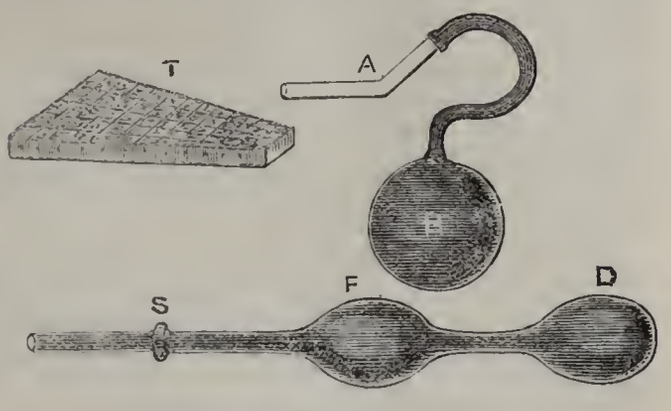


Fig. 21.

piece of fine brass wire gauze fitted in to keep it in its place. In default of this, a little fine iron wire can be threaded across through small holes punched in the sides as shown at T.

These two easily made pieces of apparatus are attached to some sort of support of wood or metal, not shown, left to the taste of the maker, according as it will be used in the hand, or resting on some fixed position. A piece of flexible rubber tubing is selected of a size to fit tightly on the end of the glass tube, and to the other end is attached a rubber ball. Even so simple a thing as a child's ball can be used effectively if the proper article cannot be procured. It is easily attached by cement to the rubber pipe by making a small clean round hole in it, and inserting a piece of the same glass tubing. The contrivance sold for producing spray is very useful, as a quick strong blast is readily obtained by it. All that is required is a spring clip, wood or wire, as at S, which shuts the pipe while the reservoir F is filled, or partly so, by pressure on D. At the right moment the clip is pressed and the flash is produced. Too much air force is inadvisable, as the lamp may be blown out, and the combustion of the powder may be incomplete. The charge of five to ten grains of powder is inserted by removing the pipe from the glass tube and dropping in the powder by means of a folded piece of smooth paper, and none need be lost if this is carefully done. The angular position of the tube allows the magnesium to fall, and a few taps is at times of assistance. The open end of the tube should be about three-quarters of an inch above the tray, and half an inch back from it. The asbestos or sponge is saturated with methylated alcohol, and the best results are obtained when the flame is large and full.

Attention has recently been called to the fact that much of the powder sold is very coarse in grain, in consequence of which, combustion is often very partial. If this apparatus is used when any unburnt magnesium can be collected and examined through a small lens, this peculiarity will be noted. It has been suggested that a sieve of coarse muslin or wire guaze might be employed to separate such roughly divided particles, and with the result of more brilliancy and more perfect combustion.

Such a contrivance as the above should be used in conjunction with the reflecting arrangements indicated in the earlier part of this chapter, and there should be something white suspended at the side of the lamp, and an opaque screen to prevent the light entering the lens.

The great drawback to this form of artificial light is the production of a cloud of magnesium oxide, a white powder, which falls gradually, forming a smoky mist. This must be allowed to clear off before a second charge is fired. Several arrangements have been tried for trapping the smoke, such as an inverted box, buscuit tin, &c. Perhaps the most convenient form of smoke-trap is that

* Five grains of powder is equal to four feet of ribbon by weight.

which is made like a camera bellows, about two feet long and sixteen inches in diameter, closed at the top, and having an opening at the bottom, which can be closed. In use, it is suspended over the lamp, with the opening downwards, and after the flash it is closed, and the trap removed into the open air, and emptied by pressing the ends together. Without employing a trap of this sort, the smoke nuisance can be reduced to a minimum by selecting an apartment thoroughly ventilated, and of good height, also by taking care that the powder is fine and thoroughly burnt. The addition of half the weight of lycopodium seems to facilitate the combustion somewhat, and the yellow light is more than balanced by the brilliancy of the burning magnesium.

In portraiture by artificial illumination the unpleasant effect of two or more high-lights in the eyes, with a sort of glare, is often seen. This is generally produced by having at least two powerful lights, a plan never productive of agreeable results. Oxy-hydrogen or limelight, gas, and paraffin lamps, are more useful for copying purposes or printing by development than for the production of direct negatives, and the student will select that which is most convenient for the work in hand. When the subject of bromide paper is treated of, the details of this kind of artificial illumination, both for contact prints and enlargements, will be more fully entered upon.

Portraiture by the electric light is better than any other substitute for daylight, and, if it is not superior to the latter, the effects produced by our leading portrait photographers in London are at least equal to those of the same subject photographed under the ordinary studio sky and side light, and the length of exposure is not inordinately prolonged. But in no case is the sitter exposed to the direct rays of an intense arc light, the amount of illuminating power being so great as to allow of all rays being reflected, and more or less diffused. The result of this is seen in the beautifully soft and finely modelled specimens of photographs taken in this way. An electric arc lamp of three to four thousand candle power is used in three of the leading studios the writer has visited, and in two cases this was supplemented by a few incandescent lamps of fifteen candle power, ranged in series, to assist in softening the harder shadows, and, consequently, in helping out detail; while a quick-acting portrait lens and a fairly rapid plate, registering 22° on the standard sensitometer, are conditions essential to success. Under such circumstances, an exposure of less than ten seconds will suffice for a cabinet size, three-quarter, or bust portrait. In cases of artificial illumination, as well as in daylight work, the use of a shutter inside the camera, actuated by an electro-magnet, is strongly recommended as affording means whereby the merest tyro can effect the exposure, at the most favourable moment, without the knowledge of the sitter. The writer has taken many hundreds of portraits in this way long before the introduction of rapid dry plates, when, in a well-lit studio, ten seconds was regarded as a tolerably short exposure.

It is not supposed that beginners will start at once on portraiture by the electric light, but as every day brings us nearer to the universal adoption of this subtle agent for both general and domestic lighting purposes, it is only proper that these chapters should indicate the possibilities of its more extended use, and its special value to the photographer. Until that time arrives, by far the larger number of those who practise this art must rely for their source of artificial illumination upon such simple and inexpensive agents and apparatus as have been suggested.

PHOTOGRAPHICAL OPTICS.

BY W. K. BURTON.

Chapter II.—On the Reflection, Transmission, and Absorption of Light by Matter

So far we have considered merely the body from which light emanates, the "source of light," and the transmission of the light from this source through space. We come now to a brief consideration of the effects produced when this light comes in contact with any material object—with matter, to put it briefly.

It is necessary, before going further into this, to consider very briefly the atomic theory of matter. To go fully into a consideration of this question here would be quite out of place; those who wish to do so may consult the article "Atom," in the latest edition of the *Encyclopædia Britannica*.

Briefly put, it is assumed in the atomic theory that all matter is made up of innumerable small fragments called atoms, and that the distinctive feature of these atoms is that they are indivisible and indestructible; also that they are capable of individual motion. It is assumed, further, that these atoms are in motion in the case of all matter that we know of; that there are atoms differing one from another in some such way—either by being individually different, or by forming themselves into different groups—as to make them constitute, when in motion, different kinds of matter. Further, it is supposed that these atoms, whether several of one kind, or several of various kinds, are capable of building themselves up into systems, which are called molecules. By a stretch of imagination we may illustrate a piece of matter by the whole of the universe that we know of, supposing each celestial body to be an atom. The conditions are so far fulfilled that these bodies are in continual motion. A molecule may then be conceived as illustrated by a solar system, or by one of the systems of fixed stars that we know of, in which there are very special motions of each of the bodies of the system in relation to the others.

The different states of matter—as solid, fluid, and gaseous—are, in the molecular theory, supposed to be attributable to different degrees of motion of the atoms.

Much discussion as to what constitutes an atom, what are its physical properties when isolated, has taken place. Some have supposed atoms to consist of minute elastic spheres, thereby assuming, in an atom, one of the very properties—elasticity—for the explanation of which the atomic theory was invented. Others have supposed them to be centres of force, of attraction and repulsion merely. There are many other theories, amongst which that of Sir William Thomson, already mentioned, stands pre-eminent. He has supposed that atoms consist of vortex rings, which may be physically represented by the rings of smoke which some smokers can blow from their mouths, these vortex rings being, however, formed in an atomless ether in place of in the air. At first sight this idea seems so preposterous that it might be dismissed without further consideration; yet a careful investigation of it shows that it carries with it fewer objections than any other theory for the formation of atoms than has ever been enumerated. The properties of "vortices" investigated by Helmholtz and Thomson are so very remarkable that scarcely anything is too extravagant to expect from them; further, the theory is better than any other, inasmuch as it requires much more molecule assumption than any others; in fact, it requires the assumption merely of an ether, consisting of a primitive fluid having no other properties than inertia, invariable density, and perfect mobility.*

So much having been said of the atomic theory, it is necessary to state, as in the case of the undulatory theory, that it is merely a theory, inasmuch as, without requiring assumptions which it is impossible to grant, it is compatible with many or all of the phenomena which have been investigated with reference to it; and that, without admitting it, it is impossible, in the present state of our knowledge, to account for some phenomena. In future, it is spoken of as if it were more than a theory—an established fact. This is done to avoid the necessity for continually repeating the statement that it is but a theory.

* *Encyclopædia Britannica*, article "Atom."

This much of the supposed nature of matter is perparatory to a few words as to the effects which are produced when an undulation of light in ether impinges or strikes upon matter of any kind. So far as we know, whenever light strikes any material object, one of three things takes place: either the light is reflected, it is transmitted, or it is absorbed. It would, perhaps, be more correct to say that in every case all three of these things take place, but in many cases one occurs to so much greater an extent than the other, that it may without much deviation from the truth be spoken of as if the others did not occur at all.

The general idea conveyed in the word reflection need scarcely be explained. It is simply a casting back of something which comes in contact with a material surface. In the emission theory, reflection was easily disposed of, on the assumption that the material particles which constituted the light rebounded from the surface as an elastic ball does when it strikes a wall. Accepting the undulatory theory, it is possible to imagine that the undulations of light transmit this vibration to the surface of the reflecting object, the atoms of which are capable of a vibration of the same period as that of the light striking them. They will then themselves be, so to speak, a source of light giving off new vibrations to the ether of the same kind as those they receive. There is no case of a perfectly reflecting body; every body which reflects light also either transmits or absorbs some of it, or does both things. There are many substances which reflect light of some particular wave-lengths, but of no other, or which reflect light of wave-lengths between certain limits only. All coloured substances are of this nature. It may be imagined that in the case of these the atoms are capable of answering to vibrations of certains periods, but not to those of others.

Reflection is a subject not of great importance in connection with photography, except in so much that it is only in virtue of reflection that we are able to photograph objects at all, which can, it is true, scarcely be considered a trifling matter.

The well known law of reflection must be stated. It is that when a ray of light strikes a reflecting body, the incident and reflected rays are in the same plane as each other, and as the normal, are on opposite sides of the normal, and form equal angles with it. The normal is a line at right angles to the reflecting surface at the point of incidence.

Substances which transmit light or allow it to pass through them are said to be transparent. There are no bodies which are perfectly transparent. All so called transparent substances reflect a certain amount of the light which impinges on them—as a rule, a greater quantity the more oblique to the surface the direction of this light, —and absorb another certain amount.

Whether when light passes through a transparent body the atoms of the body simply permit of the passage of the undulations of ether between them without interference, or whether the atoms themselves vibrate and transmit the vibrations, has been a matter of dispute; but the fact that the velocity of light is changed, being reduced when it passes from vacuum to a transparent medium, would indicate that the atoms take part, at least to a certain extent, in the undulation or vibration, and indeed it is impossible—to the writer at least—to conceive that matter, constituted in accordance with Thomson's theory, should allow a vibration to pass through it without causing some motion of the atmosphere due to that vibration.

This change of velocity is a most important matter in connection with the action of light, as to it is due the fact that light is changed in direction, or is *refracted*, when it passes from vacuum into a transparent medium; or, as a rule, when it passes from one transparent medium to another—as, for example, from air into glass. This refraction is the cause of all the phenomena observed in connection with prisms, the spectroscope, lenses, and in fact the majority of so-called optical instruments. As, however, *refraction* needs to be treated of at some length, I say no more of it here than that it is accounted for on the undulatory theory by the differences of velocity of light in vacuum and in various transparent media. It is scarcely possible here to enter into the explanation of the action whereby the retardation or acceleration of the velocity of a wave of light, falling obliquely on the boundary of two media, causes a change in the direction of the wave; but it may be said that the agreement of the fact here stated with theoretical action on the undulatory theory is considered as one of the great arguments in favour of that theory, as against the emission theory.

When light impinges on a body which neither reflects or refracts it, as when it strikes a black opaque body, it is said to be *absorbed*. This means that the energy of the light passes into the body in some form. It is not—except in a very few cases—strictly correct to say that the light, or any but a little of it, is actually absorbed. In most cases a certain amount of the light is absorbed, the energy going to cause vibration of the atoms of the body; these vibrations being, however, of such period that they do not make the body visibly luminous, but merely heat it. Such of the vibrations as were of such speed before as to give light sensations, serve to produce in the body slower vibrations, and it is commonly said that the form of energy is changed from that of light to that of heat. We have, however, already explained that in photographically considering light we cannot draw any hard-and-fast line between those undulations which are chiefly sensible through the sense of sight, and those which are chiefly sensible through their heating power. But to use the convenient popular phrase, which will be readily understood if taken with the qualification just mentioned, after so much light has been converted into heat as to raise the body acted upon by the light to a certain temperature, energy is given off in heat as rapidly as it is absorbed in the form of light. It is given off in the form of radiation, by transmitting to the surrounding ether wave motions of a slower rate of vibration than that which was received from it; and, if the body be not isolated in vacuum, by communicating directly to the air around it, or to other objects which are in contact with it, energy in the form of heat.

There are a few cases in which light which is absorbed is given off in the same form in which it is received; that is to say, in which the vibrations are not reduced in period. The best examples of such bodies is the luminous paint now so well known. This possesses the power just mentioned in a very high degree, but there are very many bodies which possess it to a trifling extent.

There is yet another variety of absorption of light which must be specially considered, as it is of great importance in connection with photographic matters. In fact, to it may be said to be entirely due the possibility of photography. This is the form of absorption in which the energy of the light is exerted in changing in some way the chemical (or molecular) constitution of the body.

We take a piece of sensitive photographic paper of any kind—let us say that known as albumenised paper—and place it in the sunshine. It very quickly darkens. This darkening is the outward sign of some chemical change in one or more of the substances in the paper, or on its surface, and is due, strictly speaking, to a change in form of some of the energy which reached the paper as light.

We can by no means say for certain *what* is the change that takes place, or in what way it is brought about, but the following is a hypothesis. We shall suppose, for the sake of simplicity, that there is only one sensitive substance under consideration, and that it is a compound substance. Of such a compound substance each molecule is in the form of a system of atoms of at least two different kinds. We shall suppose, for the sake of simplicity, that there are two large atoms of one

kind, and one small one of another kind. These are in continual motion relatively to one another; each one is supposed to be vibrating in a course in some way determined by the other two, and with a certain period of vibration. A vibration of the ether with which the atoms are surrounded, or of which they may be constituted, may communicate itself to these atoms. The hypothesis is that the vibration will communicate itself more rapidly to an atom if the normal period of vibration of the atom is the same as the period of a vibration of the ether.

The physical analogue of this is to be seen in the case of a pendulum, which may readily be made to swing through a considerable arc if given a series of very slight impulses at periods corresponding with the natural period of the swing of the pendulum, but cannot be caused to swing through nearly so large an arc by much stronger impulses applied at other periods; as in the case of the famous experiment at the Menai Bridge, when it was found that the whole structure could, by the concerted action of a few men pushing it at periods corresponding with its natural vibration, be deflected through a much greater distance than by a storm of wind which applied hundreds of times the force that the men applied.

We may now suppose the smaller of the three atoms that we have imagined to have a period of oscillation equal to that of the undulation of light which is brought to play on it. It is supposed that the oscillation of the atom is increased to such an extent that it disassociates itself from the other two, and flies off either by itself in what is technically called the "free" form, or to join itself with some other atom to form a new molecule; in other words, to form a new combination or chemical substance.

This is—perhaps not very well described—the molecular theory of the chemical action of light, supported, and I believe first enunciated, by Abney. Granted the atomic and the undulatory theory, it appears to be sound enough, but of course it can only be taken as a theory. We do, however, know that light may use its energy to change the chemical composition of certain bodies. To this action is given the name of photographic action.

SCIENCE AND ART.

BY DR. P. H. EMERSON.*

SINCE all mental progress consists, as Mr. Herbert Spencer has shown, for the most part in differentiation—that is, in the analysis of an unknown complex into known components—surely it were a folly to confuse any longer the aims of Science and Art. Rather should we endeavour to draw an indelible line of demarcation between them, for in this way we make mental progress, and Science and Art at the same time begin to gather together their scattered forces, each one taking under its own standard those powers that belong to it, and thus becoming integrated, and necessarily stronger and more permanent; for evolution is integration and differentiation passing into a coherent heterogeneity. Now, I do not mean to premise that this confusion between Science and Art exists everywhere; it does not. But I feel sure that it exists largely in the ever increasing body of persons who practise photography. The majority of these have not thoroughly, nay, not even adequately, thought the matter out.

It is obvious, then, according to the teachings of evolution, that, if we are to make progress, this differentiation must be made, thoroughly understood, and rigidly adhered to by every practitioner of photography. Each one must have his aim clearly stamped upon his mind, whether it be the advancement of Science or the creation of works whose aim and end is to give æsthetic pleasure. Let us first approach the subject from the scientific standpoint.

Assuming that we have before us a living man, let us proceed together to study him scientifically, for the nonce imagining our minds to be virginal tablets, without score or scratch. Let us proceed first to record the colour of his skin, his hair and eyes, the texture of his skin, the relative positions of the various orifices in his face, the number of his limbs, the various measurements of all these members. So we go on integrating and differentiating until we find that we have actually built up a science—ethnology. If we pursue the study, and begin to compare different races of men with each other, we find our ethnology extends to a more complex anthropology.

We next observe that the eyelids open and close, the lips open, sounds issue from the mouth, and our curiosity leads us to dissect a dead subject, and we find that beneath the skin, fat, and superficial *fasciæ* there are muscles, each supplied with vessels and nerves. We trace these vessels and nerves to their common origins, and are lead to the heart and brain. In short, we find the science of anatomy grows up under our hands, and if we go on with our studies we are led into microscopy. Then we begin to ponder on the reasons why the blood flows, on the reasons why the *corrugator supercilii* and *depressores anguli oris* act in weeping, the *musculus superbus* in practical arroganee, and the *lavator anguli oris* in snarling or sneering. So we go on studying the functions of all the organs we find in our man, and lo! we are deep in physiology; and if we go deeply enough we find the thread lost in the most complex problems of organic chemistry and molecular physics. And so we might go on studying this man; and if our lives were long enough, and if we had capacity enough, we should be led through a study of this man to a knowledge of all physical phenomena, so wonderful and beautiful is the all-pervading principle of the conservation of energy, and so indestructible is matter. As we proceeded with our studies we should have been observing, recording, positing hypotheses, and either proving or disproving them. In all these ways we should have been adding to the sum of knowledge. And in the greatest steps made in our advancement we should have made use of our constructive imagination—the highest intellectual power, according to recent psychologists.

The results of these investigations, if we were wise, would have been recorded in the simplest and tersest language possible, for such is the language of Science. It is needless to point out that in these records of our studies, as in the records of all scientific studies, too many facts could not possibly be registered. Every little fact is welcome in scientific study, so long as it is true. And thus the humblest scientific worker may help in the great work; his mite is always acceptable. Such is, alas! not the case with that jealous goddess, Art: she will have nothing to do with mediocrity. A bad work of art has no *raison d'etre*; it is worse than useless,—it is harmful.

To sum up, then, "Science," as Professor Huxley says, "is the knowledge of the laws of Nature obtained by observation, experiment, and reasoning. No line can be drawn between common knowledge of things and scientific knowledge; nor between common reasoning and scientific reasoning. In strictness, all accurate knowledge is Science, and all exact reasoning is scientific reasoning. The method of observation and experiment by which such great results are obtained in Science is identically the same as that which is employed by every one, every day of his life, but refined and rendered precise.

Now let us turn to Art, and look at our imaginary man from the artistic standpoint. Assuming that we have learned the technique of some method of artistic expression, and that is part of the science we require, we will proceed with our work.

Let us look at the figure before us from the sculptor's point of view. Now what is our mental attitude? We no longer care for many of the facts that vitally interested us when we were studying the man scientifically; we care little about his anatomy, less about his physiology, and nothing at all about organic chemistry and molecular physics. We care nothing for his morality, his thoughts, his habits and customs,—his sociological history, in fact; neither do we care about his ethnological characters. If he be a good model, it matters little whether he be Greek, Italian, or Circassian. But we do care above all for his type, his build, and the grace with which he comports himself; for our aim is to make a statue like him, a statue possessing qualities that shall give æsthetic pleasure. For the *raison d'etre* of a work of art ends with itself; there should be no ulterior motive beyond the giving of æsthetic pleasure to the most cultivated and sensitively refined natures.

The first thing, then, we must do is to sit in judgment on our model. Will he do for the purpose? Are his features suitable? Is he well modelled in all parts? Does he move easily and with grace? If he fulfils all these conditions we engage him. Then we watch his movements and seize on a beautiful pose. Now with our clay we begin to model him. As we go on with our work we begin to see that it is utterly impossible to record all the facts about him with our material, and we soon find it is undesirable to do so,—nay, pernicious. We cannot model those hundreds of

* A communication to the Conference.

fine wrinkles, those thousands of hairs, those myriads of pores in the skin that we see before us. What, then, must we do? We obviously select some facts—the most salient, if we are wise—and leave out the rest.

All at once the fundamental distinction between Science and Art dawns upon us. We cannot record too many facts in Science; the fewer facts we record in Art, and yet express the subject so that it cannot be better expressed, the better. All the greatest artists have left out as much as possible. They have endeavoured to give a fine analysis of the model, and the Greeks succeeded.

It is beside the question to show how Science has exercised an injurious influence upon certain schools in art; but that would be very easy to do. At the same time, the best art has been founded on scientific principles—that is, the physical facts have been true to nature.

To sum up, then, Art is the selection, arrangement, and recording of certain facts, with the aim of giving æsthetic pleasure; and it differs from Science fundamentally, in that as few facts as are compatible with complete expression are chosen, and these are arranged so as to appeal to the emotional side of man's nature, whereas the scientific facts appeal to his intellectual side.

But, as in many erroneous ideas that have had currency for long, there lurks a germ of truth, so there lurks still a leaven of Art in Science and a leaven of Science in Art; but in each these leavenings are subordinate, and not at the first blush appreciable. For example, in Science the facts can be recorded or demonstrated with selection, arrangement, and lucidity; that is, the leaven of Art in Science. Whilst in Art the physical facts of nature must be truthfully rendered; that is, the leaven of Science in Art.

And so we see there is a relationship between Science and Art, and yet they are as the poles asunder.

II.

We shall now endeavour to discuss briefly how our remarks apply to photography. Any student of photographic literature is well aware that numerous papers are constantly being published by persons who evidently are not aware of this radical distinction between Science and Art. The student will see it constantly advocated that every detail of a picture should be impartially rendered with a biting accuracy, and this in all cases: this biting sharpness being, as Mr. T. F. Goodall, the landscape painter, says, "Quite fatal from the artistic standpoint." If the rendering were always given sharply, the work would belong to the category of topography or the knowledge of places—that is, Science. To continue, the student will find directions for producing an unvarying quality in his negatives. He will be told how negatives of low-toned effects may be made to give prints like negatives taken in bright sunshine; in short, he will find that these writers have a scientific ideal, a sort of standard negative by which to gauge all others. And if these writers are questioned, the student will find the standard negative is one in which all detail is rendered with microscopic sharpness, and one taken evidently in the brightest sunshine. We once heard it seriously proposed that there should be some sort of standard lantern slide. My allotted time is too brief to give further examples. Suffice it to say that this unvarying standard negative would be admirable if Nature were unvarying in her moods; until that comes to pass there must be as much variety in negatives as there are different moods in Nature.

It is, we think, because of the confusion of the aims of Science and Art that the majority of photographs fail either as scientific records or works of art. It would be easy to point out how the majority are false scientifically, and easier still to show how they are simply devoid of all artistic qualities. They serve, however, as many have served, as topographical records of faces, buildings, and landscapes, but often incorrect records at that. It is curious and interesting to observe that such work always requires a name. It is a photograph of Mr. Jones, of Mont Blanc, or of the Houses of Parliament. On the other hand, a work of Art really requires no name—it speaks for itself. It has no burning desire to be christened, for its aim is to give the beholder æsthetic pleasure, and not to add to his knowledge or the science of places—*i.e.*, geography. The work of Art, it cannot too often be repeated, appeals to man's emotional side; it has no wish to add to his knowledge—to his Science. On the other hand, topographical works appeal to his intellectual side; they refresh his memory of absent persons or landscapes, or they add to his knowledge. To anticipate criticism, I should like to say that of course in all mental processes the intellectual and emotional factors are inseparable, yet the one is always subordinated to the other. The emotional is subordinate when we are solving a mathematical problem; the intellectual is decidedly subordinate when we are making love. Psychologists have analysed, to a remarkable extent, the intellectual phenomena, but the knowledge of the components of the sentiments or the emotional phenomena is, as Mr. Herbert Spencer says, "altogether vague in its outlines, and has a structure which continues indistinct even under the most patient introspection. Dim traces of different components may be discerned; but the limitations both of the whole and of its parts are so faintly marked, and at the same time so entangled, that none but very general results can be reached."

The chief thing, then, that I would impress upon all beginners, is the necessity for beginning work with a clear distinction between the aims and ends of Science and Art. When the art-student has acquired enough knowledge—that is, Science—to express what he wishes, let him, with jealous care, keep the scientific mental attitude, if I may so express it, far away. On the other hand, if the student's aim is scientific, let him cultivate rigidly scientific methods, and not weaken himself by attempting a compromise with Art. We in the photographic world should be either scientists or artists; we should be aiming either to increase knowledge—that is, Science—or to produce works whose aim and end is to give æsthetic pleasure. I do not imply any comparison between Science and Art to the advantage of either one. They are both of the highest worth, and I admire all sincere, honest, and capable workers in either branch with impartiality. But I do not wish to see the aims and ends of the two confused, the workers weakened thereby, and, above all, the progress of both Science and Art hindered and delayed.

III.

Next I shall discuss briefly the ill-effects of a too sedulous study of Science upon an art student.

The first and, perhaps, the greatest of these ill-effects is the positive mental attitude that Science fosters. A scientist is only concerned with stating a fact clearly and simply; he must tell the truth, and the whole truth. Now, a scientific study of photography, if pushed too far, leads, as a rule, to that state of mind which delights in a wealth of clearly-cut detail. The scientific photographer wishes to see the veins in a lily-leaf and the scales on a butterfly's wing. He looks, in fact, so closely, so microscopically, at the butterfly's scales, that he never sees the poetry of the life of the butterfly itself, as with buoyant wings it disappears in marriage flight over the lush grass and pink cuckoo-flowers of May.

I feel sure that this general delight in detail, brilliant sunshiny effects, glossy prints, &c., is chiefly due to the evolution of photography; these tastes have been developed with the art, from the silver plate of Daguerre to the double-albumenized paper of to-day. But, as the art develops, we find the love for gloss and detail giving way before platinotype prints and photo-etchings.

The second great artistic evil engendered by Science, is the careless manner in which things are expressed. The scientist seeks for truth, and is often indifferent to the manner of expression. To him, "Can you not wait upon the lunatic?" is, as the late Matthew Arnold said, as good as, "Can'st thou not minister to a mind diseased?" To the literary artist, on the other hand, these sentences are as the poles asunder,—the one in bald truth, the other literature. They both mean the same thing; yet what æsthetic pleasure we get from the one, and what a dull fact is, "Can you not wait upon the lunatic?" There are photographs and photographs; the one giving as much pleasure as the literary sentence, the other being as dull as the matter-of-fact question. The student with understanding will see the fundamental and vital distinction between Science and Art as shown even in these two short sentences.

And now, I do not think I can do better than finish this section by quoting another passage from the writings of the late Matthew Arnold.

"*Deficit una mihi symmetria prisca.*—'The antique symmetry was the one thing wanting to me,' said Leonardo da Vinci, and he was an Italian. I will not presume to speak for the American, but I am sure that, in the Englishman, the want of this admirable symmetry of the Greeks is a thousand times more great and crying than in any Italian. The results of the want show themselves most glaringly, perhaps, in our architecture, but they show themselves also in our art. Fit details strictly combined, in view of a large general result nobly conceived: that is just the beautiful *symmetria prisca* of the Greeks, and it is just where we English fail, where all our art fails. Striking ideas we have,

and well executed details we have; but that high symmetry which, with satisfying delightful effect, contains them, we seldom or never have. The glorious beauty of the Acropolis at Athens did not arise from single fine things stuck about on that hill, a statue here, a gateway there. No, it arose from all things being perfectly combined for a supreme total effect."

CONCLUSION.

And now I must finish my remarks. I have not perhaps told you very much, but it I have succeeded in impressing upon beginners and some others the vital and fundamental distinction between Science and Art, something will have been achieved. And if those students who find anything suggestive in my paper are by it led to look upon photography in future with a new mental attitude, something more important still will have been attained. For, in my humble opinion, though it is apparently but a little thing I have to tell, still its effect may be vital and far-reaching for many an honest worker, and if I have helped a few such, my labour will have been richly rewarded indeed.

Notes.

Perhaps one of the most interesting papers which has recently been read before the Society of Arts is one by Mr. H. H. Statham, on "Architecture in its Relation to Landscape," the paper as printed in the *Journal of the Society of Arts* for April 26th, being illustrated by eighteen very instructive sketches. We may take it that any outdoor photographer might profit by reading the paper in question.

One point in connection with this may be commented upon—the circumstance that it is headed "*The right of reproducing this paper is reserved.*"

The Society of Arts is a public educational body, and ordinarily no obstacle is placed in the way of the republication of communications read before it; indeed, the number of periodicals reprinting its papers is always considerable. To forbid this kind of re-publication seems undesirable on several grounds.

At the Physical Society meeting on the 13th inst., an interesting experiment was shown by Mr. Shelford Bidwell, which tends to show that light may considerably influence the condition of an iron bar in a state of magnetic disequilibrium—that is, close upon the time of a magnetic change. One end of the iron bar, when made to receive a powerful beam of light, showed signs of magnetic change, a re-magnetization of the bar taking place if the immediately preceding change had been one of demagnetization. The direction of magnetization induced by the light is the same as the previous magnetization.

A somewhat similar experiment was shown some time previously to the Royal Society by the same physicist, and it is quite possible that further study in the same direction may lead to remarkable developments in the way of recording telegraphs in which a beam of light is the medium.

At the same meeting of the Physical Society Mr. G. M. Whipple read some notes on "Lightning Photographs." He supposes "ribbon lightning" to be an effect produced by taking the photographs through windows, and to test this he photographed lines on a blackboard through plate-glass placed obliquely, and also through window glass, the result being that triple and ribbon flashes were closely imitated. As regards "dark flashes," the author believes these appearances are due to the prints being taken in oblique light, and they are produced by successive reflection.

The Americans certainly excel in the celluloid manufacture, and more especially in the thin sheets suited for use as a base for gelatino-bromide. The American films are thin, uniform in thickness, and, what is most important, are not sent out in a condition of unequal strain, which causes them to become "buckled" after a few changes of temperature if left unpacked. Hence we are glad to find that Messrs. Fry and Co. are sending out celluloid plates coated on the American material. They not only send us samples of the above, but also plates coated on ground glass, the advantages of these being now generally appreciated.

The third edition of Mr. Wormald's "Index of Photographic Exposure" comes to hand (published by the author, Sutton, Surrey, price one shilling and sixpence), and it is well brought up to date, and worth careful study. We are inclined to think that the best use for a student to make of a work of this sort is to carefully study it, and master the principles upon which the tables are constructed, than to delay matters by referring to it at the instant before exposure.

The amateur photographer has now a defined social position. At one time you could not carry a camera without being classed among the "nasty messy photographers," and without being looked upon as hailing from the Euston Road. It is difficult for the modern amateur to understand the ignorance displayed in the letter which Mrs. Cameron once received, and which is quoted in the catalogue of an exhibition now being held at 106, Bond Street. The letter runs thus :—"Miss Lydia Louisa Summerhouse Donkins informs Mrs. Cameron that she wishes to sit to her for her photograph. Miss Lydia Louisa Summerhouse Donkins is a carriage person, and therefore could assure Mrs. Cameron that she would arrive with her dress uncrumpled. Should Miss Lydia Summerhouse Donkins be satisfied with her picture, Miss Lydia Louisa Summerhouse Donkins has a friend who is *also* a carriage person, who would *also* wish to have her likeness taken."

This is very delicious, but there are a good many parallels to it. One occurs to us. An amateur of some celebrity in his day was staying at an inn in a certain country village, and was rather surprised at receiving the bill every morning at breakfast. However, he took it to be the custom of the house, and said nothing. After he had discharged his liabilities every morning for about a fortnight, the landlord said to him, in a patronising sort of way, "You seem a decentish kind o' chap, and I'd loike to do you a good turn. What 'ud you charge to take me and the

missus, and the youngsters, and the dog, all together?" The amateur laughed, and said he'd rather not undertake the job, as he never photographed for money. "What, do you mean to say you carry a couple o' hundredweight o' baggage about with you for pleasure?" said Boniface, with his eyes wide open. "Yes," was the answer. "Well, to be sure. There be fules in the world sure-ly!" and he walked away with a look of supreme contempt on his face.

Editors of newspapers which are not professedly illustrated journals, but only go in for cuts occasionally as a sort of extra attraction, are often sorely tried. Mistakes will happen, and if the printer can make a blunder he will. The readers of a well-known evening paper last week must have been sorely puzzled by a portrait which appeared in the notice of Mr. Pinero's new play at the Garrick, without a word of explanation. Everybody thought it was intended to be a portrait of Mr. Pinero, and though it was not a bit like the popular playwright, the want of resemblance was put down to the eccentricity of the artist. It now turns out that the puzzle was due to the eccentricity of the printer, who slipped in a portrait of somebody who had nothing whatever to do with the play!

Paris photographers are much relieved in their minds. The tribunal before which M. Eiffel brought his claim of exclusive copyright in his own creation, the tower which bears his name, has decided that the architect, or inventor, or artist, or whatever M. Eiffel may be called, not having reserved the copyright to himself in his contract with the city of Paris, his tower is a public monument, and can therefore be reproduced by anyone who chooses to do so. This decision will certainly open the eyes of other designers. There is sufficient similarity in the law of England and France to make it clear that there is, what has hitherto not been suspected, a copyright in a building. Up to the present the question has not been tested in the English Law Courts, but at any moment it may arise. This will expose the photographer who goes about photographing everything to an awkward risk. It is, perhaps, too early to pronounce an opinion upon the subject, and therefore it may be as well to wait until some definite point arises.

It is a well-known fact that resemblances which exist between persons are often intensified to a puzzling extent when the persons in question are photographed. A curious case in point has lately been recorded in regard to Mr. Alma Tadema and Mr. Du Maurier, between whom there is a striking resemblance. Mr. Du Maurier was one day at a dinner party, when a lady next him expressed surprise that he could ever be mistaken for Mr. Alma Tadema, for she could not see the slightest likeness. Afterwards she said, "Oh, I bought your photograph the other day; would you mind putting your autograph to it?" Mr. Du Maurier said he had no objection, and the photograph subsequently was produced. Mr. Du Maurier took it up, looked at it, sighed, and laid it very gently on the table: "That," said he, "is Mr. Alma Tadema's portrait!"

In the *Times* cablegram describing the celebration of the Washington Centenary it is said that when President Harrison appeared on the platform from which the chief speeches were made, "dozens of cameras were pointed at him from the surrounding windows and housetops." Then it goes on to say that "he stood still for a moment, thus giving the photographers an excellent opportunity." And this is what we are really coming to. Before long, any celebrity who is taking a prominent part in any public display will almost instinctively "give the photographers a chance." Everyone thus circumstanced will know, even if he do not actually see, that dozens of detective cameras are levelled at him, and will, as we have said, be well-nigh impelled to give all those eager operators the chance they seek. Kings in the act of being crowned will feel that a thousand lenses are fixed upon them, and pose themselves all the more regally. Conquering heroes, returning in triumph from the wars, will pause now and then on their prancing chargers, in order that they may be properly focussed. Popular actors, in their great situations, will remain posed long enough to give every hidden camera its opportunity, and perhaps the stage manager will provide a suitable "flash" or other light at such times. Champion cricketers on their way to the Pavilion, after scoring "a century," will halt *en route*, and fall unconsciously into what may be called photographic attitudes.

Whether this universal attitude of photographic expectancy will be a desirable state of affairs is another question into which we need not now enter. We only wish to point out that as things are going, the community will soon be divided, roughly, into two classes—viz., that one which comprises the individuals who, on some ground or another, are considered eligible to have their photographs taken, and that much more numerous one which is made up of all the people eager, on all possible occasions, to take them.

Dr. R. W. Shufeldt, in an article on "Zoological Gardens, their Uses and Management," in the current number of the *Popular Science Monthly*, lays great stress upon the importance of a photographic gallery under the charge of a thoroughly competent photographer, who should also combine in his photographic knowledge a familiarity with the habits of animals. He should be kept continually at work photographing the rarer animals, and efforts should be continually made to catch them in the act of any of their peculiar habits. Further, he should be enabled to take photographs of special dissections of the prosector, and of casts, and skeletons, and similar work. A full series of these photographs should be bound and kept on file in the collections of the establishment, as they would be of the very highest importance to the scientific taxidermist, artist, engraver, zoologist, and others.

This is a very excellent suggestion, but we are afraid that it will be a long time before the Royal Zoological Society adopts it. The admirable photographs of Mr. Dixon represent what has been done in this direction in the Regent's Park establishment, but they necessarily

appeal more to what may be called the popular rather than the scientific taste. There is a whole field unworked in the bye-paths of zoology. A half an hour's talk with an intelligent keeper will show that there all are kinds of animal peculiarities which the public never see. There is a sort of friendship between the keepers and some of the creatures which brings out qualities in the latter never dreamt of, and it is these qualities which are so valuable to the students of zoology.

A curious instance of friendship—not between an animal and a keeper, but between two animals totally dissimilar in their habits—was noticed some years ago by a friend of ours, which was so incredible that Mr. Frank Buckland at first refused to believe it. The gentleman in question was passing by the giraffe enclosure when, to his amazement, he saw one of the long-necked animals stretch its head over the railings into the adjoining enclosure of the hippopotamus, and put its head inside that of its next door neighbour. The arrangement evidently was a friendly one, for the giraffe manifested no fear, and withdrew its head after a short interval, both animals apparently being perfectly satisfied with this peculiar greeting. The spectator happening to mention this circumstance to a member of the Society, the latter named it to Mr. Buckland, who pooh-poohed the whole story, and declared it to be impossible. The member of the Society, rather nettled at being taken in, as he thought, by a Munchausen tale, said as much to the original narrator, who immediately insisted upon taking his friend to the Gardens to make enquiries of the keeper. They did so, and found the man verified the occurrence in every particular. Not only so, but the explanation was a very natural one. The hippopotamus living on succulent vegetables such as carrots, turnips, &c., was frequently troubled by pieces remaining in its teeth. The giraffe, having a weakness for the same kind of food, was only too delighted to render its neighbour a service by picking its teeth, and this was what it did when it put its head inside the other's mouth. How they came to make such an arrangement in the first instance one would like to know; but had photographic science in those days reached its present stage, and had the Society its own photographer, we probably should have had some light thrown upon this curiosity of natural history.

NOTES FROM NEW YORK.

New York Amateur Society—Philadelphia Exhibition—Making Lantern Slides at Night.

The fifth annual meeting of the Society of Amateur Photographers of New York was held on Tuesday evening, April 9th, at which interesting reports were read by the officers.

The President spoke mostly on the work of the Society during the past year, remarking that the reserve fund of some six hundred dollars was a sort of sheet anchor, which would form a nucleus for a building fund that the Society might eventually raise. He regarded larger and more commodious quarters as being very necessary, and suggested that some one commence to look about for a better place. The Treasurer reported a healthy state of affairs, stating that the expenses during the year had been $3,100, and receipts nearly $4,000. The Secretary's report was confined to the statistics as to membership, showing a very favourable gain, notwithstanding the number of resignations due to the starting of another club. Apparently the Society was never in a better condition. Considerable work ahead has been planned out. The new officers elected were C. W. Canfield, President; David Williams, Vice-President; H. T. Duffield, Secretary; and J. E. Plimpton, Treasurer. The lantern slide committee, of which Mr. Beach is still chairman, made a brief report on the work of the year, dwelling especially on the new feature which had been introduced in having frequent informal test nights to which members could bring slides to be tested in the lantern. Those that are suitable are reserved to be exhibited at some future lantern exhibition, the balance are returned to the maker. By this plan the committee were able to gather a large collection of interesting views; the makers are also especially interested, since they learn by observation very quickly the difference between a good or bad slide. The American lantern slide interchange was alluded to as aiding the committee in supplying a basis of good slides to commence an exhibition on. The interchange has worked very satisfactorily during its first year. In the next year special subjects may be required to be illustrated.

At the meeting, a very interesting discussion on celluloid films occurred. Several members had met with pits in the film, and also fog. Others seemed to think that the film would not keep, stating that it worked nicely when they first had it, but after a time the negatives would fog over in development. Some thought the cause might be due to the camphor in the celluloid, but no definite explanation was given, other than that these defects had lately been particularly noticeable. It is to be hoped the favourable opinion of these films is not going to be injured by trifling defects. Undoubtedly they will be overcome as the manufacturers gain experience.

A very interesting lantern exhibition on "From Killarney to the Hebrides," was given before the Society on the 17th by Mr. Randall Spaulding, Principal of the High School at Montclair, N.Y., representing some of his work last summer. Over 130 slides were shown, and the work in its entirety was well done. This showing of one man's work at special exhibitions has become quite a feature.

The third annual joint exhibition of the New York, Boston, and Philadelphia Societies, has just come to a close at Philadelphia, and has been very successful in the show of fine work and attendance. It is the largest of any exhibition yet held, there being 683 exhibits, including nearly 1,500 separate pictures. There was a very large display of foreign photographs, and, in the point of beauty and finish, they were in many respects ahead of work done by amateurs ahead here. Mr. Frank Sutcliffe's exhibit, as usual, was very fine, and took a prize. Mr. Harry Tolley's two 11 by 14 pictures—"On the Lonely Shore," and "A Frosty Walk near Wilford, Notts"—were the gems of the exhibition, and were most exquisite types of platinotype and bromide printing. Mr. W. W. Winter's large single picture, called "My Mammy," was a splendid figure composition, and deserved the diploma awarded to him. The New York Society was accorded two diplomas through Prof. H. A. Rowland—one on lantern slides, and the other on applied photography, consisting of two fine maps of the solar spectrum. Mr. H. A. Latimer took the only diploma awarded to the Boston Club. The pictures were very nicely arranged, being on a level with the eye, and care was taken to keep each exhibitor's work by itself. Two evenings of each week, lantern slide exhibitions were held in a lower hall, very well adapted for the purpose, and were largely attended.

In spite of the heavy expense in getting up the very elaborate and complete catalogue, the exhibition has been

financially successful, more than paying expenses. I herewith append a report of the judges :—

The Board of Judges appointed to make the awards of diplomas for work at the Joint Exhibition of the Society of Amateur Photographers of New York, the Photographic Society of Philadelphia, and the Boston Camera Club, held at the Pennsylvania Academy of Fine Arts, Philadelphia, April 8th to 20th, 1889, respectfully report that they have carefully examined each exhibit, and make the following awards :—

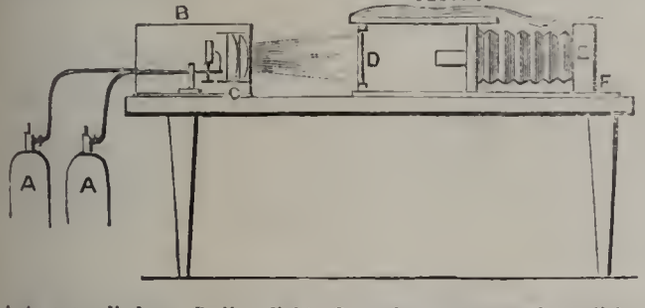
Diplomas for Special Excellence.—(1). For landscape and marine views.--Harry Tolley, Nottingham, England, No. 524, "On the Lonely Shore." (2). For portraits. — Frederick Gutekunst, Philadelphia, No. 303, miscellaneous portraits. (3). For genre subjects and figure compositions.—W. W. Winter, Derby, England, No. 608, "My Mummy." (4). For work by ladies.—Mrs. S. M. Cleveland, Philadelphia, No. 311, entire exhibit. (5). For enlargements.—William H. Rau, Philadelphia, Nos. 310 to 343. (6). For lantern slides.—Professor Henry A. Rowland, Baltimore, Md. (7). For applied photography—scientific or technical — Prof. Henry A. Rowland. Johns Hopkins University, Baltimore, for photographic maps of the normal solar spectrum, second series, 1888.

Diplomas for Excellence.—For entire exhibits. — Frank M. Sutcliffe, Whitby, England ; William Parry, Shields, England ; J. P. Gibson, Hexham, England ; John Bartlett, Philadelphia ; Charles L. Mitchell, M.D., Philadelphia; George B. Wood, Philadelphia ; Paul Lange, Liverpool, England ; Robert S. Redfield, Philadelphia ; Richard Keene, Derby, England ; Harry Symonds, Portsmouth, England ; S. W. Burnham, Lick Observatory, California ; the Rev. F. C. Lambert, M.A., Cambridge, England ; H. A. Latimer, Boston, Mass. ; A. K. P. Trask, Philadelphia ; George A. Nelson, Lowell, Mass ; R. T. Hazzard, Philadelphia ; Clarence B. Moore, Philadelphia ; Mr. and Mrs. W. J. Anckorn, Arbroath, Scotland.

(Signed) John C. Browne, George W. Hewitt, Xanthus Smith, Fred. B. Schell, James B. Sword.

These annual exhibitions have proved so beneficial and been so well supported that it is probable they will become permanent. The officers are contemplating, so it is reported, the substitution of medals for the present diplomas, which appear to be lightly regarded in some quarters. Medals will not burn up, and very likely this and other reasons, aside from their intrinsic value, make them more desirable as a reward than paper.

I send a diagram of a very successful apparatus for making slides at night in the camera, which Mr. James H. Stebbing, Junr., showed at the Society of Amateur



A A, gas cylinders ; B, lime light ; C, condensers arranged parallel ; D, negative ; E, camera ; F, board holding camera.

Photographers on the 5th inst., using the limelight. By placing both faces of the condenser parallel, a parallel beam of light is obtained, which equally illuminates the negative. He gave an exposure of about twenty seconds, and obtained a good slide.

The Society goes on a special centennial excursion on April 29th, to celebrate the end of 100 years since Washington was inaugurated the first president of the United States. On that day a great naval parade is to take place in New York Harbour. On a special boat, the *Philadelphia*, members of the Society, with, perhaps, a hundred cameras and two dark rooms aboard for changing plates, will photograph every section of the parade and some new war vessels. A good time is promised if the weather permits.

SULPHITE.

New York, April 20, 1889.

PHOTOMICROGRAPHY.

BY ANDREW PRINGLE.

THERE is hardly a book or a paper written now-a-days on any matter concerning microscopic morphology that does not contain rather more than passing reference to photography as a means of graphically delineating the objects discussed in the book or paper. In books ostensibly dedicated to microscopic preparation and examination of objects, there is always an allusion at least to photography, but frequently behind the allusion we find delusion; instructions are given in an off-hand matter-of-course style, as if the writer knew all about photomicrography, though in nearly every case old-world apparatus is figured, and obsolete processes and theories given. There are certainly exceptions to this, and when we find that the busy physiologist has found time and energy to master the difficulties of photography, we are bound to do him the honour he deserves.

Bright and particular, amid the constellation of great and busy men who have turned intelligent attention to photomicrography, shines Dr. Robert Koch, of Berlin. In the domain of vastly important bacteriological research, the name of Koch stands first ; in a class not lower, but to some extent separated, shines the name of Pasteur ; while to all who have even in passing studied micrographic science, the names of Sternberg, Maddox, Cruikshank, Woodward Gibbes, Van Heurck, R. Zeiss, Nelson, Miquel, and many others, cannot fail to be known, and, being known, honoured.

I cannot affirm that Pasteur has himself produced any photomicrographs, but I know that one of his assistants, Dr. Ronx, has produced many bacterio-photomicrographs of great excellence. Koch, I understand, was himself the producer of the wonderful photographs of many of the micro-organisms with which his name is so intimately connected ; and, beyond this, Koch has expressed in terms so happy, so cogent, and so logical, his opinions as to the value of, the proper sphere for, and the best means to, photomicrography, that I propose to read extracts from a paper by him in the *Mittheilungen aus dem Kaiserlichen Gesundheitsamte*, vol. i., Berlin, 1881, translated by Mr. Victor Horsley, in "Recent Essays by various authors on Bacteria in Relation to Disease," published by the New Sydenham Society, and edited by my friend, Mr. Watson Cheyne—himself, by the bye, another photomicrographer, but of bygone days only.

"Photographs," says Koch, "are of the highest importance in investigating micro-organisms, for, if ever a pure objective perception, free from every preconceived idea, is necessary, it is in these investigations." He then goes on to advert to the difficulty of ensuring that any two observers shall see the same objects in the same aspects, with the same illumination, and the same optical appliances. Two observers see different appearances, and each asserts the correctness of his own vision and of his own interpretations, while the observations, and consequently the interpretations, are more or less diametrically opposed to each other. "Which of the observers," asks the learned writer, "is medical science to credit?" "For these misunderstandings," writes Koch, "which have in microscopy already frequently been proved to exercise a most injurious influence on the progress of the science, there is only one remedy, and that is photography, which comes both as a harmonising mediator and as an instructress. Indeed, under certain circumstances, the photographic picture of a microscopical object is more valuable than the original preparation. For if I give someone a microscopical preparation with the object of his examining some particular spot in it—for instance, a lymph-vessel containing bacteria—I have no guarantee that he will find the right place in it ; or, if he does find it, that he will select the proper focus or the best illumination, &c. Photography, on the contrary, gives the microscopical picture once and for all, and reproduces it without the slightest error, in exactly the same focus, magnification, and illumination as when it was taken. Moreover, nothing is more simple than to come to an agreement as to what a photograph exhibits, for several observers can simultaneously look at the picture which before was accessible to only one individual at a time ; one can point out with the finger the object in question, measure it with compasses, compare it with other photographs similarly taken, whether of the same or of other objects ; in short, one can do everything which may aid in the comprehension of the disputed point."

Koch then proceeds to clinch his argument with examples of mistakes made by pure microscopy, and corrected by comparison of photomicrographs. He does, in passing, a little bit of kindly

* A communication to the Conference.

criticism on the photographs of a certain Herr Zurn, saying that these photographs, though suffering "from all the errors which can possibly occur in micrographs"—lacking all sharpness, for the most part not properly focussed, having excessively marked diffraction bands, and, what is most reprehensible, partly touched up—are to his mind still "infinitely more valuable than the finest drawing."

After further example, he goes on to say: "I think no one will blame me if I exercise great scepticism about every drawing of micro-organisms, the accuracy of which I cannot control by examining the original preparation; and I cannot too strongly urge everyone who is working at these problems to take up the suggestion that they should support their discoveries by the convincing proof of photographic illustrations." He then proceeds to make statements regarding high-power work and staining, which, though doubtless perfectly well founded when he wrote, would require very considerable modification in any article written to-day. He concludes, so far as you and I are concerned, with the following words, which I would corroborate and emphasize with all my might:—"It should not be forgotten, in the treatment of the negative and development of the prints, that the photographic picture should not be merely an illustration, but that it should occupy the first rank as a proof, to a certain extent a document about the reliability of which there must not be the slightest doubt. Thus the least touching up of the negative or prints wholly destroys their value. This must be so obvious as not to require more than passing notice; but since retouched microphotographs are published, it is necessary to draw attention to the point, and once and for all to protest most energetically against the use of retouched negatives." My own experience has been that nine out of ten photomicrographs which I have seen exhibited have been retouched, the ground as a rule being blocked out to make a pretty picture and hide imperfect technique; but, as I have always said, if, as a rule, one part of a microscopic picture is more important than the rest, surely it is the outline, the very thing that these negative improvers falsify by their dodging.

I must now apologise for the length of this quotation, which I assure the members of this Conference is by far the longest quotation I have ever made in my life.

Koch in these words admittedly refers to bacteriological photomicrographs; may I add a plea in favour of the pathological, physiological, histological, and other branches of the science? With a stroke of a pencil or pen one can make something that might represent a microbe, though as a representation of any particular microbe it would be valueless; but we cannot, even with much labour, make a sketch adequately representing many a physiological structure or organ. Did anyone, by hand, ever produce a sketch even tolerably true to nature of a retina, of a causeating tubercle, of a "taste-bud," of an injected lung? I have seen what are considered the finest existing drawings of many such objects, but while I congratulate the draughtsmen on their great skill, I cannot so candidly congratulate science on the possession of their drawings. It is, in fact, impossible to draw accurately many structures daily under observation by the microscopist.

Now I have no desire to enlist an army of amateur doctors—perhaps the most dangerous class of persons now at large; I do not wish to persuade any one here to wear a stethoscope in his hat in the approved medical fashion, and I do not wish our Club to be called the Cannula Club. I do not long to hear our secretary discourse on the art of laryngoscopy, nor our librarian on the theory of antiseptic surgery. I have no wish to see our darkroom fitted with an operating table, nor a "Schlitten-microtome," nor even a pocket-case. I trust our mercuric chloride will continue to be used for intensification, and not come into requisition for ablution of our hands; and if we must have argentic nitrate, let it be for sensitizing, and not for cauterising purposes. But I would like it if I could induce some of our members to help the doctors a bit. Photomicrography requires a lot of spare time, which most medical men have not, and perhaps a lot of money, which some medical men lack.

Those who have not tried photomicrography have no idea what they miss. Putting aside entirely the question of unity, of service to mankind, I can still recommend this pursuit to any one who has some knowledge of photography—that is where the members of the learned professions are so apt to come to grief, they lack the skill in photographic technique that many here possess.

I can assure you that beautiful as a landscape may be, interesting as it may be to try to put grace into the rustic form, exhilarating as we all find it to twist the pretty cousin's head about, stooping and staring the while critically into the depths of the "pair of blue eyes," still you will find beauties not inferior in the single eye of the microscope. I am not aware of anything more perfect in form than some of the *diatomaceæ*, and a well-stained scirrhous cancer is a thing of beauty, I can assure you. And the microscope is our passport, our Bradshaw, our courier to a new world, unlimited in extent, unsurpassed in variety, as in beauty and interest.

No great outlay is required—at least, none that need appal many here. I advise you to try no makeshift apparatus, no cheap leuses, no half-measures of any kind. Nearly all opticians now make apparatus for the work, and every one I have examined is fit to do good work.

I recommend objectives of wide aperture, and made with the new Jena glass, because I am certain they are the best. But much good work has been done, some perfect work has been done, with well-made and well-corrected ordinary objectives. I consider the use of a condenser absolutely essential to the best work, except with the very lowest powers—below one inch, for instance. I sometimes see people recommending that no condenser be used with powers lower than medium, but when I see the work of these parties, I say that it is the best possible argument in favour of the use of the condenser. Pay no attention to the statements about low-angled glasses having most penetration; but remember, first, that penetration, if it exists, is a fraud and a defect in photomicrography; that the proper course to follow is to use the lowest available power with the highest available aperture. I am quite alive to the fact that of 100 microscopists of the old school, 99 would jump on me for these assertions, but happily the young school is multiplying and replenishing the earth.

The very greatest trouble we have, if we are not "in" with the medical world, is to get proper objects to photograph. I refer to medical subjects, of course. We must often prepare our own subjects, for they cannot be got otherwise; but photomicrography has even now made such a mark that at almost every research laboratory and college museum there is some one who knows what we require. Dr. Klein, for instance, has some of the most gorgeous preparations for photography, as I am lucky enough to have discovered, and what is equally satisfactory, he knows exactly what is suitable for photography and what is not. But let it be clearly understood that we ought to be able to photograph well every object or preparation that can be seen well in the microscope.

Colour-correct photography, coupled with apochromatic objectives, has placed us in a new position. We can use colour-correct photography at its best, for we have only to deal with transmitted light, and the infinite and innumerable errors introduced by reflection in ordinary colour-correct photography are not here to puzzle and defeat us.

I have referred chiefly to medical subjects, which to some are without interest, and to others are absolutely gruesome. Our greatest power for good lies in the direction of helping medical research, but there are many other fields of work open to us, more beautiful and little less useful. My paper is random, unscientific, inelegant, I know; but I have a set object in view, and towards that end I strive earnestly—it is, to induce some one here to take up this grand branch of science. It is as engrossing as intellectual, as practical to the worker as it is useful to his fellow-men.

Discussion.

Mr. Charles White quite agreed with the Lecturer in his description of the beauties of the new countries that photomicrography had opened up. But, independently of these beauties, there were the practical results that accrued through it to histology. A student examining the rough woodcuts that disgrace many books but a few years old, would have great difficulty in recognising the designs as having the slightest resemblance to the real objects when in his microscope.

Mr. Taylor was not altogether at one with the Lecturer with respect to penetration. When he had an object to photograph, like the head of a crane-fly, he found far more pleasing results would be obtained by using a lens that had a good amount of penetration.

The Chairman would like to know whether Mr. Pringle worked with monochromatic light.

Mr. Pringle, in reply, said that a full description of his apparatus would be found in the Club Journal. With respect to penetration he quite admitted that if a general idea of the fly's head was to be obtained, a lens having consider-

able penetration was advisable, but if he required a really critical and reliable image of the fly, he should prefer to photograph each plane separately. With respect to penetration, Mr. Nelson had very clearly showed that although it depended on or decreased with the angular aperture, it decreased far faster with the power of the lens, and it was for that reason that he had advised the use of a wide angle and low power. Although he had not actually used monochromatic light, still as most of his slides were taken on colour-correct plates, these necessitating the use of colour screens, and he found it a most important point to be able to accurately appreciate the particular colour of screen that will suit the particular stains of the object.

Proceedings of Societies.

Liverpool Amateur Photographic Society.

The usual monthly meeting was held on Thursday, April 25th, at Crescent Chambers, Lord Street, Mr. A. W. Beer in the chair.

The minutes of the last meeting were read and confirmed. Messrs. Percy Allman, J. W. Ashurst, Geo. Breading, H. J. Bromilow, John S. Brown, Oswald E. Brown, G. L. Burton, John Byrne, H. Cunningham, Edw. Edwards, Wm. Faltin, E. Gibson, Richd. Hartley, Frank Howard, D. A. Hunter, Thos. T. Irvine, S. H. Johnson, A. J. Keay, Thos. S. Lamb, Geo. F. Mason, Chas. W. Mayne, J. R. Moir, G. Banner Newton, Chas. B. Reader, J. Sheard, Isaac Smith, Jas. S. Webster, and Mrs. J. T. Smith were duly elected members of the Association.

The President announced that Mr. W. Hughes would lead the excursion to Rossett on May 4th, also that a second smoking concert would be given on May 2nd, at which the musical arrangements would be under the charge of Mr. Nicolls, whose arrangements met with so much appreciation on the last occasion.

The Hon. Secretary acknowledged the kindness of the editor of *Photography* in sending the whole of the frost and snow competition pictures for exhibition, and said he had made application to be allowed to retain them at the rooms for a week; also the receipt from Mr. Fallowfield of his Annual, which was presented to the library. He exhibited specimen "Opaline" and cloud negative received from Messrs. Holmes, Sadler, and Holmes, and read letters from the Hon. Secretary of the Paisley Photographic Society offering exchange of lantern slides, and from Mr. Thomas Comber, J.P., regretting absence from Dr. Paul's demonstration, and sending for exhibition a transparency of a diatom pleurosigma angulatom, magnified 1,800 diams.

A question from the box on cloud negatives was answered by Mr. Beer and several other members. The general opiuion was that it was best to use slow plates, small stop, and rapid exposure.

Mr. F. T. Paul, F.R.C.S., gave a demonstaation on the mode of making microphotographs, showing how the apparatus can be adapted from an ordinary camera and microscope. He remarked that he thought the value of microphotography had been exaggerated, that for low powers it was invaluable, but that when very high powers were employed, he preferred makiug drawings. He employed a microscope of the Coutinental construction, with short body, removing the eyepiece, and advised the use of the lower powers, gainiug maguificatiou by increased length. The 1″ and $\frac{1}{2}$″ objectives answer well, the $\frac{1}{4}$″ and higher powers require a condenser, but theu the light begins to fail. He employed an ordiuary long focussing half-plate camera, placing it with the microscope and illumination upon a long board upon which is placed a beadiug to keep the camera straight, also another to fix the placc of the microscope. Focussing is effected by means of a long rod, with a blind roller wheel at the end and a catgut band driving the fine adjustment of the microscope; the microscope and camera were connected by a box, and light prevented from entering by velvet cloth. As regards the correction of the object glass, there were special apochromatic objectives made by Zeiss, but these were very expensive, and for low powers unnecessary. He had not found isochromatic plates to work very well, and preferred a fairly slow ordinary plate. The light employed was an ordinary blow-through lime jet, and a very small diaphragm; a paraffin light takes from several minutes to half an hour; sunlight is best, but requires a heliostat. He placed a microscopic slide on the stage aud exposed for thirty seconds, using a one-inch objective. The resulting negative was developed by Mr. J. H. Day, and proved quite a success.

Mr. V. C. Driffield then read a paper upon the "Actinograph," an instrument invented by Dr. Hurter and himself for calculating photographic exposures.

He said that one of the greatest difficulties the photographer has to eucounter, lies in correctly estimating his exposure. The fluctuations of the light throughout the year, and again throughout the day, are so great, that they cannot be adequately allowed for unless some reliable data are at hand. Again, the great variety in the speeds of plates presents a very serious complicatiou. The actinograph is the outcome of an effort to reduce exposure to system, aud to put the speed of plates on a satisfactory basis. After many attempts, Dr. Hurter succeeded in constructing an actinometer which they believe to be the only existing means of rapidly and accurately measuring diffused daylight. One form of this instrument is self-recording, and for upwards of a year they took, by means of it, daily diagrams of the light, three of which were shown on the screen. From these diagrams they learnt that though the light fluctuates considerably, these fluctuations are limited deviations from a certain mean value. In order to facilitate the calculation of exposures from the actinometer readings, they made use of a logarithmic slide rule, with this difference, that the light value, instead of beiug ascertained from the actinometer, is ascertained from a specially constructed light diagram which records the mean value of the light. A photograph of the instrument was here shown. It consists of a small box which can be easily carried in the pocket, and which contains, suitably mounted, four logarithmic scales, which correspoud with the light, the lens, the speed of the plate, and the exposure. The light scale is wrapped round a cylinder, and in coutact with this is a slide bearing the lens and exposure scales, and fixed in a particular position is the speed scale, sliding between. The exposure and speed scales is an index pointing on the upper edge to the speed of the plate. The light scale records the value of the light from hour to hour, throughout the year, by means of a system of curves, each curve giving the value of the light for a particular hour. The unit of light is so chosen that in places where the sun culmiuates in the zenith the brightest light is 100 units. Oue actinograph degree of light is therefore $\frac{1}{100}$th part of the brightest diffused light on the surface of the earth. The lens scale allows for the differences in the construction of lenses, and for various ratios of aperture to focal length. The exposure scale indicates directly exposures ranging from $\frac{1}{20}$th of a second to oue minute. In speaking of the speed scale, the author called attention to the pressing ueed of some scientific and satisfactory method of comparing the rapidities of different plates, and said that Dr. Hurter and he had endeavoured to meet this need by adopting as a unit of speed the length of time required to produce upon the plate a definite result. They call that plate a speed one which in one second, with one degree of light, produces under certain other conditions a satisfactory landscape negative, possessing a certain definite ratio of density betwcen foregrouud and sky; and a plate which yields the same result, under the same circumstance, in the $\frac{1}{100}$th part of a second would be said to be speed 100. The speeds indicated on the actinograph range from 0·5 up to 300; 0·5 is about the speed of a wet plate, and 50 is about the speed of the most rapid plate so far made. The short scale sliding betweeu the exposure and speed scales, and pointing on an edge to five different exposures, serves to allow for variations in the light due simply to atmospheric conditions. The single mark on the lower edge, termed the "speed index," is placed opposite the speed of the particular plate about to be exposed. The author here made some remarks upon development. He said that it is popularly supposed that a great deal can be done in developmeut to modify the effect of faulty exposure. Careful experiments made to decide the question, however, show that this coutrol during development is, to say the least of it, greatly exaggerated. A techuically perfect negative can only be produced by a correct exposure. The effect of abnormal additions of alkali is merely to hasten development, and eventually to fog the plate; and the effect of abnormal additions of a bromide is simply to retard development, and eventually to prevent it altogether. The author proceeded to show, with the aid of the lantern, how correct exposures are calculated by means of the actinograph, and how the speed of plates is ascertained by the photographer himself. He also drew attention to the variations necessary in the light diagrams for different parts of the globe, several of which he exhibited. Actinographs are constructed for any latitude north or south of the equator at intervals of $2\frac{1}{2}$ degrees.

Both papers were of a scientific character, and were highly

appreciated, a hearty vote of thanks being awarded to Messrs. Paul and Driffield, also to Mr. Bell for his services at the lantern. A number of lantern slides, the work of Dr. Paul, were shown, also the negative just produced.

At the close of the ordinary meeting the meeting was made special, and the revised rules, with slight verbal alterations, unanimously passed. The principal change in the rules raises the entrance fee for all new candidates to 21s.

Bath Photographic Society.

An ordinary meeting was held at the Royal Literary and Scientific Institution on Wednesday, the 24th ult., Mr. W. Pumphrey (President) in the chair.

The Chairman referred to the loss the Society had sustained in the death by drowning of Mr. Janvrin.

Mr. G. F. Powell detailed the interest taken by deceased in the Society—of which he was a founder—and spoke of the dangerous condition of the coast where the sad accident occurred; and upon motion, a letter of condolence with the family was ordered to be sent.

Attention was drawn to the forthcoming International Congress in Paris during August next, and Messrs. Friese Greene and Philip Braham were elected delegates for that purpose.

Messrs. Hensley and Munday were elected members of the Society.

A series of large photographs of "Niagara" were, through the kindness of Miss Ashley, exhibited. This collection, which illustrates the world-renowned Falls from several points of view, were much admired. Photographs of the same places in the depth of winter, including magnificent studies of frost, ice, and snow—probably the finest collection ever before shown in this country—called forth a hearty vote of thanks to the exhibitor. Miss Ashley promised to lend another American series of Rocky Mountains and Colorado scenery at a future meeting.

Mr. J. Dutton next drew attention to some negatives of Salisbury Cathedral, made by the wet collodion process about fifteen years ago, on 18 by 14 inch plates. It was said to be a difficult subject at any time. Some negatives made by means of the old collodio-albumen process were shown by the same exhibitor, and the peculiar colour of such negatives remarked upon, and their slowness.

The President handed round for inspection two sets of photographs, the result of a month's tour in Italy and in Switzerland (half-plate), and 10 by 8 respectively. The prints were shown to illustrate the capabilities of film photography, and the mode of mounting adopted was that of attaching the boards with glue, whilst the prints were in contact with sheets of ebonite, which, when stripped, left the picture with a highly glazed surface.

Mr. Friese Greene said he had lately found that it was quite possible to destroy the effect of light—the latent image in a plate—by the influence of electricity, after which the same plate was again ready to be acted upon by light. He then handed some notes to the Chairman, which were read.

Mr. Aug. F. Perren next demonstrated the treatment of platinotype prints by the "hot bath" process of development. He commenced by remarking that there are three methods in use for producing platinotypes: the "hot bath" development, which was the oldest and, he thought, the best; the "cold bath," also requiring a developer; and that of "printing right out." In the first, paper received a coating of a mixture of iron salts in conjunction with a previous platinous salt. During the action of printing, the composition of the iron salt became changed to such an extent that it would freely dissolve in the developer, with consequent deposition of platinum, which metal was thus substituted for the acted-upon iron. In the second, or "cold bath" process, the iron also formed the image, the platinous salt being contained in the developer. In the third method referred to, all the salts are put on the surface of the paper, and when the printing has been carried on sufficiently, there is nothing further to do beyond washing in acidulated water, and finally in clean water. Mr. Perren having pointed out the absolute necessity to keep the sensitive paper dry, and the variations in temperature of the developer allowable under fixed conditions, proceeded to pass a number of exposed papers over a hot bath of potassic oxalate solution. These were afterwards soaked in acidulated water, and then handed round. The pictures, mostly local views, were much admired, as also were some finished specimens.

On Thursday, the 25th ult., the first outdoor meeting took place at Farleigh Castle. There was a very good attendance, and the chief points of interest in that vicinity were photographed. At 5.30 p.m. the party assembled at the "Houltin Arms," where a substantial tea was provided, over which the President presided. The next excursion, May 30th, will be to St. Catherine's.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 25th inst., Mr. T. E. Freshwater in the chair.

A series of platinotype prints was exhibited by Mr. F. P. Cembrano from negatives taken by him during a recent tour in Spain. Several of these included interior and exterior views in the same picture, necessitating great care in the development of the negative. The difficulties in these cases were overcome by using a very weak developer, until the details in the well-lighted parts of the picture were well out; the plate was then washed, and the dark interior locally developed with a camel's hair brush, occasionally washing the plate to prevent stains. The developing solution was used at a temperature of about 60°.

Mr. Cembrano showed a picture that had formed part of his exhibit at the Crystal Palace, which had been referred to in a notice in one of the photographic journals as bearing evidence of being retouched. He stated that this was not the case. Replying to a question whether he had used plates backed for interiors, Mr. Cembrano said he took some backed plates out with him, but he had not found any difference between them and plates not backed.

Mr. A. Cowan showed a negative of a rainbow taken on Easter Monday, at Sonning.

Mr. J. B. B. Wellington referred to an article in a weekly journal—*Work*—on toning, in which acetate of lead was advocated in place of gold. He questioned whether prints toned by this method would be permanent.

Mr. A. Haddon thought the changes in the colour of a print immersed in the solution referred to would be due to sulphur toning.

The subject of hydrokinone being brought under discussion,

Mr. F. P. Cembrano said he had used it, but had gone back to pyro.

Mr. J. J. Briginshaw considered it had many advantages; its freedom from producing stains rendered it peculiarly adaptable for the development of lantern transparencies; any degree of density was obtainable without sacrificing transparency in the shadows.

Mr. W. H. Harrison, remarking upon the difficulty in judging correct density in negatives in development, said it was a good plan, and one adopted by several photographers he knew, of always making it print to over-develop, and afterwards by reducing the density bringing the negative to a standard printing quality, the last operation having the advantage of its being able to be performed in daylight.

West Kent Photographic Society.

The ordinary fortnightly meeting was held at Cromwell House, Bexley Heath, on April 26th, Mr. Pringle in the chair.

The minutes of the previous meeting having been read and confirmed, monthly meetings were arranged during the summer in addition to the fortnightly outings.

The President showed a travelling lantern he had had made. By packing the condensers (4 inch) and front lenses inside the body of the lantern, the whole thing packed into a box about 6 inch cube. The lantern had no chimney, the roof being specially jacketed to obviate the necessity for one. It was much admired as a marvel of compactness and portability. He also showed a camera which had been built to design. One special feature was an arrangement whereby the centre swing could be obtained without the use of the extra weight of woodwork usually put in the back for this purpose. A patent box for carrying plates was also shown by Mr. Pringle. This had a simple arrangement of pressure springs, which had the effect of making the plates carried in it practically one solid block of glass, thus avoiding all fear of breakage.

Messrs. Watson's detective camera was next shown by the Secretary, who also handed round a specimen copy of the *British Journal of Photography*, and Mr. Fallowfield's new catalogue, which had been forwarded for the use of members.

Mr. Hawkins exhibited a number of stripping film negatives taken on a cycling tour.

Mr. Pringle then gave a short address upon "Quinol *v.* Pyro." He had made a series of exhaustive experiments, comparing the merits of the two as developers of negatives. The result of them was in favour of pyro. It has been said

that quinol gives negatives of a wet plate character, and this has been advanced as a fact in its favour. Now the distinguishing characteristic of a wet plate negative is clear glass in the shadows. This is a thing we ought to be very careful to avoid. Clear glass would give absolute blackness in the resulting print, and there being no such thing in nature as absolute blackness, the very deepest shadows in a view possessing detail, and this we want to reproduce on our negative. Now quinol will develop the high lights to an abnormal degree of density, while leaving the shadows unaffected. And this great density in juxtaposition to clear glass, while being entirely wrong for nearly all classes of work, is just right for one branch —viz., copying engravings, &c. Another great fault of quinol in landscape work is that it does not render distance or atmosphere. Many workers liked this developer because it gave such "pretty negatives." These were to be guarded against, as, however nice they might look as a negative, it was impossible to obtain a good print from them. While being unsuitable for negatives, it was, however, a most excellent developer for transparencies.

After a short discussion, a vote of thanks to the President terminated the proceedings.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE ordinary meeting of the above was held at the Club Room, Colmore Row, on Thursday, the 25th inst., Mr. W. J. HARRISON, F.G.S., in the chair.

Messrs. R. H. Edney and Alfred Reading were elected members.

Mr. WALTER GRIFFITHS remarked that "Lanterns and Lantern Work" should be a subject chosen for a Tuesday social evening in the Club Room, and that the suggestion be referred to the Council.

The following half-day excursions were recommended by the Excursion Committee:—May 4th, Yardley Wood; May 18th, Dudley Castle; June 11th, Coleshill and Maxstoke Castle.

Mr. B. KARLEESE then introduced the subject of "Cameras and Appliances." In the course of his remarks he said: "In selecting a camera, the chief consideration usually is its cost, and the purpose to which it has to be applied for amateurs, the range of usefulness should be as wide as possible. The remarks I shall make this evening will be confined chiefly to apparatus used by myself (which you see before you), and my experience with the same. This is a tourist camera for whole-plate size, which I consider to be the largest limit to use with convenience and comfort in landscape work. It was made to my own specification, and, as you will see, is of the square form, made of mahogany and with leather bellows, and parallel throughout, closes to a focus of four inches, and extends to twenty-six inches; this is ample range for the lenses usually supplied for this size plate, my own lenses being from eight-and-a-half to twenty-two in focus. The focussing is by rack-and-pinion, and operates from the back, which is preferable to the front focussing, both as regards the convenience for manipulation when using a long focus lens, and the advantage of having the base-board out of the way for a wide angle lens, and the use of a drop shutter. The front has vertical and horizontal movements The back is firmly supported in a vertical position by a long rod running from a groove in the base-board and secured in position by screw nuts at the top. It is quite reversible, and the focussing screen hinged to it in such a manner as to fold completely out of the way when the plateholder is in position. It swings from the centre, also from either side, giving in each case a range of over an inch. The arrangement for inserting the plateholder, you will observe, is of the simplest form, a groove running the length of the back, with a corresponding lip on the plateholder to drop into it, and a spring catch on the opposite side to secure it to the camera, the whole being reversible in two seconds. The plateholder carries two plates, is of book form, and the shutter double-hinged so as to fold completely out of the way. When the camera is closed the base-board folds upon the focussing screen so as to entirely protect it, and you will see that to open or close the camera only two operations are necessary: those of releasing or fixing the side struts, and withdrawing or closing the back to the position required on the base-board; and, most desirable of all the advantages, there is not a single loose screw or pin in the whole apparatus, a *sine qua non* to the forgetful photographer. Nothing has been sacrificed for weight, and I should advise you rather to select a substantial apparatus than to be looking out for phantoms and feather-weights which, when set up in the field, are vibrated by the softest breeze. With respect to levels, rather than fix them to the camera, I prefer to carry a pocket spirit level of about three inches, bearing a small plumb-line, which, with the compass, you will notice are conveniently disposed of in this small case. When travelling, I pack the cameras in one case, the plateholders in another, and the tripod in another. I am then able to carry the whole comfortably, or to accept the services of a companion without the risk of fatiguing him. The tripod I have here is of the sliding pattern, and when set up to its full extent elevates the camera to a height of 5 feet 6 inches, enabling me to see the focussing screen without stooping. At the same time I can reduce it to 3 feet when necessary. Having given you a full description of the apparatus suitable for landscape work, I may mention mine has been in use for two years, and I have not found on the beach, the mountains, or in the field, that any further additions have been necessary."

A long discussion followed, and a number of different cameras and apparatus were explained by the members who exhibited them, and their respective merits debated upon.

The subject of next meeting's paper will be "Composition," by Mr. E. T. COX.

SHAFTESBURY PHOTOGRAPHIC SOCIAL.

THE above Club held their usual monthly social on Friday evening with a good attendance; Mr. BULL in the chair.

The minutes having been read, the evening was spent with songs and recitations.

On Friday next there will be a show of Easter work by the members. Visitors are invited.

DERBY PHOTOGRAPHIC SOCIETY.

THE members of this Society held their first outdoor excursion of the season at Ashby-de-la-Zouch on Saturday last, where, by the kind permission of Mr. J. Hemsley, they were enabled to photograph the ruins of the castle from the grounds of the Manor House. Upwards of sixty plates were exposed, and some excellent negatives obtained. The weather being exceedingly fine, a most enjoyable time was spent. Mr. Hemsley kindly entertained the members to light refreshments during the afternoon, and, before returning home, the party sat down to an excellent repast provided by Mr. Boden, of the Queen's Head Hotel.

NORTH SURREY PHOTOGRAPHIC SOCIETY.

THE annual general meeting of this Society was held at the West Norwood Constitutional Club on Tuesday, 9th April.

The HON. SEC. submitted the audited accounts for the past year, showing a balance in hand of £12 13s. 4d.

The following gentlemen were elected to form the committee for the ensuing year:—Messrs. J. Morrish, W. H. Baldwin, J. J. Bright, J. Larcombe, W. Rice, W. A. Roach, and Dr. Charles Gross, one of whom is to be secretary and treasurer, to which office Mr. J. Larcombe was appointed at a subsequent meeting of the committee.

A hearty vote of thanks was passed to the retiring committee and secretary, under whose guidance the Society was started, and through the efforts of whom it has reached its present height of usefulness to amateurs and others in the neighbourhood.

The next meeting will be held on Tuesday, 7th May, at 8 p.m., when Mr. THOMAS will read a paper, illustrated by lantern slides, on the "Coast of Yorkshire."

The HON. SEC. (address, West Norwood Constitutional Club, Norwood Road, S.E.) will be pleased to send particulars of membership, &c., on application.

NOTTS AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE fortnightly meeting of this Association was held on Monday evening, the 29th ult., at the Society's Rooms, Cavendish Chambers, Market Street, Mr. H. BLANDY, L.D.S., Edinburgh (the President), in the chair, and among the members present being Mr. S. Wells, Vice-President; Mr. P. E. Knight, Hon. Secretary; Dr. Crew, Messrs. R. S. Armitage, J. Furnley Lewis, J. Spray, G. Shepperley, T. Cornell, &c. There was a very good attendance. Mr. George Smith was elected a member.

Mr. POLLARD GRAHAM, of Derby, gave a demonstration entitled "The Relation of Exposure to Development." The experiments were directed chiefly to showing the immense latitude in the exposure possible, with development suited to

the occasion. Four plates had been exposed during the day at Bestwood Lodge, by Messrs. R. S. Armitage and George Smith, the plates used being the Ilford, and exposures being given of 1, 3, 5, and 20 seconds; the three second being the correct exposure. This plate was developed by Mr. Armitage for comparison with the other three after Mr. Graham's development, and it is satisfsctory that Mr. Graham was successful in securing all as good negatives, with little trace of either under or over-exposure. Another experiment was by contact exposure, excellent negatives being secured from a half-plate transparency with exposures varying one second to sixty, which still further confirmed the fact of the extraordinary latitude claimed.

The PRESIDENT, in moving a vote of thanks to Mr. Graham, thought that he had made good his claim to the possibility of getting good results from widely diverging exposures, and had shown the members what could be done by studying the conditions under which they exposed, and that it rested entirely with themselves if they lost a plate through either under-or over-exposure.

Mr. S. WELLS seconded, which was carried unamously.

Talk in the Studio.

THE "STAR" ON IMPRESSIONISM IN PHOTOGRAPHY.—In the *Star* of Monday last, we find the following remarks upon Mr. Cameron's photographs, productions upon which we have several times commented. "Though it may to certain people seem almost profane to compare impressionism in photography with impressionism in painting, when mechanical methods are used by a person of such artistic temperament as the late Mrs. Julia Margaret Cameron, they become artistic. And to the true artist an artistic photograph and an artistic painting are both of value, each in its own way. Any subject treated in an artistic manner must appeal to art lovers, and I say that the person who could photograph the Sir Henry Taylor, the Sir John Herschell—and I agree with the great astronomer that his own head, the Carlyle, and the Tennyson, 'beat hollow anything I have ever seen' in photography—is an artist. But while I do not believe that Monet could produce anything that was not artistic, right on the same wall and virtually in the same frame there are photographs of most proper children with no clothes on, or else the underclothes, by way of propriety, with palpably paper wings, most inartistically grouped and artlessly labelled as angels, saints, or fairies. No one would imagine that the artist who produced the marvellous Carlyle would have even shown such childish trivialities."

ONE-MAN EXHIBITION AT THE CAMERA CLUB.—The third of the series of One-Man Photographic Exhibitions at the Camera Club will be open for private and press view on Monday evening, May 6th, at 8 p.m., and on and after Tuesday, May 7th, it will be open to visitors on presentation of card. The exhibition will continue for about two months. The object of this series of exhibitions is to bring together in turn, as already stated in connection with the Sutcliffe and Tolley exhibitions, representative collections of the work of the best photographic artists. By the co-operation of Mr. J. Gale, the Club is enabled to exhibit a representative set of his photographs. These pictures are chiefly landscape, and landscape with figure, and are printed in platinum and in silver processes.

PHOTOGRAPHIC CLUB.—The subject for discussion for May 8th will be "Fixing Negatives and Prints." Saturday outing at Waltham Abbey; train 2.15 from Liverpool Street Station.

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," (but not letters intended for insertion under the heading "Correspondence") should now be sent to Mr. Spiller, who is alone responsible for all which appears under the heading "Answers to Correspondents." Failure to attend to the above instructions may lead to disappointment.

Answers to Correspondents.

This column will, in future, be under the charge of Mr. John Spiller F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, will be placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

R. S.—Your chocolate mounts are certainly at fault by containing a soluble red colouring matter, and we cannot advise you to go on using them.

E. D. S. (St. Leonards).—You cannot do better than select the instantaneons shutter named at tho foot of your note; it is in every way reliable.

B. B. (Macclesfield).—1. For architectural subjects and groups of tho kind mentioned, choose a rapid rectilinear. Tho size 15 by 12 ought to answer for your purpose. 2. Assuming that your enquiry refers to Mr. Chapman Jones's lectures on Lenses given at the Birkbeck Institution in 1887, you will find the reports at pages 602, 628, 770, and 818 of our XXXI. Vol. See also pages 75 and 154, and the Supplement for February 18th, 1887. We can give you many other references if you wish to have them, but in that case kindly state more specifically your object of search.

NITRATE (Lee).—It is impossiole to give a formula for sensitizing bath which shall be equally suitable for all kinds of albumen paper, and for both dense and thin negatives. From forty to sixty grains of silver nitrate per ounce of water is usually employed, and half as much nitratc of soda is commonly added; but it is manifest that a heavily-salted paper will require the higher proportion of silver, and as the nitrate of soda constantly increases with usc, an old bath merely requires the addition of silver alone to keep it in good working order. Kaolin is certainly the best ingredient for removing the accumulation of organic impurities. Consult for other details Mr. W. M. Ashman's little book on "Silver Printing," or the "Photographic Printers' Assistant," to be had of our Publishers.

L. A. (Burton).—Anderson's wavelet bath is in common use; it was figured and deserihed about two years ago in the NEWS. The rocking silver bath is invariably used for large collodion plates.

E. G.—The photographs are dreadfully spotty; let us see one or two of your plain mounts.

R. S. B. (New York).—With a centrifugal separator you could hardly go wrong, for by its use you can easily remedy any defects, tbe heavier portion of the emulsion being generally found most suitable for ordinary landscape work. Mr. A. L. Henderson's formula was given in the NEWS of March 27th, 1885, and the Eder-Wales method of making a highly sensitive gelatino emulsion in the YEAR-BOOK for 1886, page 185.

MINOR.—Bloxam's "Laboratory Teaching" (J. and A. Churchill) ought to give you exactly the sort of information required to make a start; but you had better join one of the technical classes.

ASTRO.—The stellar photograph exhibited by Mr. Isaac Roberts at the last meeting of the Photographic Society will shortly be procurable, with also one or two others showing peculiar irradiation.

J. M. S. (Wells)—For a gold toning bath take thirty of acetate of soda to each grain of chloride of gold dissolved in ten ounces of water. If you keep stock solutions, and mix them as required, there will be no loss of gold by precipitation.

OLD NEGS.—Methylated spirit is the quickest solvent for old varnished films, but it is perhaps doubtful whether the recovered glass will repay the trouble and cost of stripping. Caustic soda is sometimes used, and is very efficient, although its highly corrosive nature demands special precautions to avoid touching either the skin or clothes of the operator.

EXHIBITOR.—The question of medals was practically decided by the voting at the April meeting; but details will have to be arranged later by the council, and the jurors chosen by ballot.

SUBSCRIBER.—Mr. J. Ashford's address is 179, Aston Road, Birmingham. The new stand is kept in stock by most of the dealers. Now is the time to begin your experiments on foliage development.

E. W. (Birmingham).—A treatise that appears to meet your requirements is Piquepe's "Enamelling and Retouching" (Piper and Carter); and the only suggestion we have to offer is that, for the larger sizes, you should give up the use of your hard pencils, and take a BB or BBB, which must necessarily give a broader stroke more in harmony with the rest of the subject. Have you tried finishing off with an artist's stump to overcome the hardness of your pencil marks?

IN TROUBLE.—You must have got hold of a milled sort of bibulous paper, which is necessarily slow for filtering. If so, use this up for blotting pads, and procure Schleicher and Schull's, which is rather rough in appearance, but excellent for all filtering purposes.

A. E. S.—The patent you mention is not yet accessible.

L. M., and other correspondents, in our next.

PATENT OFFICE LIBRARY

THE PHOTOGRAPHIC NEWS.

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THE GREAT EXHIBITION IN PARIS.

IF we may judge from the opening and from what is already to be seen, the exhibition organised by the French Republic to celebrate the centenary of the overthrow of the French Monarchy in 1879 will, as regards interest and importance, surpass all international exhibitions yet held; and although many persons regret—as we ourselves very much regret—that a political significance has been given to this exhibition, this circumstance need not blind us to the great industrial and technical importance of the gathering together of the nations and their works in Paris. We hope to give rather full accounts of the exhibition in special reference to matters interesting to our readers.

The opening festivities were in every way striking and successful, not only as regards numbers, but also with respect to the spirit and enthusiasm shown by the spectators.

President Carnot—the man elected by the French nation as their head—drove from the Elysée in an open carriage to the exhibition building, where he alighted under the central dome, the building being thronged with gaily dressed spectators; and immediately in front of the President's platform were the ministers and their suites, visitors of distinction, and the representatives of foreign powers.

The English representatives were Mr. Egerton, Colonel Villiers, Mr. Austin Lee, and Viscount Molyneux. M. de Schön and M. de Thielmann represented Germany, and M. Ressmann, Italy. The United States Minister and his Secretary of Legation were also present, and a squad of Marines of the American Navy acted as a guard of honour in the American Section. Neither Russia nor Austria was represented. As the President entered the grounds he was vociferously cheered, and when he took his seat on the platform under the dome, a choir sang the hymn of the Revolution, the "Marseillaise," a detail to be regretted, as possibly causing ill-feeling in some quarters.

"This Exhibition not only forms a magnificent proof of the vitality of France under a Republic," said M. Tirard, in opening the speeches, "but also a proof that other nations also have progressed."

The President read his speech. In commencing, he said, "France yesterday glorified the dawn of a great century, which opened a new era in the history of mankind. To-day we are come here to contemplate all its splendour, the work begotten by this age of labour and of progress. We are come here to greet the workers of the whole world, who have brought to this spot the fruits of their efforts, the productions of their genius. We have come to extend the hand of friendship to all who have been our co-operators in the work of peace and concord to which we have invited all nations. We offer our greeting of welcome to the visitors, who, from all points of the horizon, within and without out frontiers, are flocking to this capital to share in our *fêtes* with utter disregard of distance."

After the Exhibition had been declared open, it took a long time for the President and his suite to visit the various sections, the crowd continually breaking in upon them and cheering for the man of their choice.

The President was the first to enter the fine art section, which, though as yet incomplete, is far more advanced than was at one time supposed. It includes two sections: firstly, the most notable French works of the past ten years; and secondly, the masterpieces of that century of progress which the exhibition is intended to celebrate. About fifteen hundred pictures come under the former category, and about six hundred under the latter; while in the foreign section there are over a thousand pictures.

The British section is the most complete, and we may say the best of the Foreign section, a condition of things largely due to the hard and patient work of Mr. H. Trueman Wood, the Acting Secretary. When the President visited the British section, the crush was so great that some of the members of the British Commission could not make way to the place where they were to receive him. Sir Polydore de Keyser was absent from ill-health, his place being taken by Sir F. D. Bell and Mr. Trueman Wood. Among the other members of the Executive Council present, were Sir Douglas Galton, Sir Andrew Fairbairn, Sir V. K. Barrington, and Sir Joseph C. Lee.

Mr. Trueman Wood made a short speech in French, telling the President of the good feeling existing in England towards the French nation; and M. Carnot, in reply, said nothing in the Exhibition pleased him more than the British section, after which he complimented Mr. Wood on the excellent results of his labour in connection with the British section.

Electric lighting is a prominent feature, the Gramme Company providing most of the electrical plant, and Messrs Davey, Paxman, and Co., of Colchester, supplying much of the motor machinery.

We have already given some particulars as to the photographic exhibits sent from this country, and we hope to have much to say in connection with what may be regarded as the event of the year.

AN EXHIBITION AT SALFORD.

THE committee of the Museum are making arrangements for an exhibition of photographs, which will be opened on the 7th of June, and will be closed at the end of August, admission free. The photographic exhibition sub-committee consists of Alderman Bowes, chairman; Alderman Makinson, deputy-chairman; Alderman Jenkins; Alderman Mottram; Mr. J. Plant, curator.

The regulations are as follows:—

1. The exhibition will include amateur and professional work.

2. Works sent for exhibition must be delivered at the Museum, Peel Park, free from charge, before Monday, 20th May, prior to which date descriptions, and if on sale the prices thereof, including frame (on the official form enclosed herewith), must be sent to Mr. J. Plant, Peel Park Museum, Salford.

3. All works must be sent in framed and mounted; no oval or Oxford frame will be admitted.

4. Every work must have attached to the back of its frame a label, legibly written, descriptive of the subject, with the name of the photographer, and the number (if there be more than one) to which it refers in the description sent to the curator. Exhibitors are also requested to repeat the title and price, with name and address, on a label, to be attached to the back of the frame by a string, so as to allow it to hang over the front of the work during hanging and cataloguing. The strict attention of exhibitors to these regulations is earnestly requested, in order to ensure accuracy in the catalogue; the absence of the price frequently interferes with the sale of works.

5. All moneys arising from sales in the exhibition must be paid by the purchaser to the curator, who, upon receipt thereof, will remit the same to the respective exhibitors at the close of the exhibition, after deducting commission as hereinafter mentioned. It will be a condition of sale that within fourteen days from the close of the exhibition the balance of the purchase money must be paid, and in default thereof the contract for sale will be thereby rescinded, and that the purchaser will not be entitled to a return of the deposit, which will be forfeited, and that, unless otherwise expressed in the sale-note, the copyright will remain vested in the exhibitor. In the event of any such default on the part of a purchaser, the committee will return the work to the exhibitor, and at the same time remit to him the deposit (less commission thereon). The committee do not guarantee payment in respect of any sales of works. A commission of ten per cent. will be charged by the corporation on the price of all works sold. If a sale is negotiated through the committee at a reduced price, the commission will be on the amount actually agreed to be paid; in every other case the commission will be charged on the full price.

6. The committee will undertake to unpack works sent for exhibition, and will re-pack and deliver same to carriers for return at the close of the exhibition, and the utmost care will be taken of all works sent for exhibition, but the committee will not be responsible for any loss or damage incurred whilst the works are in their possession, or in transit to or from the Museum.

All communications respecting this exhibition of photographs, or their sale, must be addressed to Mr. John Plant, curator, Peel Park, Salford.

PHOTOGRAPHING THE NIGHT-BLOOMING CEREUS BY THE FLASH-LIGHT.

Our publication of the interesting account by Mr. Julius Sachse of his experiments as to photographing night-blooming flowers has brought us an interesting communication from Mr. B. Grant, of St. Helena, in which he gives interesting details of a night-blooming cereus common in that island, and he also encloses a fine series of photographs taken after dark; some with the flash-light, and others at twilight. Mr. Grant says:—

"In your issue of 14th and 28th December, 1888, I read with much interest the article by Julius F. Sachse, on the 'Evolution of the Night-Blooming Cereus.' As there is a similar plant growing profusely in St. Helena, at 'The Briars,' 'The Briars' Village' (where I reside), 'Maldivia,' and 'Cambrian Cottage,' at the head of Jamestown, and here and there on the arid hillsides, and this (January and February) being the time of year it bears flowers, I availed myself of the opportunity to try a few plates, and met with, I consider, fair success considering the dull state of the weather at the time. As to the merits or demerits of the photographs sent herewith I leave you to judge, merely stating that I am an amateur of three years' standing, and have gained what little knowledge I possess of photography by reading and working unassisted. My object in photographing these beautiful flowers, and the vine which produces them, was to give you and others who have not had the pleasure (good fortune, I may say) of seeing them, a better idea of the buds, &c., than could be realised from photographs taken at twilight or by the 'flash light.' That the cereus growing here is of the same genus as that of which so excellent a description has been given in your esteemed paper, the photographs (6) sent, I opine, will prove. The only exception is, the vine is much broader than a man's finger—about two inches—and is three-cornered. It was imported here, I believe, from Madagascar, and is locally called 'cactus,' and 'Madagascar creeper,' but the botanical name is *Cereus triangularis*. The bud, in its first appearence, is about as large as a seed of Indian corn, which it resembles both in colour and shape, and sixteen or eighteen days elapse before it opens. The flower comes out in full bloom after nightfall, and remains so until the sun's rays fall upon it (between nine and ten next morning), when it shrinks and dies, sometimes leaving a fruit- the shape of a pineapple—which is edible, but I have not tasted it. Those who have eaten it say that it is very good, but has a faint taste. It is really a magnificent sight to see fifty or sixty of these elegant flowers in full bloom on a moonlight night, when they emit a powerfully fragrant odour, similar to that emitted by the flowers of the 'honeysuckle;' while on dark nights they are scentless. This shows that the moon has great influence on the flowers, causing them to give forth a delightful perfume. Mr. Sachse's description of the flower answering exactly to that growing on the island, I need not enter into detail here further than to state that when in full bloom, it measures over eighteen inches in circumference. I measured a flower at midnight on 2nd instant. The vine is eaten greedily by sheep and goats when accessible to them, and is easily propagated—as easily as the prickly pear (*Opuntia vulgaris*, a cactus), over which it trails."

In reference to his own work, Mr. Julius F. Sachse writes:—"I see by your paper, December 14th, 21st, and 28th, that you have reproduced my sketch of the evolution of the cereus—a fact which has afforded me much encouragement for the future. In connection with this matter, I send you per post to-day four prints of the series which I consider the most important of the set, as they show the growth plainly during the period of exposure of 15 seconds (33), and 25 seconds on 34. The independent outward growth or movement of the pistil is also a curious revelation. I expect to continue these experiments this spring, and should I arrive at any results of interest, I will mail them to you if you care to receive them.

THE BRIGHTNESS OF THE STARS AS DETERMINED BY PHOTOGRAPHY.

In the issue of *Nature* for May 2nd we find some interesting particulars of work being carried on at the Harvard College Observatory, in which stellar magnitudes (using the term in the conventional sense) have been registered on the sensitive plate. The work in question is being carried on by the assistance of Mr. Bache's fund, and is mainly concerned with the determination of the brightness of the stars in three particular regions, each with special qualifications for the functions of standard stars: viz., 1,000 close circumpolar stars, 420 stars in the Pleiades, and over 1,100 equatorial stars. The work, therefore, forms a valuable introduction to a complete survey of the heavens on the same method. The instrument in use is the Voigtländer photographic doublet of 8 inches aperture

and 44 inches focal length, so that the scale is 2 centimetres to a degree. The images of the stars obtained on the plates are of different kinds, the clock sometimes being employed to drive the telescope when the stellar images were points or disks; sometimes the clock was stopped when trails were obtained; sometimes the clock was used, but trails produced through the polar axis of the telescope not being parallel to that of the earth; indeed, the adjustment of the polar axis was made in this way. The standard for measuring the stellar points was a photograph of the Hyades, the plate being exposed six times with exposures of 3 seconds, and 3^2, 3^3, to 3^6 seconds respectively. For measuring trails, a plate was exposed to the polar region, and the aperture of the telescope varied to correspond to successive differences of a magnitude. The result of the careful and independant measurements of the plates show that the measures of a skilled observer of the same star, disk, or trail do not vary on the average by so much as a tenth of a magnitude; so that if the errors due to the photographs themselves can be eliminated, the photographic method of determining stellar magnitudes is at least as efficient as the best photometric methods. The behaviour of photographic lenses of different apertures shows that to double the aperture is to command two additional magnitudes; to treble it two and a half. A 24-inch aperture should, therefore, grasp stars below the seventeenth magnitude. A comparison of the photographic magnitudes with the "Corboda Catalogue" and the *Durchmusterung* gives distinct maxima for the residuals in the Milky Way, showing that the "Catalogue" magnitudes are too faint where stars are numerous.

NOTES FROM AUSTRALIA.

In your January 18th issue there are some interesting notes on the Richmond Photographic Exhibition by Mr. Valentine Blanchard. On reading these notes I have been wondering if it would not give some little additional attraction to these exhibitions were the management to invite photographers in the Colonies to send specimens of their work to be put in competition against the photographers at home. There may be difficulties in the way, but I think if they were got over there are plenty photographers here who would be disposed to try their metal against the men of "light and leading" in England.

A very strong effort was lately made in Victoria to get an *ad valorem* duty placed on dry plates; no less than 25 per cent. was the modest request the local masters wanted. The duty was actually put on, but the outcry against the duty was too strong on the part of photographers to be disregarded, so it was rescinded, much to the discomfiture of the local masters, and the joy of one photographer in particular, who got back 25 per cent., which he considered was gone for ever, from the Customs, having paid this as duty on a large shipment of "Ilfords."

The Melbourne International Industries and Art Exhibition is now a thing of the past; it has been a wonderful success in regard to attendance. I hear from those who were at the Glasgow Exhibition that the Melbourne one was much the larger of the two. Photography was badly represented as far as European exhibits were concerned, and no English photographer whatever put in an appearance.

If one may judge from your columns, photography for 1888 has not been altogether with you in a very flourishing condition, low prices being the principal reason, I believe, to account for this. Here we have two-thirds of the photographers doing two enamelled cabinets for 3s., and the man who substituted these low prices has made a small fortune, so I have been credibly informed. Low prices are having their effect on the higher class establishments, as a great portion of the Colonial public fail to see the difference between the photograph at 12s. per dozen and that at two guineas. Most probably if he or she had any choice, they would prefer the former, "as their face in it was whiter," would be the rejoinder.

We are at the end of our summer; we know it by the shortening of the day, and inversely lengthening of exposure. We know it also by the densely crowded state of the outgoing steamers, who carry with them at this time everybody who can afford the money and the time to spend a year in Europe. As a set-off against this depopulation, we have the weekly stream of immigration pouring into Melbourne and Sydney; and a fortunate thing for photography is the fact that about the first thing these people do is to get photographed, and send the result to their friends at home.

A great complaint among photographers here is the inability to get good retouchers and printers. This is no Eldorado for the photographer, but he certainly can, if he is good at his business, command a much higher rate of wages than in England. Unfortunately, those who do come out, and have had any connection with photography in England, are not of much account. AUSTRAL.

CHEMICAL CHANGES FROM THE MODERN POINT OF VIEW.

BY C. H. BOTHAMLEY, F.I.C., F.C.S.*

WHEN silver chloride is treated with a solution of potassium bromide, it is converted into silver bromide, potassium chloride being formed at the same time; and if silver bromide is treated with potassium iodide, silver iodide and potassium bromide are formed. Using the same data as before:—

$$AgCl + KBr = AgBr + KCl$$
29,380 90,230 22,700 101, 170 liberates 4,260 cals.

$$AgBr + KI = AgI + KBr$$
22,700 75,020 13,800 90,230 liberates 6,310 cals.

The heat liberated by the conversion of potassium bromide into the chloride is greater than that absorbed by the conversion of silver chloride into the bromide; and the heat liberated by the conversion of potassium iodide into the bromide is greater than that absorbed by the conversion of silver bromide into the iodide. In the case of silver chloride and potassium iodide the balance in favour of interaction is still greater.

A different but very instructive example of the necessity of taking all the substances present into consideration is afforded by the reaction between chromium compounds and hydrogen peroxide. It is well known that if hydrogen peroxide is added to an acidified solution of potassium bichromate, a deep blue compound is formed, but this rapidly decomposes, with evolution of oxygen, and the colour of the liquid changes from orange to green because the chromate is reduced to the condition of a chromic salt. Thus:—$K_2Cr_2O_7 + 8HCl + 3H_2O_2 = Cr_2Cl_6 + 2KCl + 7H_2O + 3O_2$.

If, on the other hand, hydrogen peroxide is added to a solution of chromic oxide in caustic potash or caustic soda, the liquid becomes yellow owing to the oxidation of the chromic oxide and formation of a chromate. Thus:—

$$Cr^2O_3 \times 4KHO + 3H_2O_2 = K_2CrO_4 + 5H_2O.$$

That is to say, in presence of an acid, hydrogen peroxide reduces chromates to chromic salts, whilst in presence of an alkali it oxidises chromic salts to chromates. Direct measurements show that the first reaction liberates a considerable quantity of heat, due mainly to the formation of the chromic chloride and the liberation of oxygen, whilst the second reation also liberates heat, owing to the formation of the potassium chromate.†

We see from these examples that the quantity of heat absorbed or liberated plays a very important part in determining the course of a chemical reaction, this quantity being the algebraic sum, or resultant, so to speak, of several subsidiary combinations and decompositions, some operating in one direction, some in another.

In the case of the haloid silver and potassium compounds, which we have already discussed, it is found that if the substances interact at the ordinary temperature, and in equal molecular proportions, the conversion of the silver chloride into bromide is never quite complete, only about 95 per cent. of the theoretical quantity of silver bromide being formed, whilst the

* Continued from page 221. † Berthelot, *Comptes Rendues*, 108, 24.

rest of the silver remains as chloride. The same result is obtained when silver nitrate (one molecule) is added to a mixture of potassium chloride and bromide in equal molecular proportions.* Further, if silver bromide is treated with a large quantity of potassium chloride, a certain proportion is converted into silver chloride.

We come here to the influence exerted on the course and limit of a chemical reaction by the relative masses of the reacting substances. In 1803 Berthollet endeavoured to show in his *Essai de Statique Chimique* that the amount of a chemical change is conditioned by the relative masses of the reacting bodies and their co-efficient of affinity, but as he did not recognise the laws of combination in definite proportions by weight, his views did not meet with general acceptance. Since that time, however, the influence of mass has been investigated mathematically and experimentally by Guldberg and Waage, Ostwald, Potilitzin, and others, and a summary of the most important results can be found in Muir's "Principles of Chemistry" or the English translation of Lothar Meyer's "Modern Theories of Chemistry." This influence is most strongly marked in the case of reversible reactions, *i.e.*, those which under suitable conditions work more or less completely in both directions. One of the best-known examples of a reaction of this kind is the decomposition of a solution of bismuth chloride by water, with production of a precipitate of bismuth oxychloride, hydrochloric acid being also formed and remaining in the liquid, thus :—(A) $BiCl_3 + x\ H_2O = BiOCl + 2\ HCl + x-1\ H_2O$. On the other hand, if bismuth oxychloride is treated with hydrochloric acid, it redissolves with formation of bismuth chloride and water, thus :—(B). $BiOCl + y\ HCl = BiCl_3 + H_2O + y - 2\ HCl$. The reaction is completely reversible, and the direction in which it takes place is determined by the relative masses of bismuth chloride, water and hydrochloric acid.

In all cases where a reaction is reversible we are really dealing with the relation between two velocities. The configuration of the system we are considering, consisting as it does of bismuth, oxygen, chlorine, and hydrogen, is dependent upon the relation between the velocity of reaction A and the velocity of reaction B. If the velocity of A is the greater—*i.e.*, if the conditions are such that more molecules of bismuth chloride are converted into oxychloride in a given time than can be reconverted into the chloride—then precipitation of the bismuth oxychloride will take place, and will continue until, in consequence of the removal of bismuth chloride and the increase in the amount of hydrochloric acid, the velocity of the two reactions becomes equal, and equilibrium is established. When, on the other hand, the conditions are such that the velocity of B is greater than that of A, then more bismuth oxychloride can be reconverted into chloride in a given time than can be formed in that time; hence there is no precipitation, and the system remains in equilibrium.

We regard matter as consisting of very minute particles which we call molecules, and which, in liquids and gases, are in a state of continual motion from place, and are therefore continually coming into encounter with one another. It does not follow that molecules of different kinds will interact every time they encounter one another; but it is obvious that, other things being equal, the greater the number of encounters the greater the chance of a reaction taking place. We should expect, therefore, in the case we are considering, that if we increase the mass of water present, and thus increase the number of collisions between molecules of water and molecules of bismuth chloride, we should increase the velocity of reaction A, or, in other words, increase the tendency to form a precipitate. If, on the other hand, we increase the mass of hydrochloric acid present, we increase the velocity of reaction B, and reduce the tendency to precipitation. It is obvious that the greater the proportion of acid present the greater will be the quantity of water required to produce a precipitate—*i.e.*, to make the reaction work in the direction A. The reaction has been very fully investigated,† and it is found that the mass of water required to produce a precipitate is very large compared with the mass of hydrochloric acid present. The velocity of B, by reason of the affinities of the elements concerned, is much greater under normal conditions, than the velocity of A, and it is only when the mass of water becomes relatively very large that the velocity of A is increased sufficiently to make it exceed that of B.

In the case of the action of potassium bromide on silver chloride, and of potassium chloride on silver bromide, there is even a greater difference in the velocities, that of the first reaction $KBr + AgCl = AgBr$ being very much greater than that of the second, $AgBr + KCl = AgCl + KBr$. In order to completely decompose the silver bromide the mass of potassium chloride would have to be very large indeed, whereas a comparatively small excess of potassium bromide is sufficient to make the first reaction complete, and convert the whole of the silver into bromide.*

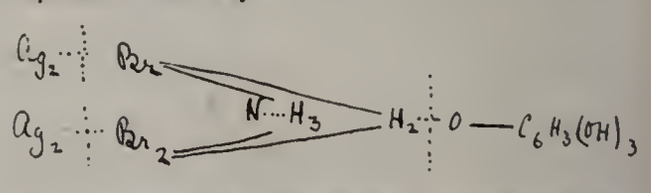
Causes which are commonly regarded as purely physical may exert a great influence on the velocity of a chemical reaction, although, as a rule, they have little influence on the limit if sufficient time is allowed for equilibrium to be established. It is well known, for instance, that vigorous agitation of a liquid, or rubbing the sides of the vessel with a glass rod, will promote the formation of a precipitate. It is also found that precipitation of many compounds is accelerated by the presence of broken glass and similar substances. Admixture with viscous bodies such as gelatine, glycerol, &c., even when they do not act upon the individual substances, frequently retard a chemical reaction in a very marked manner, although, if sufficient time is given, the same result is obtained in the end as if the gelatine, &c., had not been there. Muir had shown (*loc. cit.*) that the way in which the bismuth chloride solution and water are mixed may exert very great influence upon the rate at which the decomposition takes place, without affecting the limit at which equilibrium is established. A bismuth chloride solution of the proper strength can be mixed gradually with a certain amount of water, and precipitation will not begin until after some time; but if the same quantity of water is carefully poured upon the same quantity of bismuth solution, so that the two liquids form distinct layers, and then by agitation they are mixed suddenly, precipitation begins immediately, and at first proceeds rapidly; but afterwards the change becomes very slow. In both cases the same limit is reached in the end.

It has not been possible in all cases to illustrate the different points by examples of specially photographic interest. My aim has been to give a general idea of the various problems which the investigation of a chemical change presents. In conclusion, it may be useful to discuss from this point of view one of the most important, if not the most important, of photographic processes—development by means of alkaline pyro. The initial and final configurations of the system may be presented in this way :—

Initial Configuration.	*Final Configuration.*
$x\ Ag_2Br$	$x+y\ Ag_2$
$y\ AgBr_2$	$x+2y\ NH_4Br$
$z\ NH_3$	$z-(x+2y)\ NH_3$
$m\ H_2O$	$m-\left(\frac{x}{2}+y\right) H_2O$
$n\ C_6H_3(OH)_3$	$n\ C_6H_3(OH)_3 + \left(\frac{x}{2}+y\right) O$
pNH_4Br	pNH_4Br

Here the original substances, neglecting all unnecessary complications, are silver sub-bromide, silver bromide, pyrogallol, water, ammonia, and ammonium bromide, though this last is not absolutely necessary. The products are metallic silver, oxidised pyrogallol, an increased amount of ammonium bromide, and a reduced amount of ammonium and of water.

We start with a certain number of molecules of silver bromide and sub-bromide, of ammonia, water, and pyro; we finish with reduced metallic silver, an increased amount of ammonium bromide, a smaller amount of ammonia and water, and oxidised pyro.† The main chemical attractions which come into play may be represented in this way :—



The horizontal broken lines represent the attractions which tend to keep the system in its initial condition; the unbroken lines represent the attractions which tend to bring about a new

* Potilizin, *Ber d. Deutsch. Chem. Ges.*, 1883, p. 3,053.
† M. M. P. Muir, *Journal of the Chemical Society*, 1879, 811.

* For other examples, see *Journal of the Chemical Society*, 1878, 27; 1880, 60 and 424.
† I assume the existence of silver sub-bromide Ag_2Br, and the truth of the theory of development which is generally formulated. I am not, however, contending for the truth of either of these assumptions, but simply wish to illustrate one method of looking at the phenomena.

arrangement of the atoms ; the vertical broken lines indicate the points at which ruptnres of the existing molecules in all probability take place. It is interesting to observe that the action, as thus represented, is strictly analogous to the well-known reaction between another reducing agent, sulphurous acid, and many colouring matters :—

$$H_2SO_3+OH_2+dye=H_2SO_4+(dye+H_2)$$

H_2SO_3———O ····· H_2——— DYE.

The reactions which take place during the development are complicated almost from the beginning by the introduction of an electrolytic action between the silver bromide and the metallic silver, which, as Abney has shown, plays a very important part in the building up of the deposit of silver.

Now, what a photographer is most concerned with is the rate at which development takes place—or, in other words, with the velocity of the reaction. This velocity depends in the first place, other things being equal, upon the concentration of the developer. Every photographer knows that a strong developer acts more rapidly than a weak one. It depends also upon the temperatnre : if the latter is low, density is obtained very slowly ; but if the liquid is warmed to an average summer temperature, a great increase in the rate of development is at once observed. The velocity depends also upon the relative masses of ammonia, pyro, and ammonium bromide present at the beginning, and, on the whole, shows the same kind of variation as in ordinary chemical changes—*i.e.*, it is very small at the beginning, then rapidly increases, and finally becomes smaller and smaller until the change ceases altogether. Looking at the diagrams of configurations and strains, it is easy to understand why the rate of development should increase with an increased amount of ammonia or of pyro, since these are the active agents in reducing the silver bromide ; and it is also easy to see that the rate of the reaction will gradually diminish, because, as it proceeds, the amounts of ammonia and pyro become reduced, the former being converted into ammonium bromide, and the latter being oxidised. The influence of the ammonium bromide, which is introduced as a retarder, is by no means clear. It may be that we have here something of the nature of a reverse reaction, or that we are dealing with a phenomenon akin to evaporation, the tendency towards the formation of fresh ammonium bromide being reduced when the amount already present in the solution is increased, just as the tendency of a liquid to evaporate is reduced as the amount of its vapour in the surrounding atmosphere is increased. Assuming that the ordinary theory is correct, any cause which checks the formation of fresh ammonium bromide will of course check the reduction of the silver bromide of sub-bromide. This, however, is one of the points which still require investigation—as, indeed, does the whole process. May I, in conclusion, be allowed to point out that the only method of investigation which can yield results of any value in these and all similar cases is the method of painstaking and accurate experiment ?

Discussion.

Mr. Jerome Harrison said that he had frequently had the advantage of hearing Mr. Bothamley, and was always struck with the clearness of his descriptions. He thought that photography was taken up by most photographers as a mere pastime ; but he hoped that they would be induced to go into it more thoroughly At the Conference last year he had proposed the formation of a Government establishment for the testing of lenses. Something had been done in this direction, and he thought and hoped that good schools of photography, such as Captain Abney had undertaken at South Kensington, would be instituted in all our chief colleges and schools.

The President, in summing up, said that the lecturer's paper was so clear, and the theories he advanced so thoroughly proved, that it was not surprising that no general discussion could be raised. Two points he had particularly noted, and those were the influence of temperature and the necessity of the presence of a third substance to bring about any chemical reaction between two bodies. If dry chloride of silver were exposed to light in a freezing mixture of ether and carbonic acid, no colour change would take place. This might be ascribed either to the absence of moisture—the water being all in the solid state—or to the reduction of the temperature. Practically, every photographer knows that printing is always slower in cold weather for the above cause. Another case : suppose silver chloride be exposed in a vacuum ; if great care were taken to have the vacuum perfect, no alteration would take place in the salt on exposure to light, and he had some tubes which had now been exposed to light for years, but still remained pure white. The same remark applied to the action of dyes, when, if moisture and air were excluded, no bleaching action ensued. He hoped photographers would bear in mind the effect mass had on exciting chemical combinations, for, although the facts must be known, they were not properly recognized by photographers. He felt sure that they would also join him in according a hearty vote of thanks to the Lecturer.

EFFECTS PROBABLY DUE TO PHOSPHORESCENCE, ELECTRICITY, AND COLOUR SENSITIVENESS.

BY FRIESE GREENE.*

The question of the action of light upon materials is merely inferred from a number of experiments, and every contribution to this interesting subject may conduce to shorten the time in evolving the truth, however small the effects may be. We may expect from the acts of light some explanation of light itself. Colour, magnetism, electricity, phosphoresence, &c., it is true, stand in the most intimate relation to each other, but we should think of them as belonging to Nature as a whole—for it is to Nature, as a whole, which manifests itself by their means in an especial manner to the sense of light. Really, light is always *speaking* to us in a thousand ways. To clearly understand what knowledge we possess of light, we must make the most of our own time, and more deeply appreciate the knowledge which others have given us before—names too numerous to mention, but valued and honoured all the same, I know. For my own part I should have liked to have washed out the bottles of some of the investigators. I just read these few words, before I relate my experiments, in order to impress you with a touch of the *uncommeasurable* power of light:—"Only imagine, by the aid of a photographic plate or film, you can, in the 1,000th part of a second, obtain a picture which would have taken a lifetime to draw fifty years ago, and then not so true to Nature and so full of minute detail."

We must remember, while experimenting, Nature must ever be present to the worker—that is to say, the success of a play depends upon the peculiarities of the actors, their voices, their gestures, the scene around, and the spirit and humour of the spectators ; so do experiments depend upon the things you are using, the conditions of things around, and the spirit and humour you have for keen observance, power of perception, and common reasoning. Then you must concentrate all these to the one object you are aiming at, for every chemical change is so closely associated with physical change of all description, which you are bound to notice, for all are connected one with the other, and sometimes it is a puzzle to know *which is which.* Look what temperature has to do with that marvellous and perplexing power, *chemical affinity.* We can only account for what we see, and notice to the best of our ability, and weigh our reasoning accordingly. What we surmise may be wrong, still I am under the impression those that can show what their surmises by experiment may be, should be allowed a little latitude for their surmises ; for if they are wrong there is some credit due to them for their trouble—for, look at Aristotle, though he was wrong with his idea of four elements, two hearts, &c., he really set the seed from which we are now reaping great benefit. The eye may be said to owe its existence to light, which calls forth, as it were, a sense that is akin to itself—the eye, in short, is formed with reference to light to be fit for the action of light—the light it contains, or its nearest affinity, which contains corresponding action within and without. This is not easy to comprehend, but undoubtedly it is so. It may be asserted that light, or its affinity, resides in the eye, and that it may be excited by the slightest cause from within or without—of course there is a tone between a faint light and a dazzling light. What I mean by tone is this :—If you go into a dark room after looking at a strong light, your eyes require some time to recover their tone, and, on the other hand, if you come from a dark room to a dazzling light, your eyes are more susceptible. Just the same with focussing the eye. I remember looking one evening out of my window at a full moon, and focussed the markings in the moon as sharp as I could upon the retina, then suddenly looked at a lamp thirty yards away. I found it took four seconds to adjust my focus to the lamp ; it also took four secouds to adjust my focus from the lamp to the moon (of course I am fully aware of the effect on the optic nerve, which con-

* Communicated to the Photographic Society of Great Britain.

tinues a short time after the exciting cause is removed). I feel so ignorant about this persistence of vision, so the less I say the better. Now I want my audience here to notice as I blow this flash-light, to look at the light, then to close their eyes and tell me the shape of what they see at the top. I always see, so do many, the same way as it really is—not inverted. I have had some controversy over this, so I should like to know the effect upon most of you. On some future occasion I shall have more to say about this. I will now hand round a photograph of an electric arc taken with the eye.

Now there is another subject which may be more interesting. You will see by this negative, which I hand round, some magnetic or electric effect produced. Mr. Philip Braham, F.C.S., and I, did this experiment together in this way—it is a very delicate experiment, and I am going to try to do it before you. We wrap up a bromide plate, put it between two powerful electro-magnets, which I have here, then send a current of electricity through it: now set to work this ingenious contact-breaker—which is the work and suggestion of Mr. Braham. The plate is damp, and two platinum plates connected with it, which are connected to this small dynamo. Now I have a continued break of magnetism one way, and a current going at right angles—I will keep this up for two minutes. When I develop you will see the result, which is very curious. I also feel too ignorant to say anything about this. On Faraday's experiment in passing light through two nickel prisms, then sending a current of electricity between the prisms, one prism being more turned than the other, he found that the magnetism from the electricity altered the propagation of the vibrations of the wave length. To me this is a marvellous experiment, and it gave me the suggestion of what you see before you now.

I will leave the electric magnetic effect, and get to the most particular, or at least most important to us photographers at present—colour sensitiveness. I have the things also here, so I will do the experiment before you. I believe it is the first that has been done before an audience. There have been a good many valuable papers upon the subject, but not an experiment. Well, these experiments are delicate, although they seem so simple, and you are not always sure of success; so, if I fail, you must be patient with me, for I will try and try again another time until I succeed; I am so used to failures that I get like an egg, the more you boil it the harder it gets. Now, before I begin, I must say a few words about *colour*. Anything connected with this subject we must approach very, *very* carefully. Though Nature is so full of it, and it acts upon our senses with such force, and we may say it is inherent in all things—I believe the knowledge of the whole world will be found out by colour—I don't mean only the bright and brilliant colours, but the faint and *dusty* colours as well; I maintain, with our slight knowledge of the physical forces, it is impossible to give an explanation of colour, with its separation and contrast, union and reunion, augmentation and neutralisation, and goodness knows what. If the ox begins to rave at one colour, those who try to fathom it with its two millions of tints may be excused if they begin to rave and get furious; nevertheless, let those that study colour with pleasure, let them only master one of the two million tints, they will have accomplished something to the most complicated and beautiful subject. To others who are not so fond of minute detail, and take a broader view of the subject, let them take the relation of colour to the eye, its action and reaction upon that organ; also the relation of colour to different substances, and the action of colour on things around in the evolution of Nature—that is to say, the physical and chemical colours. The first is passing, the second may be made permanent for any length of time, and this is why I believe, as time rolls on, the problem of obtaining permanent photographs which shall represent objects in their natural colours will be discovered, and on *this*, and *this* alone mind you, I base my belief. We are not going to master colour with reading a few paragraphs and doing a few experiments; it will be one continual game of chess—we shall snatch a pawn here and there, and by-and-bye some genius will take a knight or bishop; but the great and grand difficulty will be checkmating—perhaps, after all, it will be a draw. If you ask my humble opinion how far we have arrived at present, I should say about the third pawn. A chemist looks upon colour as indications by which he may detect the more secret properties of material things, but he finds much inconvenience. Why? Because our knowledge of colour is very vague. But no doubt the very faintest tint has its chemical law, and I should say colour is rather calculated to bring to light the most delicate operations of Nature. Of course, though I say this, you must consider that the ideas of men are very varied, according to the way they approach a science or branch, for it depends upon which angle they begin at.

Although the subjects which I have brought before you this evening are not of a very startling kind, I hope the time I have spent has not been wasted, but may bear fruit in elucidating the variety of the subjects. I will not bother you with all the details of my experiments, with the action of different subjects upon a gelatinous bromide film, but give you the best I have at present for colour graduations.

No. 1.

Nitrate of silver	10 grains
Cyanide	10 ,,
Alcohol	2 ounces
Glacial acetic acid	2 minims
Bark of chestnut juice	1 ounce

One dram of No. 1 solution to 20 ounces of water, then add one dram of ammonia; filter, and dip the plate for two minutes. This is the most sensitive, and carries you further into the red end of the spectrum than any I have tried yet. Mind, whatever you do, *filter it well*, and don't use it for a second batch of plates. Keep free from dust, and work cleanly.

ON THE USE OF DRY PLATES IN PHOTO-MECHANICAL WORK.

BY W. T. WILKINSON.*

TWELVE months ago, when any one asked me if dry plates could be used for photolitho and kindred negatives, the answer was, that there were no plates in the market to be depended upon, giving the absolute clear lines so necessary for success. Now, I am glad to say, that there are two brands of plates in the market, that give negatives quite as good as the wet process, when working at its best. This word *best* will no doubt recall old memories, the reverse of pleasant, in the minds of many who had to put up with troubles that a dry-plate worker of to-day knows nothing about. Now, in the case of bother, the operator can get out of it by opening a fresh box of plates; then, no matter how much care was taken, the negatives could not be made.

The two brands of dry plates alluded to above are Mawson and Swan's photo-mechanical, and England's rapid chloride, and upon either plate negatives suitable for photo-litho or photo-zinco—line, or grained—may be done, equal to the best wet-plate negative, and with infinitely more certainty, and far less trouble.

These plates may be developed with either pyrogallic or hydroquinone, the last being perhaps the best. For the sake of those who would like the formula I use, they are here given:—

Pyro and ammonia:—

Stock Pyrogallic Acid Solution.

Meta-bisulphite of potash	1 oz.
Bromide of potash	640 grs.
Water	8 ozs.

Dissolve; then add 1 oz. of pyrogallic acid; then make up to 10 ozs. with water.

Developer, No. 1.

Stock pyro, as above	2 ozs.
Water	18 ,,

Developer, No. 2.

Liquor ammonia, ·880	1 oz.
Water	19 ,,

For a normal exposure, use two parts No. 1 to one part No. 2.

Pyrogallic acid and soda:

Stock Solution Pyrogallic Acid.

Meta-bisulphite of potash	2 ozs.
Bromide of potash	240 grs.
Water	8 ozs.

Dissolve; then add 1 oz. of pyrogallic acid, and make up to 10 ozs. with water.

Developer, No. 1.

Stock pyro, as above	2 ozs
Water	18 ,,

* A communication to the Conference.

Developer, No. 2.

Saturated solution, washing soda

For a normal exposure, use, eight parts No. 1 to one part No. 2.

Hydroquinone developer:—

Solution, No. 1.

Hydroquinone	80 grs
Meta-bisulphite of potash	120 „
Bromide of potash	5 „
Water	20 ozs

Solution, No. 2.

Caustic potash, pure stick	200 grs
Water	20 „

For a normal exposure, use equal parts of No. 1 and No. 2.

Do not waste time and plates trying the ferrous oxalate, as it is the same with these as with ordinary plates; if ferrous oxalate gives a good negative, any of the above developers would have given a better, *as under no circumstances will ferrous oxalate give as good a result as either pyro or hydroquinone.*

For these plates much more light may be used in the dark room, in fact, should be used so that the whole progress of the development can be seen with comfort. Two thicknesses of golden fabric will be found quite sufficient.

The generally accepted idea for a photo-litho negative is that it must be dense. Never mind about anything else so long as it is dense. This is wrong. Get as much density as you can without clogging up the lines; but the first consideration is absolutely clear lines. Get this, and the density is of little consequence. Of course, it must be understood that a *grey* negative will err on the other side.

For making grained screens for half-tone type-blocks, these plates are a perfect boon, it being so easy to get screens free from stains and spots—a condition of things not always possible with wet plates. Besides, the density required can be obtained at one operation instead of the risk of clogging up entailed by the operation of intensifying with mercury, &c.

A few words as to these screens may be acceptable. For the production of half-tone blocks it is necessary to have a variety of these screens ranging in density from a grey to almost a jet-black, the lines in each case being perfectly clear. For each picture to be reproduced a screen must be used that will best suit it. For a flat picture use a thin grey screen, whilst for a hard black and white portrait use the dense screen.

The grained negatives resulting from the use of the screen must be developed so as to get the lines clear. Density must not be aimed at, it being neither possible nor desirable.

For collotype work the wet process has no advantages over good dry plates, as with care and skill quite as good negatives of ordinary subjects may be made upon dry plates as upon wet, and that with less trouble and more certainty, whilst for colour-rendering the dry plate gives the best results. Dry plates can be stripped or reversed with just as much ease and certainty as wet plates.

If the mirror be used for making reversed negatives for collotype, patent plate glass must be used, and this would be too expensive from the necessary failures and other causes; so stripping must be resorted to, and I will here give you the method I have used with unvarying success since 1884. The operations are simple and easy, and its certainty may be judged from the fact that I have never met a brand of plates that does not suit.

1. Clean a few glass plates a size larger than the negatives to be stripped, soak them in weak acid, rub both sides with a clean rag and rinse under the tap, then coat with the following solution:—

Gelatine	2 drs.
Water	20 ozs.
Saturated solution, chrome alum	5 drops

Soak gelatine till soft in the water previously mixed with the chrome alum. Then melt and filter the flood over the wet plate, and stand up to dry. These plates improve by keeping, so a lot may be prepared at one operation.

2. Clean back and edges of negative to be turned.

3. Place upon a levelling stand, and cover with as much collodion as it will hold without running off.

4. Let this film of collodion set thoroughly right through.

5. Immerse the negative in clean cold water, changing occasionally until the greasy appearance is quite removed, and the water flows over the film quite evenly.

6. Immerse the negative in a dish containing fluoric acid 2 drachms water 100 ounces. Rock the dish until the corners of film show signs of coming loose. Then remove and wash under the tap both front and back.

7. In a dish of clean water put one of the gelatinised plates the gelatine film up. Now place the negative face down upon the surface of water, when by a little careful management the film will leave the glass and float upon the surface of water. Now raise the glass plate gently, carefully adjust the film in position, then lift the two slowly from the dish, and with a soft squeegee carefully expel the water from between the glass plate and the film.

8. Flood with, or immerse in, methylated spirit of wine, then place on a rack to dry.

When it is desired to have 6, 8, 10, or 12 negatives upon one plate, they are stripped as above. Then a plate the requisite size, previously gelatinised, is placed on the bench and covered with water, the films being lifted from the water and placed in position one by one; when all are in position place a piece of macintosh cloth over all, then squeegee well.

The process given here is perfectly safe, and if one or two points are attended to, there need be no hesitation in turning the most valuable negative. The important points are, always clean the back and edges of negative, else the tiny shreds of gelatine usually left on the back of gelatine negatives will be detached by the fluoric acid, and will get between the film and glass when stripped, and being so very attenuated will be difficult to dislodge.

Be sure and get a good film of collodion upon the negative, so that the stripped film is easily handled, and any risk of frilling prevented. Be sure the film of collodion is thoroughly set before immersion in the water, else a portion of the film will be opalescent. When this does happen, flood the plate with a mixture of ether and methylated spirits, and remove the collodion by rubbing gently with the fingers, then wash and dry, and try again.

Stripping films are not dry plates, in strict sense of the term, but are close enough allied to come under the heading I have chosen, so I will venture upon a few words as to their use.

In making negatives for collotype printing, the roll holder and stripping films will be very useful, as the negatives after development need only be mounted upon patent plate glass—previously collodionised—and when the paper backing is removed the negative is in its right position for collotype, and if afterwards required for silver or platinum printing, can be stripped in the usual way. The Vergara films dried upon collodionised glass are just as useful, as also are Pumphrey's films.

Notes.

According to a provincial paper, quoted in the *Star* of Tuesday last, Mr Cash, a board schoolmaster, and Mr. Pringle, a solicitor, were out photographing, and a plate was exposed on a river view near Ipswich. When the plate was developed, "there was plainly revealed, in the foreground of the picture, the figure of a woman apparently floating upright in the water, as it is declared that drowned bodies sometimes will, after immersion for a certain length of time. The face and head are clearly outlined; the arms are hanging straight by the side of the body, which is clad in ordinary female attire, and is visible to the waist; and the portrait generally appears to be that of a tall and comely young woman."

The schoolmaster and solicitor, apparently thinking there was some peculiar phantom in the river invisible to the eye, but able to impress the plate, took a chief of police into their council, and the collective wisdom of the three took the form of trying to capture the phantom by dragging the river.

Possibly, by this time, Messrs Cash, Pringle, and the chief of police have learned that phantom images on gelatine

plates are not extremely rare, as a minute hole in a drying-cupboard or box will often cast an image on a plate. Again, such phantom images occasionally arise from a minute hole in the camera, plate-box, or even the dark slide. Most likely a little enquiry will serve to identify the original of the phantom portrait.

From Mr F. North, of 27, Kirkgate, Bradford, we receive a copy of the rules of the newly-established Bradford Photographic Club. Comfortable rooms are provided for members and visitors, and the subscription is only 10s. 6d. per annum. Mr. North is secretary.

Celebrities have no reason to bless photography in one of its aspects. A photograph is common property, anybody can buy it, and the enterprising advertiser can, if he chooses, make use of your features to puff his goods without asking your leave. If you are a lady and the advertisement beautifies you, you smile and say nothing; but when the contrary is the case the effect is not so pleasing. Mrs. Langtry just now is suffering under a sense of wrong which must tend to spoil the most angelic temper in the world. One of the cities in the United States is at present placarded with twin pictures of the Jersey Lily—one inscribed "Before," and the other "After." The first represents the lady with something approaching a toothless cavern in the place where the mouth ought to be, and the other shows her as she is known to the public, with a charming set of teeth. This certainly is an unwarrantable liberty, and ought to be checked at the outset, or we may have Madame Patti as she appears when suffering from an attack of neuralgia, and as she looks after taking a dose of somebody's infallible nostrum; or Mr. Gladstone, after rubbing his head with the contents of one bottle of What's-his-name's hair restorer, represented with long curly locks. In fact, there is no end to the base use of a photograph in this direction.

The reproductions from photographs of garments of ancient date, which appear in the interesting "Studies in English Costume" now running in the *Magazine of Art*, suggest how immensely useful a systematic series of photographs of this kind would be to artists. Fairholt and Planché are too often a delusion and a snare to the artist who wants to be conscientious in matters of detail relating to costume. If not defective, these authorities are too often confusing. Accurate studies can, of course, be made from pictures such as those of Hogarth, but these are not always obtainable. There must be a vast variety of old costume still extant, although time may have made its inevitable ravages. But this is only an additional reason why some steps should be taken to preserve mementos for present and future use.

Photography is far-reaching. Its latest capture is the sign-painter. Recently, in the suburbs of London, we saw a painter hard at work laying-in the colour on a gigantic sign-board, and drawing the design from a 12 by 10 photograph which he had before him. The trade carried on was that of a coal merchant; the proprietor had had one of his waggons and teams photographed, and it was this photograph which the artist was reproducing. There is in this desire for representing truth much that is gratifying, and it would not be surprising if the tendency made itself felt in other directions.

We do not see why, in the not very far-off future, the inn-keeper should not be disgusted with the eccentric animal which has hitherto done duty as a "Red Lion." He probably may stick to the roseate colour, because though a "Black Lion" may be admitted, a "Grey Lion" is altogether outside the "public" interest. But as to form, it is not unlikely that he may insist upon absolute accuracy, and be satisfied with nothing short of a reproduction from a photograph from a Regent's Park lion. The same with the "White Horse" or the "Black Horse," as the case may be. As knowledge spreads, the ancient "White Horse" must give place to the horse as represented by Muybridge. Possibly, at first, the rustic mind will regard the Muybridge variation as a little less like nature than the old animal with the impossible prance, but he will get over this in time. We certainly regard sign-boards as a fine opening for a revolutionary photographer.

That a well-known R.A. is engaged on an important picture, representing a sitting of the Parnell Commission, is an open secret; but we hear also of a "Commission Album" being also in preparation, which will be a complete photographic chronicle of this historical trial. The portraits of everyone concerned—judges, accused, counsel, solicitors, witnesses, officials, and even of the more celebrated of the daily spectators—are to be included, together with photographic reproductions of the more interesting of the numerous "exhibits" put in from time to time by one side or the other. We would suggest a way of making the record still more interesting and historical. Let the compilers, when possible, give two photographs of the more important *dramatis personæ*—one series showing them as they were at the commencement of the proceedings, and the other taken at the period which may be considered to have marked the close of the most exciting crisis in the course of the trial. Thus Mr. Macdonald should be shown both in the witness-box under cross-examination, and as he sat in the well of the court on the day the Attorney-General read out the *Times*' apology. The worn and haggard Mr. Parnell of the earlier days of the case might well be compared with the cheerily imperturbable Mr. P. who so successfully met Sir R. Webster's cuts and thrusts. In a similar way it would be interesting to study the self-assured Mr. Houston who still believed in Pigott, and the pale and agitated young man who tendered himself for re-examination after Pigott's departure; and so on and so forth. Perhaps the most significant pair of portraits, however, would be those representing the President of the Court on the day of the opening of the Commission, and the same long-suffering judge as he will probably appear—if, in sooth he appear at all—on the as-yet-impossible-to-even-approximately-calculate date when the curtain will finally fall on this great legal and forensic drama.

The reduction in price of such metals as are obtained by means of sodium is by no means so rapid and considerable as one might expect from the promises made in advance by the representations of the various Companies and Syndicates; but we find now that aluminium is being actually offered and sold at $8·50 (say 35s. 6d.) per pound by the Newport Aluminium and Steel Company of Newport, Ky., United States; while magnesium wire, ribbon and shavings are now sold in London at 16s. 6 l. per lb., one shilling per lb. less being charged for the powder. The magnesium in question is of German manufacture.

We have now come to the time when magnesium is actually sold at a reasonable price, and when photographers may freely use it; this "*is actually*" being a pleasant contrast to the numerous promises made during the years in which the price has been 12s. 6d. per ounce. A sudden reduction to 2s. 6d. per ounce not long ago came welcome enough; and now the powder can be had at less than one shilling per ounce by taking one pound.

That reduction in the price of silver which brings comfort to the photographer or photographic experimentalist, may have grave national consequences from the proposal to pay all government workmen in silver, as far as the statutory limit of legal tender will allow. Now, considering that out of three-and-sixpence worth of silver, token-coins, current for five shillings and sixpence, can be constructed, the Exchequer can make a considerable show of *apparent* economy by such a proceeding, although, if carried on far, the result would be a constant refusal to take silver in amounts over the legal tender, with an impossibility of banking this metal without giving discount, also a flow of gold out of the country: in fact, all the disturbance incident to a depreciated currency.

The production of silver is now so considerable that a steady decline in price may be anticipated. Indeed, experts say it will go down to about one-eightieth the price of gold, or about one shilling per ounce; a condition of things which will much facilitate photographic work. At present, plate makers hardly put enough silver in their plates to render them reasonably proof against halation. Then, we may hope for denser films. Still the reduction to about one shilling per ounce is not likely to come for some decades.

It is largely in the satisfactory "registering" of his slides, as projected from the several elements of his "double" or "triple," that the expert lanternist shows himself superior; and in connection with registration we may refer to a first-class system which was recently shown to us by Mr. J. H. Steward, of 407, Strand.

Standards for registering are provided and sold by Mr. Steward in the shape of photographic diagrams of cross-lines, and these are mounted in wood, so as to be identical in relation to the bottom and back edges, and all slides are mounted in their wood slabs in relation to these standards, this being a very simple and easy matter to any one accustomed to use his hands; indeed, we may say to anyone who is fit to have charge of a lime-light apparatus.

To get things right for exhibition, the adjustment has to be made in relation to the distance of the screen, and the objectives to be used, and it is done by putting one of the standard cross-lined plates right home into each element of the lantern, when it will be resting on a bottom ledge supported by two adjusting screws, and will be in contact with another adjusting screw at the end. Lock-nuts provided on the adjusting screws must now be released, and the screws shifted until the lines of all the slides coincide on the screen, when the lock-nuts are once more tightened up. The lanternist can now go through his work with the certainty of every slide being in its exact position when first made visible to the audience.

The arrangement, as shown to us, was fitted to a triple lantern, which Mr. Steward sells at £100, a really well made lantern, with three sets of objectives, full adjustments, and excellent all through; indeed, a striking contrast with much of the cheap lantern work of the day.

A capital and very interesting illustrated article on Photography, by Mr. Trowbridge, appears in the May number of *Scribner's Magazine*. We there find illustrations of photography by the various artificial lights, pin-hole photography, orthochromatic photography, a burning building photographed by its own light, a flash of lightning, a frog taken under water, photogram of human speech, besides a number of other items which have been dealt with in the Photographic News and other publications.

Among the interesting photographic items sent from the New World to the Paris Exhibition, we may refer to a remarkable series of instantaneous photographs by Mr. E. Marx, of Plainfield, N.J., comprising animals in motion and bursting shells. A large shell as projected from a pneumatic gun is also shown, the photography making apparent the condensed air cushion in front of the projectile.

The illuminations at Paris on Monday night afforded a striking contrast with the old system of gas-pipes studded with minute jets subject to partial or complete extinction by every breath of wind. When the cannon announced the illuminations were to begin, the Exhibition building, the gardens, the Eiffel Tower, and the fountains were suddenly bathed in light; incandescent and arc electric lights being the chief illuminants. On the top of the tower was an immense arc light which quite cast in the shade the giant arc light of the Brush Company at the late Electrical Exhibition, while the outlines of the tower were trimmed with incandescent lamps that seemed countless, the whole forming a beacon visible at a distance of over fifty miles. It seems that some sort of lantern show is to be exhibited from the top of the tower, the views being emblematical of the events to celebrate which the exhibition has been organised. But whether the clouds are to serve as a receiving screen is not stated.

Not long ago we referred to the photographing of mines, and our remarks have brought to us some remarkably successful photographs of the Clausthal Mines, these having been taken by Mr. E. J. Padmore. We understand that Mr. Padmore uses the flash light.

A "white ink" of which a sample is sent to us by Mr. W. Tylar, of Birmingham, is excellent for writing on dark mounts or on the bindings of lantern slides. Also it is excellent for writing on the backs of books bound in dark-coloured cloth.

So widely is Dr. Emerson's masterly work on Naturalistic Photography" appreciated, that a second edition is in the press. It seems to be as much read by artists as by photographers, and will, we are confident, do much to raise the status of photography as an exponent of art, also to teach artists what real and legitimate use they may make of photographs.

FIFTY YEARS' PHOTOGRAPHY.

BY W. LANG, JUNR.*

WE will now come down to the year 1864, and in this year we find that a distinct advance was made when Bolton and Sayce brought forward their collodion emulsion process. As is well known, this method did away with the sensitizing bath, the sensitive salt of silver being formed in the collodion and the salts of decomposition removed by washing. The actual gain in sensitiveness was not by any means great, it was rather the reverse; but this method of proceeding, when applied to the vehicle gelatine, has been the means of giving us all the brilliant results photography has in these latter years achieved. Up to the point we have been considering, the iodide of silver had formed the mainstay of the photographer, but with the introduction of the emulsion plate recourse was had to the bromide. Emulsion processes may be broadly classed as washed and unwashed. In the latter, the emulsion was washed *in situ* on the plate; in the former, the washing was effected on the material as a whole.

Leaving collodion emulsion, and passing on to consider its more successful rival—gelatine emulsion—the first in the field to point out its posssibilities was Dr. Richard Leach Maddox. We present you with his portrait. Dr. Maddox, in 1871, secured negatives by means of a silver salt emulsified in gelatine. In 1874 Mr. A. Kennett published a formula giving good results; and in 1878 Mr. C. Bennett, a photographic amateur, published results showing how great sensitiveness and rapidity were to be obtained by keeping the gelatine liquid for several days at a low temperature. This mode of obtaining the silver salt in a highly sensitive condition received the somewhat homely term of "cooking." The results obtained by the foregoing experimenters were sufficiently remarkable to bring others into the field, and the consequence was that many modifications were introduced, all having the same end in view, viz., to produce a very susceptible photographic plate. We may simply refer to some of the names associated with this work, the late Dr. von Monckhoven, Dr. H. Vogel, of Berlin, Colonel Stuart Wortley, Mr. W. B. Bolton, Mr. W. E. Henderson, and many others.

There is one investigator who stands out pre-eminently in scientific photography, and who has done much towards clearing up many of the chemical changes involved when light acts on the sensitive gelatine film—I allude to Captain Abney. To appreciate fully the value of the work done by Abney, a certain amount of chemical knowledge is necessary. Had he done nothing else, the preparation of his peculiarly constructed form of silver bromide, whereby he was enabled to photograph the red rays of the spectrum and the rays beyond, would have earned him the foremost place. Abney first pointed out the capabilities of hydrokinone as a developer, the point of difference between this substance and the pyro being that while the latter requires the presence of the restrainer, the former can be used *per se*.

As I would like to refer to what has been done in processes where silver has not been made use of, and to photo-mechanical processes, we will require to pass on. I feel that I am disposing very summarily of much that is interesting and necessary for a true estimate of the gradual development of that process which has made photography the thing it actually is; but in order that I may not appear before you again this session with another continuation, I will try to compress the more salient points still to be touched upon into the narrowest possible limits. A few words, then, in the first instance, regarding the carbon process. We have in our first communication already referred to the reaction noted by Mungo Ponton of the reduction by light of a bichromate; but another fact has to be recorded, and it is this, that should gelatine, glue, gum, or albumen be present along with the bichromate, these substances become insoluble. Taking gelatine and mixing with it a certain amount of colouring matter, and coating paper with the mixture, thereafter treating it with a solution of bichromate, we find that after exposure to light we are enabled by the dissolving away of the unaltered gelatine by means of hot water to obtain a picture. Certain precautions are necessary, such as developing from the back, &c., to secure the half tones, but these we need not enter upon, as it is with the history of the subject we are more immediately concerned. Talbot had utilised this property of the insolubility of the altered gelatine for the production of his etched plates in 1853, but Poitevin, a French chemist, patented a carbon process in England in 1855, and Pouncey, an Englishman, published in 1859 a similar process. Half tones were awauting in both processes. It was not till 1864 that carbon printing became an accomplished fact. Mr. J. W. Swan may be reckoned the true pioneer, when he showed how to develop the picture from the back by transferring it to an india-rubber support while developing; he it was who first introduced the now familiar carbon tissue. We have not the time to go into all the simplification of details which has gradually been evolved in the working out of the process, but we may simply refer to Sawyer's flexible support, which was a decided advance, and which was introduced by Mr. Sawyer in 1874. The carbon process remains with us to this day, and judging from the number of pictures on opal plates produced by this means presently for sale in the various shops in Glasgow, it shows no sign of diminishing vitality.

We have already alluded to Poitevin, and we think we may safely say that what is known as photo-lithography was to a large extent worked out by this Frenchman, and here again the alteration brought about by light on gelatine in presence of a bichromate is made use of. In this case, after damping the gelatine and going over it with a greasy ink, it was found that where the light had acted there the ink would adhere. The inky picture thus obtained was originally transferred to the stone, and subsequent impressions could be taken in quantity from this transfer. Drawing an ink impression from the surface itself constitutes what we now know under the names of collotype, lichtdruck, heliotype, and various other cognomens. The carbon image, as you are aware, is a true relief, and a photo-mechanical method was founded on this by W. B. Woodbury. The presence of the colouring matter always present in carbon tissue prevents the light penetrating to the depth it otherwise would; but if we do away with the colouring matter, or reduce it to a minimum, we get on development a very marked relief indeed. Woodbury obtained such a picture, and by forcing it into a lead plate by means of suitable apparatus, an intaglio or mould of the original was secured. Impressions were drawn from this by means of a special ink—viz., gelatine—holding a colouring material to resemble the tone of the silver. It was run into the mould hot, paper was laid on the top, and the whole was tightly pressed in a press of a peculiar construction. When cold, the paper had the gelatine picture attached to it, and the mould was then ready for a repetition of the process. Woodburytype, as this mode has been called, may be said to have come into existence in 1864. It was duly protected by patent. In 1880 a modification of the process was brought forward by Woodbury, where the relief itself, protected by a layer of tinfoil, was employed to draw the prints from. It received the name of Stannotype. Many other photo-mechanical processes were devised by Woodbury, who has been—appropriately, I think—styled the Caxton of photography. The title is certainly well deserved, when we see first-rate likenesses of celebrated men and women retailed in the shops for the modest sum of one penny. Woodbury died in somewhat straitened circumstances on September 5, 1885.

We have already referred to Poitevin, who may be reckoned the Woodbury of France; but we wish at this point to refer to

* Continued from page 268.

a process worked out by Poiteviu, and one which can be made to give good results. Orgauic matter in the preseuce of a bichromate again forms the starting-poiut; but another property which light induces, founded ou the hygroscopic nature of the substance employed, dextrine and sugar for the most part, is made use of. After exposure, a fine impalpable powder is dusted over the plate, and it adheres in those parts protected from the light; heuce, a negative gives a negative reproduction reversed as regards right and left. From the nature of the operation involved, the name of the "powder process" has been given to it. The salts of iron have been found to give similar results to the bichromate usually employed. Photographic research does not seem to be one of those things which tend to benefit financially the men working at it. Like Woodbury, the Frenchman whose process we have been consideriug died unrewarded. He seems to have all his life worked at photographic reactious and photographic applicatious, and I know of no more suggestive book than Poitevin's "*Traité des Impressions Photographiques.*" Louis Alphouse Poitevin was born at Conflaus in 1819, and died in his natal town on March 4th, 1882. We caunot go further with his career, but France, mindful of its distinguished men, has erected a commemorative bust to Poitevin in the town of Conflans.

We will simply refer to one other photographic process, aud one, perhaps, which has been made to suffer through being protected by patent, although this no longer applies, for all are now free to use it—I refer to the platinotype process. The merit of discovery of this mode of printing is due to an Englishman, Mr. W. Willis, jun., who took his first patent out in 1873, although subsequent patents followed in 1878 and 1886. The nature of the chemical reaction involved is, however, one of those discovered as far back as the days of Herschel, and is duc to the action of light on a ferric salt, reducing it to the lower state of oxidation. The ferric salt is mixed iu the first instauce with a salt of platinum, and paper coated with this uixture, after exposure, say behind a uegative, is floated or drawu over a hot solution of potassium oxalate. When the light has reduced the ferric salt to the ferrous state, then metallic platinum is deposited. We may simply add that a direct printing-out platinum process has lately been devised, but it would appear that the printing is a very tedious affair.

We have not time to go into all the various salts which from time to time have been brought forward, and on which light has been found to have a decided influence. Salts of uranium have been largely experimented with, and their behaviour seems to be very much the same in character as that of iron. The salts other than iron, the chromates and those of silver, affected by light, would require a paper to themselves. I feel I have trespassed sufficiently on your patience as it is, but perhaps you may allow me to conclude with a quotatiou I have, on a previous occasion, given, and one which shows how photography was regarded by one who knew uothing of the practical working of it, but who looked only at its influence. I refer to what Janc Welch Carlyle wrote :—

"Blessed be the inventor of photography! I set him above even the inventor of chloroform. It has given more positive pleasure to poor suffering humanity thau auything that has cast up iu my time, or like to : this art, by which even the poor can possess themselves of tolerable likenesses of their absent dear ones. Mustn't it be acting favourably on the morality of the country? I assure you I have ofteu goue iuto my own room in the devil's own humour, ready to swear at things in general and some things in particular, and my eyes resting by chauce on one of my photographs of long-ago places and people, a crowd of gentle thoughts has rushed into my heart, driven the devil out as clean as ever so much holy water and priestly exorcism could have done. I have a photograph of Haddiugtou Church tower and my father's tombstone in it, of every place I ever lived at as a homc, photographs of old lovers, old frieuds, old servants, old dogs."

PHOTOGRAPHIC CONVENTION.

ARRANGEMENTS for the Photographic Convention of the United Kingdom are fast approaching completion. The Great St. James's Hall, Piccadilly, has been taken for the week of Convention in Auguet; some influential patronage from the worlds of science and art secured, the list including such names as Lord Raylcigh, Sir J. D. Linton, Dr. William Huggins, Mr. Vicat Cole, Professor Dewar, &c.; and plans are practically settled for the exhibition of apparatus and pictures in the splendid hall which has been secured. Manufacturers and dealers will probably soon have before them conditions for the exhibition of their goods, and it has been determined to make uo charge for pictures not exhibited for commercial purposes.

A new and probably welcome feature is to be an exhibition of coloured pictures from or on photographic bases, but for evident reasons arrangements must be made to prevent the colour work from marring the effect of plain photographic prints. Tho exhibition of photographs will, it is expected, be of high quality rather than of large extent, but on account of the *prestige*, tho centrality, and the ease of access of the Hall, a "run" may be expected on space for exhibits of apparatus.

It is also a part of the project to get together a collection of material marking historically the eras of photography, and inventors will find encouragement, and facility for displaying any outcome of their genius, whether new or old.

The optical lantern will be used ou a gigantic scale, papers read by the highest authorities, and a varied series of entertainments will mark the Convention week.—*Communicated by* Mr. PRINGLE.

"ON ALIZARINE BLUE."

BY COLONEL J. WATERHOUSE, B.S.C.*

I HAVE lately received from Europe two sample of alizarine blue, which appear to be very simple and efficient seusitisers for photographing the red end of the spectrum on gelatine dry plates. One is "alizarine blue, S.W." (B.A.S.F.),† the solution of which has rather a greenish tint when dissolved in distilled water, and ammonia is added. The other is "anthracene blue," from Schuchardt. Its solutiou is of a bluer tint.

Used in the ordinary way for bathing dry plates, in a solution of a strength of 1 : 10,000 with about oue per ceut. of liquid ammonia added, they both impart to the plates very strong sensitiveness for the region C to A of the spectrum, and on beyond to Z, as the accompanying photos. will show. I have not yet been able to try their full capabilities of photographiug the infra-red rays, but it seems likely that they would prove useful for this purpose. Though so strongly sensitive to red rays, they seem insensitive to yellow, and, I find, can be worked in an ordinary dark room without serious fogging, though it would no doubt be better to work iu total darkness.

For copying work, this dye seems to give iucreased sensitiveness to red. I use as a colour-scale the specimens of watercolours published in Winsor and Newtou's little book on water-colour pigments. I hope to experiment further with this dye, and publish more detailed observations.

I have also lately been trying the B.A.S.F.'s new dye, "rhodamine," an amidophenol phthalein, as a substitute for the eosins iu orthochromatic copying work. In colour, it resembles the bluest-shade eosins, such as cyanosin, but has a vivid scarlet fluorescence, which is not destroyed by acids, as is the case with the eosins, but on the contrary it is rather enhanced. Used in a 1 : 10,000 solutiou with one per cent. of ammonia, it sensitises gelatine dry plates very strongly for the yellow rays of the spectrum about D, and a little below, towards the orange; but as a sensitiser for orthochromatic copying work, it seems scarcely equal to erythrosin, and is nearer the yellow-shade eosins.

I had hoped to have found a dye which would have replaced the eosins, the use of which, for practical dry-plate work, has to a great extent been blocked by patents. Further trial will show if this beautiful new dye is of any practical use in orthochromatic photography, and it would be interesting to kuow whether so near a relation of the eosins could be used without iufringing the patents. So far as my rough trials have gone, it seems to give about as good results with the addition of acetic acid as with ammonia. It is, however, curious to note that the addition of nitrate of silver appears to lessen the sensitiveness to yellow, instead of increasing it, as it does with the eosins. The dye does not precipitate readily with nitrate of silver, and the precipitate is very soluble on the addition of water. I write to you about this as your acquaintance with these dyes will enable you to give more information about them than I can, and especially as to the exact relationship of rhodamine to the eosins. I think it has been produced from fluoresccin.

I shall be much obliged if you will kindly bring the subject to the notice of the Photographic Society. Both dyes seem

* A Communication to the Photographic Society of Great Britain.
† The Badische Anilin Soda Fabrik, of Ludwigshafen.

well worth working out farther, and I only hope they will remain free, though there can be little doubt that the French patent has been the making of orthochromatic photography.

I notice a discussion is going on about "azalin." I have tried hard to get some quinoline red, but failed. It does not seem to be a commercial product. I have a lot of dyes to work at, but it is slow work, and not many turn out promising.

Correspondence.

NATURALISTIC ART.

Dear Sir,—May I call the attention of all students interested in Naturalistic Art to the following works which are now on view in London, and which no art student should miss seeing.

The works of Corot, Millet, and Maris, at Dowdeswell's Gallery, 180, New Bond Street. This is a rare chance for studying works by these masters.

The works of Monet and Corot at Goupil's Gallery.

Mr. Sargent's portrait of Ellen Terry at the New Gallery—the "biggest" thing of the year. Mr. Sargent's two pictures at the New English Art Club (Dudley Gallery) showing a distinct advance.

Mr. Adrian Stoke's "The Harbour Bar," Mrs. Stoke's "Go, thou must play alone, my boy, thy sister is in Heaven," Mr. Frank Bramley's "Saved," Mr. Stanhope Forbes' "The Health of the Bride," Mr. J. F. Goodall's "The Mill on the Marsh," Mr. W. E. Norton's "Condemned," Mr. Fisher's "Festa," Mr. Logsdail's "Sunday in the City," are at the Academy.

Mrs. Cameron's photographic portraits at the Camera Gallery, 106, New Bond Street.—I remain, yours faithfully,

P. H. Emerson.

A PHOTOGRAPHIC ASSOCIATION FOR HACKNEY.

Dear Sir,—In the name of the Hon. Sec., Mr. Fenton Jones, of No. 1, King Edward's Road, I have great pleasure in announcing to you that he has been successful in forming a photographic association at Hackney, N.E., which bids fair to become an important one.

At the first meeting nearly thirty members assembled, besides which the secretary holds numerous promises. The proceedings, ably presided over by Mr. E. J. Wall, were of an enthusiastic character. After the rules had been agreed upon, the following officers were unanimously chosen:—Mr. W. Fenton Jones, *Hon. Sec.;* Dr. Gerard Smith, *President;* Dr. Kibbler and Mr. J. Hubert, *Vice-Presidents;* Mr. J. Jolly, *Treasurer.*

It was decided that the committee should be elected at the next meeting—Thursday, the 9th inst.

The meetings are intended to be held fortnightly in the winter, and monthly during the summer. The entrance fee was fixed at 5s., with an annual subscription of 5s.—I remain, yours truly,

J. Hubert.

238, *Mare Street, Hackney.*

Patent Intelligence.

Applications for Letters Patent.

6,678. Henry Hutchins and Thomas Frederick Brice, 8, Quality Court, Loudon, for "An Improved Apparatus for the Delivery of Cards, Photographic and other Pictures, and Prints on Prepayment."—April 18th, 1889.

6,686. Thomas Rudolph Dallmeyer and Francis Beauchamp, 4, South Street, Finsbury, London, for "Improvements Relating to Photographic Cameras and Lenses."—April 18th, 1889.

6,749. Charles A. Hoffmann and Ralph D. Cleveland, 76, Chancery Lane, Loudou, for "Improvements in Shutters for Photographic Cameras."—April 20th, 1889.

6,771. Peter Swanson, 70, Wellington Street, Glasgow, for "Improvements in Actinometers for Photograp hic Purposes."—April 23rd, 1889.

6,886. Carl Paul Stirn, 52, Chancery Lane, London, for "Improvements in Revolving Photographic Cameras."—April 25th" 1889.

6,959. Charles Shaw, 104, Aston Road, Birmingham, for "Rendering Rigid the Legs of Light Portable Camera Stands.'—April 26th, 1889.

7,007. Charles Studders and Georg Kohl, 18, Buckingham Street, Strand, London, for "Improvements Relating to Screens and in Producing in Cameras Photographic Negatives Suitable for Mechanical Printing Processes."

Specifications Published.

7942. Thomas Kerr, of 52, Grosvenor Park Road, Walthamstow, in the County of Essex, Trimming Manufacturer, for "An Improved Photographic Detective Camera and Changing Box."—Dated 31st May, 1888.

A reservoir arrangement, somewhat like that of Mr. Harrison's. The Pateutee says:—

The sensitive plates are placed in the lower division of a chauging box (which consists of two chambers communicating) iu separate cases of metal or other suitable material, and pushed to the front vertically by a coil spring, and are thus exposed in rotation. Each plate, after exposure, is raised to the upper chamber by means of a vertical slide with catch at base, the slide being worked by lever arms on a shaft from the front of camera. The plates, on reaching the upper chamber, are kept in position by a second coil of spring. The plates are moved by the operator from one chamber to the other by a lever attached to the lever shaft, which may be kept inside or brought outside the camera case (preferably inside) as desired, and fixed to this lever is a handle passed through a slot in the side of camera case. A lock is adjusted to secure the lever handle when not in use.

For the purpose of registering the exposures, a ratchet wheel, lever, aud pawl is attached to the lever arms on the side of camera, so that simultaneously with the movement of each plate into position a numbered disc rotates, and shows the number of exposures that have been made.

5194. Dr. Heinrich Ludwig Hugo Schroder, of 17, Althorp Road, Upper Tooting, in the County of Surrey, Optician, and John Stuart, of the The Hollies, Clapham, in the County of Surrey, for "Improvements in Lenses."—Dated 7th April, 1888.

This invention has for its object to provide a lens in which the errors of curvature of the image and colour correction incident to other lenses are overcome, and this over a large field of view. Lenses made according to this invention give a sharply defined image throughout the field, which is of great advantage in most or all applications of lenses, and especially so for photographic and other like purposes. Hitherto all achromatic lenses (having either flat or other contact surfaces) that give a positive image have the convex radius shorter than the concave radius.

Now the distinctive feature of the lens according to this invention is that by employing glasses combined as hercinafter described the radius of the convex surface is enabled to be longer than that of the concave surface, and at the same time a positive image is still obtained. The convex and concave surfaces may thus be arranged to represent parts of two concentric spheres.

According to this invention the objective is composed of a convexo-plano leus made of glass of a high refractive power, and relatively low dispersive power, combined with a plano-concavo lens made of a glass of lower refractive power than that of the glass of the convexo-plano lens, but of the same or higher dispersive power than that of the glass of the said convexo-plano lens. The inner or contact surfaces of these two lenses are placed together, and preferably cemented, the convexo-plano lens formiug the frout portion of the objective.

By proper choice of the radii of the spherical surfaces of the lenses, and of the glasses used, and of their thicknesses, an aplanatic lens can be made having a positive focus, that is, a lens giving a real image of an object receivable on a screen, and having great flatness of field, and suitable colour correction throughout a considerable angular distance from the axis. The ratio of tho radii of the two concentric spherical surfaces will depend upon the refractive powers and dispersive powers of the glasses used, as hereinafter moro fully explained.

And in order that our said invention may be fully understood we shall now proceed more particularly to describe the same, and for that purpose shall refer to the several figures on the annexed sheet of drawings, the same letters of reference indicating corresponding parts in both the figures.

Figure 1 of the accompanying drawings is a transverse section of an objective made according to this invention, *a* being the convexo-plano lens of high refractive and low dispersive power, and *b* being the plano-concavo lens of lower refractive power

Fig 1.

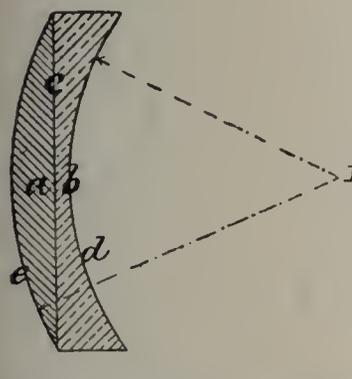
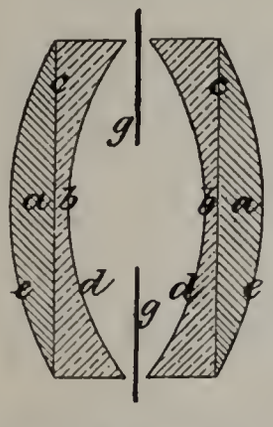


Fig 2



and the same or higher dispersive power. The convex and concave external surfaces (marked respectively *c* and *d*) are portions of concentric or approximately concentric spheres having their centre at *f*, and the plane internal surfaces are preferably cemented together at *c*.

In order to obtain a plane image throughout a large field of view, the radii of the external surfaces (*c* and *d*) should have a certain ratio to each other dependent on the refractive and dispersive powers of the glasses used.

In practice it is found that the limits of the refractive powers of glass available for the front lenses of the improved objective are from about 1·59 to 1·61 ; the index being taken to be corresponding to the D line of the spectrum. Similarly, the range of refractive powers for the glasses available for the back lens of the said objective ranges from about 1·50 to 1·53 ; the refractive index being, as before, that for the D line of the spectrum. It is to be understood that these figures are given as being what are considered the best with glass as now generally obtainable.

With the before-named glasses the ratio of the refractive and dispersive powers which would produce the best radii so far as flatness of field and suitable colour correction of the image are concerned, is given by the following tables :—

Table No. 1.

Dispersive ratio = *w*. Dn = Index of refraction relating to the convexo-plano lens.			DN = Index of refraction relating to the plano-concave lens.
1·59	1·60	1·61	
0·916	0·904	0·891	1·53
0·903	0 890	0·877	1·52
0·889	0·876	0.864	1·51
0·875	0·863	0·851	1·50

Table No. 2.

Ratio of the concentric curves = $\int$

Dn = 1·59.

DN	*w*	$\int$
1.53	0·916	1·072
1·52	0·903	1·086
1·51	0·889	1·100
1·50	0·875	1·115

Dn = 1·60.

DN	*w*	$\int$
1·53	0·904	1.083
1·52	0·890	1·097
1·51	0·876	1·112
1·50	0·863	1·126

Dn = 1·61.

DN	*w*	$\int$
1.53	0·891	1·094
1 52	0·877	1.109
1·51	0·864	1·123
1·50	0·851	1·138

Thus, for example, if the front or convexo-plano lens *a* have a refractive power of 1·61 for the line D in the spectrum, and the back or plano-concavo lens have a refractive power for the same line of 1·50, the ratio of the curves of the two spherical surfaces of the lenses (*c* and *d*) should be 1·138, in order that throughout the field of view the image may be plane with suitable colour correction.

Slight deviations may be made from the directions given above, as, for example, by slightly departing from the plane internal surfaces (*c*), or from the concentricity of the external spherical surfaces (*c* and *d*), or from the ratio of the radii or dispersive and refractive powers of the two glasses (*a* and *b*) given by the above tables without departing from this invention ; but we believe that, by following the rules given above, the best results will be obtained with glass at present obtainable.

With the aid of these tables the requisite ratios of the dispersive power appertaining to the refractive powers of the glasses used, and also the requisite ratios of the radii of the lenses, may be calculated by the ordinary method of interpolation. The objectives may be used singly, as in figure 1, or combined, as in figure 2 (*g* being the diaphragm between them).

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is :—

1. The combination of a convexo-plano lens made of glass of high refractive power and relatively low dispersive power with a plano-concavo lens made of glass of lower refractive power and the same or higher dispersive power (the said lenses having plane or slightly curved contact surfaces and outer concentric or approximately concentric surfaces) to form an aplanatic lens or objective giving a positive image, substantially as hereinbefore described with reference to the accompanying drawings.

2. The improved lens or objective hereinbefore described.

5140. James Hines, Engineer, of Dunedin Lodge, Lenzie, Dumbartonshire, Edward Howell, House Furnisher, of Inglebank, Lenzie, aforesaid, and Alfred Howell, Tobacconist, of Ingleside, Pollokshields, Renfrewshire, for "Improvements in the Modes and Means or Apparatus for Taking and Producing Photographs, and in Appliances connected therewith."—Dated 6th April, 1888.

A complex arrangement intended for the automatic taking of portraits.

We will commence this somewhat long specification next week

6814. Samuel Mark Clark, of 54, Cheapside, London, E.C., Secretary to a Public Company, for "Improvements in and relating to Photographic Cameras and Dark Slides."—Dated 8th May, 1888.

A reflecting camera of the "Sutton" type.

8193. Heinrich Mader, Photographer, and Friedrich Oertel, Merchant, both of Augsburg, Bavaria, for "Improvements in Photographic Cameras."—Dated 5th June, 1888.

A folding camera, with conical bellows, and lazy-tongs struts, and numerous adjustments.

Proceedings of Societies.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 2nd inst. ; Mr. W. England in the chair.

A member asked for information as to the best detective camera.

Mr. A. S. Newman exhibited a detective camera, quarter-plate size, that he had made from suggestions from Mr. S. Medland. The lens is fitted with an iris diaphragm, and works to within two feet of the camera. The plates are changed by hand, by means of a bag.

Mr. C. P. Cembrano described a camera that required no dark slides or sheaths, the plates being fixed vertically on a revolving circular plate.

Mr. J. B. B. Wellington showed some photographs of the Oxford and Cambridge boat race taken with a detective camera. They were perfectly sharp.

Mr. W. Cole exhibited two photographs—one taken on an isochromatic plate, the other with an ordinary commercial plate. The difference was very marked.

A question from the box was read :—"Can shellac be obtained that will be perfectly colourless when dissolved? If not, can the colour be eliminated?"

Mr. A. Cowan considered bleached shellac worthless for photographic purposes.

Mr. A. Haddon said shellac was frequently bleached by passing chlorine gas through it, which, to a great extent, destroyed the properties of the shellac.

The Chairman expressed a similar opinion—that white shellac was useless. He recommended seed lac, which made an excellent, tough, clear varnish. A very bright colour could be obtained by shaking the varnish up with animal charcoal.

West London Photographic Society.

At the ordinary meeting on May 3rd, the President in the chair, joint papers on "Enlarging" by Dr. Harrison Low and Mr. John A. Hodges were read.

Dr. Low, after some introductory remarks, said that enlarging was undoubtedly a good subject for discussion; the methods were various, and opinions upon their relative merits equally so. The advisability of getting a large picture appealed to every one. All were agreed that a large picture was better than a small one within due limitations. He thought if all could work 12 by 10 size at the same expense and with the same comfort there would be small demand for quarter-plate cameras, and even the strictest Pharisee of the quarter-plate sect, the lantern slide enthusiast, was but an enlargement man in disguise. He was aware that the production of big pictures by enlarging was not everywhere received with favour, but to his mind the taking of large pictures direct was put out of court by the large and costly apparatus necessary. His observations would be confined to enlarging on direct bromide paper. Opinions upon this method varied considerably, from eulogies (chiefly commercial) commencing "permanency at last," to condemnations like "bromide prints are not worth the paper they are printed on," the opinion given lately by a gentleman well known as a writer to the photographic journals. A far more weighty depressant had lately emanated from the pen of a vice-president of this Society, whose book on "Naturalistic Photography" had caused some stir. Dr. Emerson considered, speaking of enlarging, "it was in our opinion a needless and undesirable proceeding." This coming from a high light in our art was another shock, and but for the presumption he (Dr. Low) should have thought the high light a little dense in this particular. [Dr. Low then proceeded to read extracts from the chapter on "Enlarging."] Dr. Emerson's strictures on enlarging were to him the more surprising because they appeared to give that very broad pictorial effect so much advocated by him, and in many instances good examples possessed all the "tonality" of platinotype. Though disagreeing with the author on this matter, the book was one that should be read by every photographer. He pressed the claims of direct enlargement on bromide paper as opposed to making lantern slides and showing them upon a screen. He had come across clever photographers whose knowledge of theory and practice was as an encyclopædia to an elementary hand-book, who had not half-a-dozen decent prints to show, but who revelled in negative or transparency making. It was not, however, to be forgotten that to these gentlemen working in a scientific way, mere picture makers were indebted for tabulated results; therefore, he trusted his remarks would be taken good-humouredly. As to methods, he would only speak of daylight, leaving artificial methods to Mr. Hodges. His own mode of working had the great recommendation of being cheap, contrary to an apparatus recently exhibited at the Crystal Palace, which was said to be "just the thing for amateurs," and was only £14 or £15. If a room could be set aside for the purpose, so much the better; but personally he had to do a "Cox and Box" performance with a relative who occupied a small upper room facing south-west; therefore he had to arrange that when Cox was there, Box's arrangement should not interfere with Cox. [Dr. Low then demonstrated his method of working.]

Mr. Hodges said although he only proposed to deal with the various methods of enlarging by means of artificial illumination, he wished them to understand that he considered the results obtained by daylight were much superior, and that after a careful comparison of results, he had abandoned the use of artificial light in favour of daylight. Artificial illumination, however, had many points in its favour: it enabled photographers to work at night, and in dark weather, and the duration of exposure could be ascertained with a greater degree of accuracy. Broadly speaking, an apparatus for enlarging by artificial light embodied the same principles which applied to the construction of an optical lantern, and if the negatives were very small, an ordinary lantern might be used, or if they were of larger dimensions, a lantern transparency might be made by reduction in the camera, and a small negative printed therefrom by contact, which could then be enlarged to any required dimensions in the lantern. Mr. Hodges then demonstrated the method of working an enlarging lantern. Speaking of illuminants, any form of limelight might be used, or failing that, a flame of oil or gas. It might be taken as an axiom that the smaller the source of light, the better would the definition be. An ordinary circular wick burner would be found to give results equally as good as the very expensive parallel wick arrangement, although the exposure would be slightly protracted. In regard to lenses, probably the best results would be obtained with a lens of the ordinary rapid type, preferably of longer focus than would ordinarily be used to take the negative. Attention to this point would ensure the attainment of better marginal definition and greater flatness of field. Mr. Hodges then demonstrated the function of the condenser. A form of lantern which dispensed with a condenser was introduced some time back by M. Hutinet, although the principle appeared to be old. It consisted of a chamber enclosing rows of gas-jets arranged in tiers, which strongly illuminated a sheet of ground glass, against which the negative was placed. A modification of this system recently suggested by Mr. Ferrero would probably be found to answer the purpose better. He thought one reason why bad results were often obtained when using artificial light lay in the fact that artificial illuminants of low intensity did not possess sufficient penetrative powers to enable the full scale of gradation of tone in the negative to be reproduced. For this reason, when developing negatives to be enlarged, extreme density should be avoided. A negative inclining to thinness would give the best results. In regard to developing bromide papers, he had found some brands apt to give hard prints, but it produced more pleasing results by modifying the developer. He used one part of iron to ten of oxalate diluted with an equal bulk of distilled water. He wished to call their attention particularly to alpha paper, on account of the great variety of tones obtainable with it. It was very slow, but allowed great latitude in exposure. The colour produced by development might be modified by toning with any ordinary toning bath, or the ferro-cyanide intensifier might be employed, which would result in the introduction of brown tones. Mr. Hodges then referred to the production of enlarged negatives, and advocated Mr. V. Blanchard's process, which was described in an old Year-Book as being a simple one to work, and capable of giving fine results. In conclusion, he strongly advocated the practice of taking small negatives, and enlarging therefrom. Working a large size meant a heavy tax upon one's purse, and the possession of a more than average amount of physical endurance and energy. He would ask why should the photographer, who from motives of economy or lack of physical strength is compelled to adopt a small size plate, be debarred from the pleasure of seeing his work reproduced upon a large scale?

Mr. Foxlee said that he had had considerable experience with artificial light, including the electric light and magnesium, but he gave a decided preference to daylight. The mode of illumination with paraffine lamps and no condenser, spoken of by Mr. Hodges, would be improved by using two pieces of ground glass placed about an inch apart. He thought the focus of the lens used by Dr. Low (six inches) was too short; a longer focussed instrument would give more equal illumination. Speaking of

processes, if the negatives were suitable, bromide paper would give excellent results; if, however, the negative was not a very good one, a better result might be obtained by making an enlarged negative through the medium of a transparency. In reference to Dr. Emerson's assertion that commercial enlargers examined negatives with a magnifier for the purpose of ascertaining that they were sharp, he would only say that that was contrary to his experience; in fact, he had known many instances where the enlarged image was intentionally made a little out of focus. Mr. Hodges had said that he used a very weak developer with a very small proportion of iron; that was the way in which M. Nadar worked in producing the very fine specimens shown by the Eastman Company. He thought Dr. Low's arrangement would be improved by the employment of a reflector placed outside the window.

Mr. Broughton said it was hardly to be expected that Dr. Emerson would advocate enlarging. He seemed to aim at getting only one small portion of the negative sharp, and the rest as much out of focus as possible. Such negatives naturally would not produce good enlargements. He had found hydrokinone in conjunction with caustic soda cause frilling. The addition of a small proportion of chrome alum was an effectual remedy. He had used a great deal of alpha paper, but had not obtained very successful results.

Mr. H. Selby had been able to produce a good range of tones on bromide paper with hydrokinone by lengthening the exposure and diluting the developer. He had also produced some warm tones with the uranium intensifier on under-developed bromide prints.

Mr. Foxlee said if Mr. Broughton used washing soda instead of caustic soda, he would not be troubled with frilling. He always used it himself, and successfully.

Mr. Whiting considered artificial light better than daylight for most people, as the exposure could be more easily determined, and with the rapid papers it was more under control. Mr. Foxlee had said that some people threw their eulargements out of focus. That was a practice much to be deprecated. It was said that the late Mrs. Cameron was in the habit of racking the lens in and out during a portion of the exposure, and that might be better than doing it during the whole of the time. He preferred himself a sharp photograph.

Mr. Blackmore said his remarks on ferrous-oxalate development referred to negative work. With regard to the proportions of iron to oxalate, he would go further than the previous speakers: 1 to 30 worked well in his hands. He did not agree with the practice of diluting the developer with water to such an extent as had been recommended, as it tended to produce hardness in the prints. He had also noticed that a large proportion of bromide produced on an over-exposed print an unpleasant greenish tone; he had therefore discontinued its use.

Dr. Low was surprised to hear Mr. Foxlee speak disparagingly of the electric light. Personally he thought nothing could be better.

Mr. Foxlee said that the Eastman Company had gone to great expense in fitting up the electric light, but had abandoned it, and they now used daylight.

Dr. Low and Mr. Hodges having replied, the proceedings terminated.

The members will meet on the towing path under Richmond Bridge at 3 o'clock on Saturday, May 25th, for an outdoor excursion.

Coventry and Midland Photographic Society.

April 25th.—The first out-door meeting of the season was to Stoneleigh Ashow and Kenilworth, but there was a poor attendance of members. A large number of exposures were made with fairly satisfactory results.

May 1st.—Usual monthly meeting; Mr. President Andrews in the chair. The next outdoor meeting was fixed for May 22nd, at Lichfield. A very pleasant evening was spent examining the negatives taken at the outdoor meeting and the prints from them. Specimens of Mr. Valentine Blanchard's new process were also handed round.

North Middlesex Photographic Club.

The above Club held a members' lantern night on Monday, May 6, which was highly successful, owing chiefly to the kindness of Mr. Chatham Pexton, who found the lantern, gas, screen, &c., and worked it himself. Slides were exhibited by Messrs. Humphries, Hiscock, Pexton, Beadle, Lethbridge, Cox, Walker, and Treadway, some of them being in sets.

A short meeting was afterwards held, at which the Council announced that they had decided that it would be advisable to remove the Club to a room known as Jubilee Hall, in the Hornsey Road, which they had taken from June 24th, there being greater convenience; a dark room being attached to it, and being next to the Hornsey Road Station on the Midland Railway. This change would necessitate a slight alteration in the printed syllabus of the Club, it being necessary to hold the meetings on the second and fourth Monday nights of the month, instead of each alternate week.

May 20th.—Technical meeting, Iron Room, Strond Green.

The Cincinnati Camera Club.

At the regular meeting of the Club, Monday night, April 1st, Dr. Carson in the chair, the Philadelphia slides were shown, and officers for the ensuing year were nominated.

The second meeting of the month, held Monday night, April 15th, Mr. Prince in the chair, was largely attended; the St. Louis slides were shown.

Mr. E. B. Johnston read an able criticism on the recent Annual Club Exhibition, using a number of slides to illustrate; Messrs. Kelly and Smith manipulating the lantern.

The following officers were chosen:—
President—Mr. George Bullock.
Vice-President—Mr. William Hubbell Fisher.
Rec. Secretary—Mr. Emery H. Barton.
Cor. Secretary—Mr. H. C. Fithian, N.W., Cor. 5th and Walnut Sts., Cincinnatti, Ohio.
Treasurer—Mr. Aaron Prince.
Librarian—Mr. Arch. I. Carson.

Shaftesbury Photographic Social.

The above Club held their meeting last Friday evening, when Mr. Tollett took the chair.

Being a show of Easter work, each member was called upon to show his work. Among the very many different views, there were some interesting pictures from Chiselhurst, by Mr. Tollett, and some instantaneous views from Chingford, by Mr. Bull, taken with the "Aurora" camera. There were also a good set taken with the "Eclipse" camera, by Mr. Baker, of the Portsmouth manœuvres; some of the Volunteer Medical Staff Corps being very plain and distinct.

After an interesting discussion,

The Secretary announced that on Friday evening next, at 8·30 (Mr. D. Rintoul in the chair), Mr. Tollett will give a paper on "Alpha Bromide Process." On Saturday afternoon, May 18, the Club will go to Chingford.

East Dulwich and Peckham Photographic Society.

At a meeting held at 76, Peckham Rye, on Friday, May 3rd, Mr. Warnerke in the chair, six gentlemen were elected, and ten proposed, as members.

The subject of the lecture was "Flash Light Photography," by the Chairman.

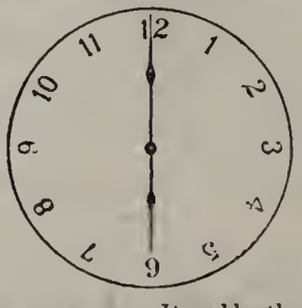
Mr. Warnerke pointed out the great help to the photographer the flash light is capable of becoming, particularly to the amateur, whose opportunities of work, if limited to daylight, are few, unless he is at liberty during the day. Mr. Warnerke handed round the lamps he used, and explained that they were inexpensive and easily constructed, while, from specimens he handed round, they were evidently effective. During the evening Mr. Warnerke photographed the members of the Society by flash light, taking one of the negatives on Fry's celluloid film, which he retained in the dark slide by means of adhesion to a support coated with a sticky substance that had been on the support two years, and was still tacky. The lecturer also showed a powerful magnesium lamp useful for copying.

The lecture was much appreciated, and a hearty vote of thanks was voted to Mr. Warnerke.

The next meeting will be held at the same place on Friday, May 17th, at 8 p.m.

Talk in the Studio.

A Printer's Tally.—Mr. H. B. Hull, writing to Mr. Wilson's *Photographic Magazine*, says: "As you are always so willing to publish anything of interest to photographers, I send you herewith a drawing of an arrangement for a printer's tally, such as I



have been using for over a year. It enables the printer to register and tally on each frame. Those who adopt it will find the two hands like the hands of a clock: one to register the number of the prints to be printed, the other to tally the prints as they are printed, will work the best. For example, when the tally-hand arrives at the register-hand, you are told at once that the order is finished. Anyone having the old-fashioned tin tally can improve it to agree with my method. I think the engraving will make the little thing perfectly plain to everybody."

A Photographer's Patron.—The Paris correspondent of the *Daily News*, in giving an account of the tradesmen's bills of the Marquise d'Avary, a well-known Society beauty, which have been before the Civil Tribunal of the Seine, and have caused much amusement, notes, among other bills which she ran up in the course of twenty-five days, a photographer's, amounting to £228. The lady's husband, the Marquis, refused to pay these bills, and the tradespeople sued him on the ground that he was bound to provide her with the clothing and accessories which her social status demanded. The tribunal took this view, and decided that the debts of the Marquise were to come out of her husband's fortune. It, however, declared some of the bills ridiculously high.

Photographic Society of Great Britain.—On Tuesday, May 14th, at 8 p.m., at the Gallery, 5a, Pall Mall East, Mr. T. R. Dallmeyer will read a paper on "The Form and Applications of Single Landscape Lenses."

Dr. Emerson's "Naturalistic Photography."—In a letter which we received too late for insertion in the usual place, Messrs. Sampson Low and Co. inform us the price of the above is but 5s. The following is the essential portion of their letter:—"You say, at foot of above notice, *'price not stated'*; please make it known through your columns that the price is 5s., post free."

Testing Citric Acid for Adulteration with Tartaric Acid.—M. Salzer recommends the following process to photographers, as it only involves the use of chemicals ordinarily found in the photographic laboratory. The method of testing consists simply in adding to a solution of the suspected crystals a drop of solution of yellow chromate of potassium. If the acid be purely citric, the yellow colouration thus produced remains unchanged for some days at ordinary temperatures, even if a few drops of sulphuric acid be added. If, however, tartaric acid be present, the yellow chromate is converted into a violet salt of chromic oxide. M. Salzer states that the presence of so small a quantity as one half per cent. will be shown by this reaction after the liquid has stood for a few hours.

Photographic Club.—The subject for discussion on May 15 will be "The Relation of the Focal Length of Lens to the Size of the Image." Saturday outing at Finchley, Church End.

*** Everything relating to the Literary Department of the Photographic News, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," (but not letters intended for insertion under the heading "Correspondence") should now be sent to Mr. Spiller, who is alone responsible for all which appears under the heading "Answers to Correspondents." Such communications, if now sent to the Editor, are forwarded by him to Mr. Spiller. Failure to attend to the above instructions may lead to disappointment.

Answers to Correspondents.

This column is now under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, is placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, Photographic News, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

L. M.—We have seen the correspondence to which you refer, and the article headed "A last word to Prof. Dr. H. W. Vogel, of Berlin," by the Editors of the *Mittheilungen*. It is no new thing for Vienna and Berlin to be at variance, and the dispute seems to cover not only the ground of Dr. Vogel's claim to priority in the use of chinoline red and cyanine for orthochromatic photography, but to have personal motives introduced into it by reason of the disinclination and refusal of the Berliners to take any part in the Vienna Jubilee Exhibition.

W. S. (West Dulwich).—We do not know the address of the gentleman about whom you are enquiring.

A. F. (Dublin).—The publisher of M. Arthur Batut's work on "Composite Photography" is Gauthiers-Villars, of Paris. A notice of it appeared in the News of October 28th, 1887. Its exact title is "La Photographie appliquée a la production du type d'une famille, d'une tribu, ou d'une race."

Photochemic.—Bromine is always given off during the exposure of a gelatino-bromide plate, although under ordinary circumstances this would be inappreciable. We have recently had occasion to notice a strong smell of bromine escaping from an accumulation of old hand-coated plates, which were, in bright sunshine, being stripped of their sensitive layers prior to being re-coated by a more perfect mechanical method. The gelatine may appropriate part of the liberated bromine, but certainly not the whole of it, for the smell was very apparent.

Block Printer.—The details of the Dallastype process have never been revealed. Whether bitumen on zinc or not, we cannot say.

P. M. (Boston).—Zaehnsdorf's self-binding mounts can be had of Messrs. Marion and Co., Soho Square, or of the Eastman Company, 115, Oxford Street, W.; see advertisements.

Adjutant.—The gun-drill pictures were formerly to be had through the War Office. We do not hear of any "new series," but enquire for yourself at head-quarters.

H. H. B.—It is quite impossible to get an efficient camera and lens for the sum named. Double your estimate, and you may succeed in getting a tourist outfit (quarter-plate) which will answer for a season; or buy second hand.

Argent.—We remember the kind of paper which you describe as being applicable to transfers and enlargements, but do not know how it was prepared. Try a heavily sized paper coated with collodio-chloride emulsion, print, and attempt the transfer on to glass upon which a film of india-rubber solution has been previously spread.

T. D. (Tralee).—The advertisement appeared in the Year-Book, and has since been several times repeated in the News, without your name being published in connection with the work. Whether or not it is mentioned within the covers of the book is easily ascertained by getting a copy.

G. W. B. (Hull).—Answered by post.

Red Rays.—The discussion on Colonel Waterhouse's paper will be taken at the next meeting of the Photographic Society, on Tuesday evening, 14th instant.

Sheffield Boy.—The lenses of your cabinet portrait combination are put together in the right order, and a glance at the image of a flat surface, such as a newspaper or placard, on the focussing screen ought to assure you that such is really the case.

Intending.—Mr. Bolas's lectures are being delivered at the City and Guilds Central Institution, South Kensington, and not at the Finsbury Technical College; hence your mistake. They will be continued every Wednesday evening, at 7.30, until June 12.

A. B. C.—There are so many different forms of detective camera that it is not an easy matter to advise you. Stern's vest camera is perhaps most easily concealed, but the Kodak, Luzo, Krügener's book and Shew's hand camera are all available patterns.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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VARIETIES IN INTENSIFYING ACTION.

A QUESTION that is frequently asked, both at those meetings of photographic societies which are held in the less formal manner that has of late years become so general, and elsewhere, is, "What is the best intensifier for gelatine negatives?"—a question that is commonly answered by a mention of the particular method that happens to be the one used by the photographer who is applied to for his advice. A point that does not seem to have been brought prominently forward is the question whether different intensifiers may not act in different ways, not merely in the amount of density obtainable by their means, but in the manner of conferring that density. If this is the case, the form of question may with propriety be varied, and be made to read, "What is the best intensifier for a particular kind of negative?"

This question of variety in the manner of action of intensifying agents is one which has not received much attention in connection with the use of gelatine plates, perhaps on account of a difficulty that many have found of meeting with any one intensifier that would act altogether satisfactorily, so that when once such has been found, the photographer is not inclined to make further experiments for the mere sake of obtaining variety.

There is, however, room for a good deal of experimental investigation in this direction, and a consideration of the differences of behaviour that have been held to be characteristic of different intensifiers when used upon a collodion film should be at the least suggestive when working with a gelatine plate.

The two methods of intensifying in most common use with collodion plates were, the one with silver solution mixed with a reducing agent, iron or pyrogallic developer, and the other a solution of mercury followed after washing by an application of an agent to darken or render more permanent, or both, the deposit that ensued from the use of the mercury salt. In these two methods there is an essential difference of action. With the silver intensifier there is an additional piling up of deposit upon that which has been thrown down in the first instance by the developing solution proper. With the mercury solution there is a change of the reduced silver into a haloid, and a deposition of mercury in the mercurous or sub-haloid form. With the silver or piling-up method, it has been held that the action would commence where the deposit is greatest, and that indeed where the deposit is exceedingly thin, as in the darker half-tones, there would be little, if any, additional intensity conferred by the use of the silver and pyro, or silver and iron, as the case might be. This selective action of the intensifier for the highest lights, whilst leaving the darker half-tones nearly where they were, was considered to render the method particularly advantageous for negatives that were fully or somewhat over-exposed, helping to confer the pluck and sparkle that such negatives particularly needed.

The mercury method of intensifying, on the other hand, appears to act, as it might be expected to do, on the whole of the deposit, whether feeble or strong; but the action seems to be complete upon the thinner portions earlier than upon those places where the deposit is strongest. This may be shown by turning the plate over whilst in progress of intensification, when it will be seen that the highest lights resist for a longer time than the half-tones, the change of colour that gradually comes over the plate, and indicates a change in the constitution of the deposit itself. The characteristic just mentioned renders the mercury method, when the process of intensification is stopped before the whole of the deposit has been acted upon by the solution, particularly serviceable for negatives that are somewhat under-exposed; the darker half-tones, which in such cases are always too thin, receiving their full increment of density, whilst the highest lights, although somewhat strengthened, are not proportionately so. Silver, on piling up intensification in these cases, leaves the dark half-tones still notably too weak, and the harsh effect of under-exposure is rather aggravated than not.

In pointing out the difference of character of intensity obtainable by these two methods, we do not say that they, or other modes of intensifying, may not be modified by variations in the manner of using them; thus, with the mercury method, if the solution be allowed to act until its full effect has been obtained all through the deposit, the intensification will presumably be proportionate throughout. Differences will also be found to arise from the particular method of treatment that is adopted to follow the use of the mercury solution.

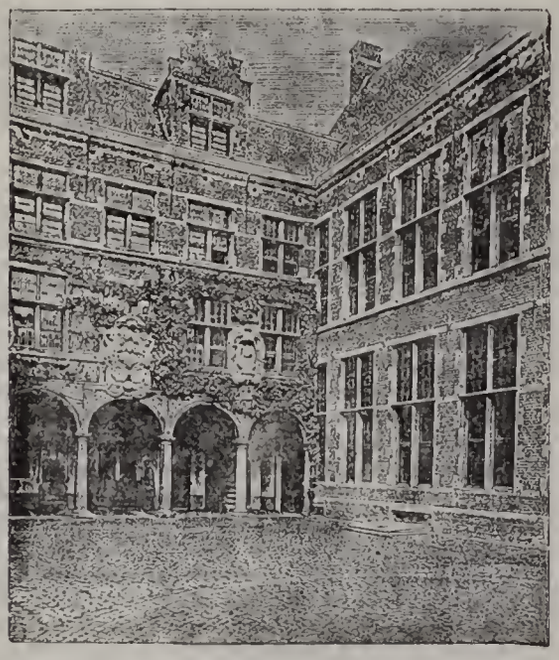
Supposing the subsequent application to be that of a solution of Schlippe's salt, as described in the YEAR-BOOK OF PHOTOGRAPHY of 1888, it will be found that with a solution of modern strength, the darker half-tones will have received their full amount of action before the highest lights are thoroughly changed. This again, like the action of the mercury solution, can be watched from the back of the plate. If the action of the Schlippe's salt solution be stopped by thorough washing at this stage, the plate may, if desired, be afterwards immersed in clean strong hypo, and the deposit that has not been completely converted by the sulph-antimonial salt—part of the highest light, that is—may be dissolved out, giving a somewhat modified character to the image.

Other variations of the intensifying solutions, or of the manner of using them, will, doubtless, occur to the reader. What it is desirable to point out is, that there is a potential difference of action obtainable, and that advantage should be taken of this difference to get the best result from negatives which may be possessed of very different characteristics, but yet alike in requiring some kind of intensification.

MR. BRIDGE'S PHOTOGRAPHS OF THE PLANTIN-MORETUS MUSEUM.

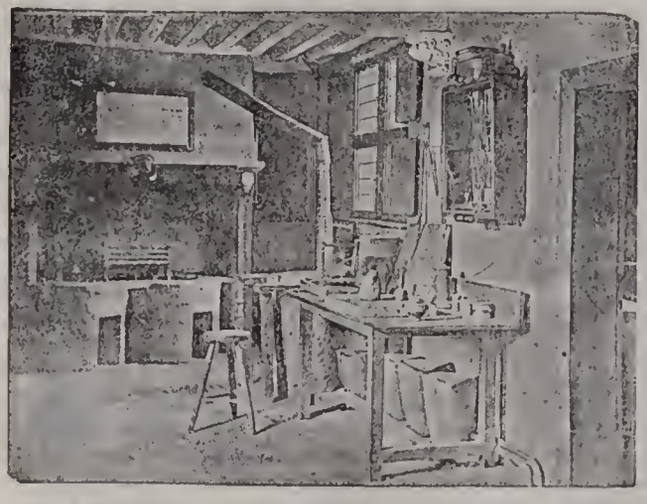
NOT long ago we made reference to a fine series of photographs of the Plantin Museum at Antwerp, taken by Mr. F. A. Bridge, and we now have availed ourselves of an opportunity of reproducing four of these photographs in the form of "Dallastype" blocks.

Perhaps the Plantin Museum is one of the most striking relics of the past now in existence, its very special interest centering on the fact of its completeness; that it repre-



sents the life of a past time with a realness and completeness, compared with which the remains at Pompeii are almost as a bare and mocking skeleton.

The Plantin House was established at Antwerp in 1555, when the industrial and commercial prosperity of the city was at its height, by Christopher Plantin, and it may be well said that during the sixteenth century more



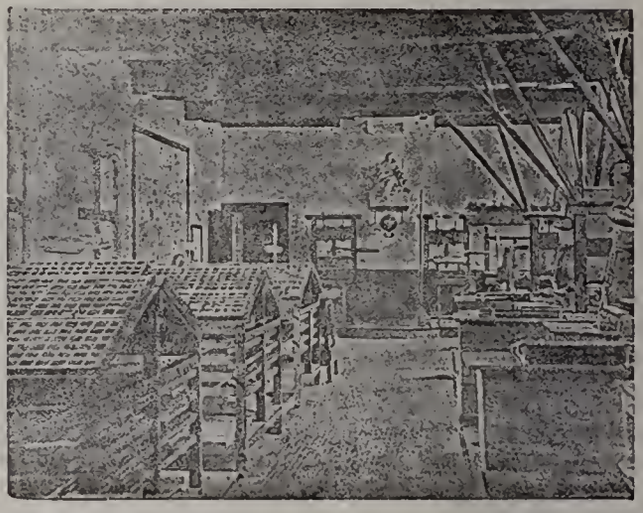
really fine books were produced at the Plantin House than at any one of the great printing houses of the time; and although he had branch establishments—one at Leiden, and one at Paris—his Antwerp house was the really important establishment.

His first great book—his celebrated *Biblia Polyglotta*, and of which only five hundred were printed—is now extremely rare. The revised sheets of the work were publicly suspended, together with an offer of a reward or the discovery of a misprint.

The tomb of the first Plantin is shown in the great church of Antwerp, where it bears the inscription, "Christophorus situs hic Plantinus, Regis Iberi Typographus: sed Rex Typographum ipse fuit." He died in 1589, when the population had, owing to the influence of the Spanish rule, dwindled to about one-third of what it was at the time he founded his house.

In 1579 Plantin removed to the present building, and the establishment was worked unabatedly by Plantin and his successors until the year 1880, after which it was practically closed till the year 1875, its treasures remaining unharmed all this while. In the following year the municipality of Antwerp obtained possession of it, and in 1877 it was constituted a public museum.

The first photograph of Mr. Bridge's series which we reproduce shows one internal angle of the great square



formed by the buildings, with the cloister-like walk on the left. It may be mentioned that the general plan of the building is not much unlike Hampton Court Palace.

The Plantin family not only employed the best artists of their time to cut punches for them and to supply them with illustrations and designs, but made an unrivalled collection of contemporary works of art and literature—arts as ex-



pressed not only in works of painting and engraving, but also as manifested in ivory carvings, pottery, furniture, and finely-wrought needlework, leather hangings, manuscripts, and other articles in the production of which artist-craftsmen excelled before the great industrial revolution which has brought machines to bear so closely upon the production of decorative objects.

The remaining photographs which we reproduce show rather the industrial than the artistic side of the great range of buildings now open to the public. The second

view shows us one part of the type foundry, an upper room at one corner of the establisnment. Over the little bench shown is a cupboard containing the tools for punch cutting, and on the bench may be seen the bellows of a miniature forge used for shaping the blanks and in hardening the finished punches.

We see a general view of the press and composiug room in the third block, while the forth shows one end of the same apartment on a larger scale. Against the wall will be seen an image of the Virgin and Child, a symbol which in the old times of deeper religious feeling was considered quite appropriate for placing in a workroom or factory.

PHOTOGRAPHIC OPTICS.

BY W. K. BURTON.

Chapter III.—Refraction of Light.

We have mentioned that a ray of light in passing from a vacuum into any transparent substance usually has its direction changed, aud that the same occurs when it passes from one transparent medium to auother. There is also a change of direction when the ray leaves the transparent body.

The law of refraction is commonly stated as follows:—"The incident aud refracted rays lie in a plane which also contains the normal at the point of iucidence, and on opposite sides of the normal. The refracted and incident rays make with the normal at the point of incidence angles, the ratio of whose lines depends only on the two media, and the nature of the light."

The ratio existing between the size of the angle between the incident ray and the normal in vacuum, and the size of that between the refracted ray and the normal, is called the refractive index for that particular medium.

This for completeness sake. We now go on to consider the bearing of these facts on certain forms of trausparent objects, leaving all technical scientific phraseology on oue side.

The most popular illustration of refraction is that in which a coin is placed in the bottom of an empty tub at such a position that an observer stationed at a certain point is just unable to see it. The tub is then filled with water, when the bending of the ray of light enables the observer to see the coin. We illustrate this case of refraction here, although it is uot the happiest illustration of refraction

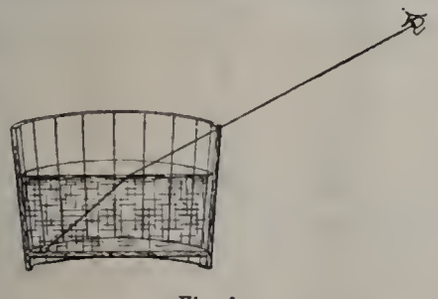


Fig. 1.

that could be chosen as a first example, because the bending of the ray of light takes place in the passage from a dense medium (water) into a comparatively rare one (air), where, as in most cases of refraction that we have to deal with in optics, the ray passes first from a rare into a dense medium.

We shall take the case of a ray of light striking obliquely the surface of a thick sheet of glass or of some similar transparent substance. But just let us say that in all cases of refraction to be here considered, the *air* may be left out of consideration, and it may be taken that the results are the same as if the ray of light entered the transparent medium directly from vacuum.

In the accompanying sketch we imagine A B to be a thick sheet of glass with parallel sides. C D is a ray of light incident to the upper surface striking it obliquely.

The ray of light will not continue directly on its course towards E; but will have its direction changed, so that it strikes the lower side of the sheet of glass at F. Here, however, it again does not continue in a straight

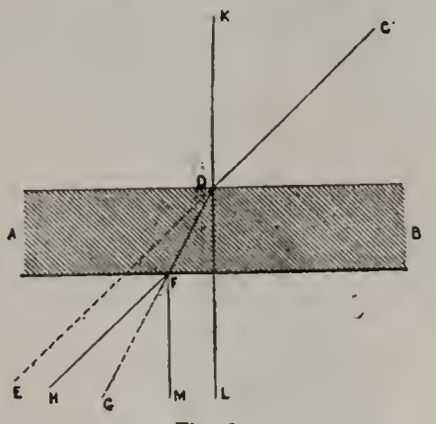


Fig. 2.

liue, which would carry it to G, but is ouce more bent, taking the direction F H, which is parallel with that D E or C D. In this case, therefore, the ray issues in a direction parallel with its first directions, but not in line with it.

The line K D is a line at right angles to the surface of the glass where the ray of light is impinged on it. D L is a coutinuation or production of that line. The whole line K L forms the "Normal." It is to be observed that on entering the glass the light is bent *towards* this line. F M is at right angles to the lower surface of the plate of glass at the point where the ray emerges, and it is to be observed that the ray is bent *away from* this liue. This is a very important poiut to remember, and I repeat it in general terms. A ray of light obliquely enteriug a transparent substance is bent *towards* a line drawn at right angles to the surface of the point of entrance; a ray of light leaving a transparent substance is bent *away from* a liue drawn at right angles to the surface of the substance at the point of exit.

The importance of this matter will very soon be perceived. In the case that has just been taken, and

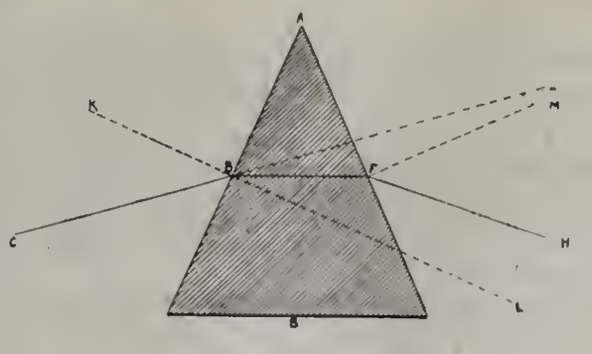


Fig. 3.

which has been illustrated by a sketch, the two surfaces of the transpareut body were parallel, and the ray of light issued parallel with the direction in which it entered, but had the surface of the body not been parallel the issuing ray would have had its direction changed; in other words, it would have been completely bent in passing through the transparent body. On this fact depends the whole of the structure of lenses, and of the greater number of optical instruments.

To take a special case, namely that of a prism. A prism is here illustrated, or to speak more correctly the section of one.

We have now, supposing C D to be a ray of light falliug obliquely on oue side of the prism, only to bear in mind

that it will bend *towards* the line K D L at right angles to the entering surface, and *away from* the line F M at right angles to the surface of exit, to see that it will take a direction something like C D F H, and to see further that the direction of the outgoing ray of light, F H, is quite different from that of the continuation or production of the line C D, shown as the dotted line D E. It will easily be understood that, by making use of this property of certain forms of transparent bodies of bending rays of light, we have a great power. We shall go on to show how this power may be made use of in the construction of what is known as a lens.

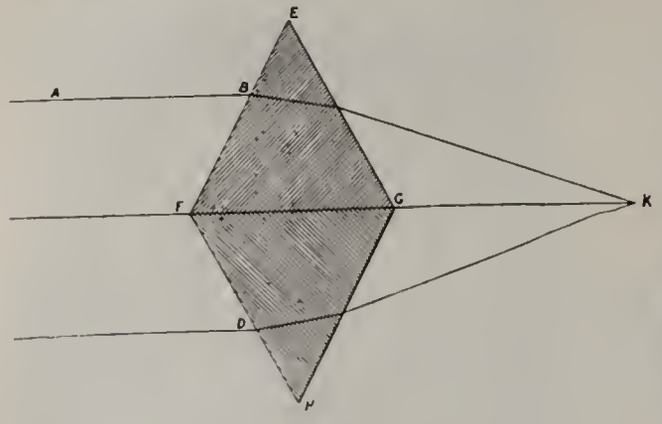


Fig. 4.

We have only to imagine two prisms F F G, H F G placed base to base, and to imagine two rays of light A B and C D to impinge on these prisms, when, if we follow the course that these rays must take, we shall find that they meet at K. We may further suppose the prism bent into a circle, so as to be in section and plan

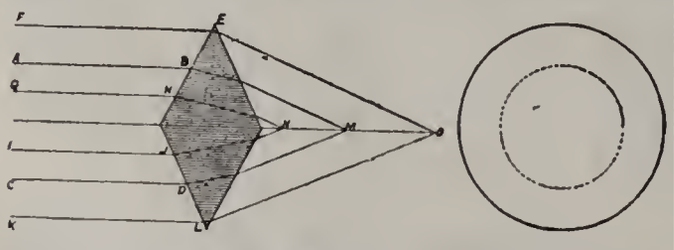


Fig. 5.

as shown in the sketch (Fig. 5); we should then find that all rays falling on a circle of the disc, concentric with the circumference—as shown by the dotted line—will be brought to meet together at one point, but that those reaching the disc in circles nearer the centre will meet together at points nearer the disc; those reaching in it circles farther from the centre, farther from the disc. This is shown by the rays G H, I J meeting at N, those E F, K L meeting at O.

We have, however, only to give the surface of our disc of glass certain curvatures, when we may have all the rays meeting at a point, as shown in the next cut. We

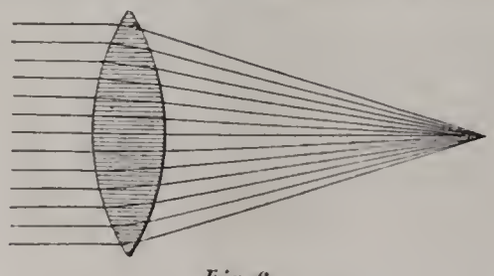


Fig. 6.

have now got a lens of the simplest form, a piece of glass which has the property of bringing all parallel rays which fall on it to a point.

I have talked here of the surfaces as curved without specifying any particular curve, and I may say that the curves necessary to cause rays to meet at a mathematical point are such as can scarcely be employed in practice, that practically the curves are generally spherical, and that, with spherical curves, the rays are only brought approximately to a point. This subject will be specially treated further on, under the heading of "spherical aberration."

All lenses do not cause rays of light to meet together. There is, on the contrary, a class of lens that causes them to separate. This form of lens is illustrated here—or rather one of the many forms which a dispersing lens may take is illustrated.

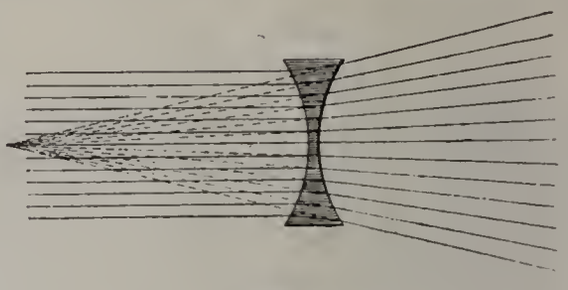


Fig. 7.

The point at which, in the case of the first form of lens, the rays of light meet is called the focus. The dispersing lens is said to be of negative focus, the negative focus point being that where the outgoing rays produced (as shown by the dotted lines in the cut) meet.

All lenses may be classified under one or other of the headings "condensing" or "dispersing." There are various forms, the most commonly used of which are shown here.

Fig. 8 shows a set of converging lenses, fig. 9 a set of dispersing. These different forms of lenses are designated



Fig. 8.

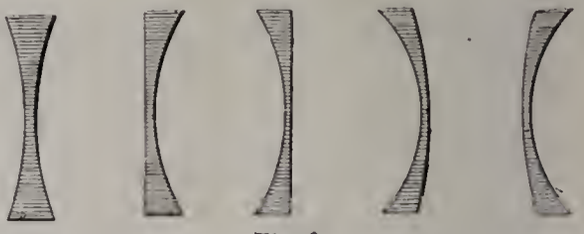


Fig. 9.

by various names, as double convex, plano-convex, convexo-plano, and so forth. When compound words are used the first of the two designates the surface that the light first reaches.

When the surfaces are both curved, and the centres of curvature of both surfaces are on the same side of the lens—as is the case with both the last two lenses in both fig. 8 and fig. 9, the lens is called a meniscus.

We must now go back to a consideration of the simple prism, and of the fact of which, for the sake of simplicity, we made no remark before, namely, that a ray of white light is composed of rays of light of all the colours of the rainbow, that on passing through the prism these rays are all bent, but are not bent to the same degree, some suffering a greater deviation from the original direction than others. This may certainly be said to be a fortunate fact, inasmuch as the whole science of spectroscopy depends on it; an unfortunate fact, inasmuch as it complicates the

structure of almost every optical instrument except the spectroscope.

The annexed cut shows the way in which light is split up into the colours violet, blue, green, yellow, orange, and red. The first mentioned of these is bent the most, the

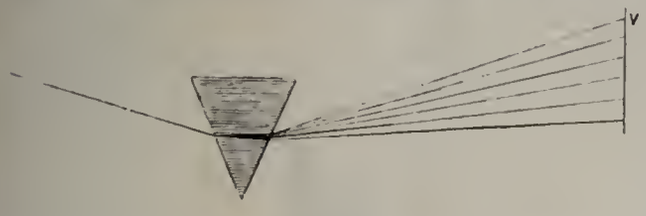


Fig. 10.

last the least, and it is common to speak of the rays causing the colours at the violet end of the row as the "more refrangible," those at the other as the "less refrangible." If a lens be now considered it will at once be perceived that there must be a similar splitting up of light by it, and that in place of parallel rays being brought to meet at a point, they will be brought to meet at a series of points,

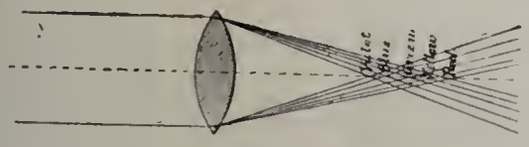


Fig. 11.

the violet light nearer the lens than the other colours, the red being the farthest away. Fig. 11 will serve to explain what is meant.

Newton, with a rashness which was not in keeping with his usual caution, declared the defect to be irremediable, but a remedy at least nearly complete was found for it when it was discovered that although all transparent bodies disperse light as well as refract it, all do not disperse and refract in the same proportion. Thus some kinds of glass which refract or bend an average ray of light to a considerable degree, disperse it to but a small degree, and *vice versa*. It is, therefore, possible by using a glass of great dispersing power, but little refracting power, in combination with one of great refracting and little dispersing power, to bend a ray of light without splitting it up into its component colours, or more strictly speaking, to recompose the decomposed light without altogether altering its direction.

The next cut shows (in an exaggerated fashion) the action of two prisms, one with great refracting and small

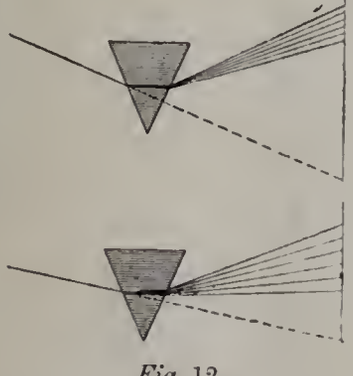


Fig. 12.

dispersing power, the other with great dispersing and small refracting power.

The next figure will, it is hoped, make clear how two such prisms, being united, may result in what is called achromatism. The word means, ethnologically, simply "no colour." In optics it always applies to the bending of a ray of light without decomposing it into various colours.

Flint glass has, proportionably, much more dispersing power, as compared with refracting power, than has crown glass. The correction of the dispersion given by a crown

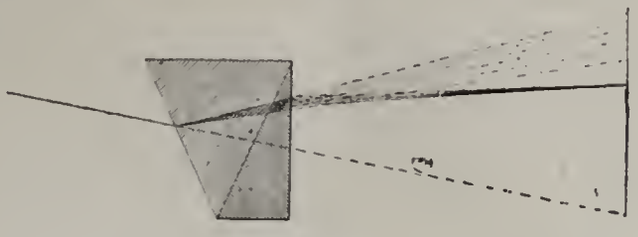


Fig. 13.

glass prism can therefore be effected by that of a flint glass without strengthening the ray of light. We have only to apply the same principle in the case of lenses, placing a dispersing flint lens behind a condensing crown glass



Fig 14.

lens, when we correct the defects due to the breaking up of white light into various colours. I show here several methods of applying the principle.

In each case the concave or dispersing lens is of flint glass, and is used solely to counteract the dispersion of the other lens. It will be seen that in the case of the third illustration there are in fact three lenses. The principle, however, is the same as where there are but two. It may be considered that the crown lens is split in two, certain advantages arising from this arrangement.

It should be said here that there is no such thing as absolutely perfect achromatization, there being always what is termed a small "residual spectrum." It may, however, be taken that, so far as photography is concerned, it is easy to obtain such approximation to achromatism as is necessary.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

BY W. M. ASHMAN.

TWENTY-FIRST ARTICLE.

"SILVER PRINTING" is the term generally understood to mean that particular process of producing from negatives, positive images upon paper made sensitive by means of silver in contradistinction to other methods of printing where salts of iron or chromium are employed. Such a paper is that sold as "ready sensitized," the glossy surface of which is obtained by coating the smooth side once or twice with a mixture composed of the white of eggs well beaten, and a small proportion of some soluble chloride, such as ammonium or barium, dissolved in a very little water. The paper is floated on the clear solution thus obtained in a room carefully heated and specially protected from dust; and where a second coating is to be applied, the first one must be coagulated by the agency of steam, or otherwise the second would fail to give that extra gloss which is frequently preferred. In either case the next thing is to sensitize the surface of albumen by floating it for a few minutes upon a solution of silver nitrate, which, under certain conditions, may vary between thirty to sixty grains of the silver salt to each fluid ounce of water. This last process coagulates the albumen, or renders it insoluble, and further produces a given amount of silver chloride which in the presence of organic matter

readily darkens in daylight, whether the paper be wet or dry.

In the preparation of sensitized paper intended to be kept some time before being printed upon, other agents are also employed, such as organic or mineral acids, sugar, &c., the particular function of which is to preserve the whiteness of the surface for a period ranging from a few weeks to as many months. It is necessary to keep it in the dark, and cool, excluding the air as much as possible by wrapping it in thin waxed paper, or putting in a jar or tin; but, after some time, varying with different samples it is difficult to prevent the silver compounds from becoming brown, and, for most photographic purposes, useless. It is in the preserved form that the student is most likely to use sensitized albumen paper, the article being easily obtained at any dealers, either plain white or tinted in various colours. The chief motive for colouring the surface by the addition of some transparent aniline dye to the liquid albumen, is to check the tendency of the surface to turn yellow in the finished print, and so keep the whites free from that degradation; and those chiefly employed are pale pinks, blues, and mauves. It must not be supposed that much of the colour of the dye remains after all the various processes the prints pass through before they are finished, for when only moderate precautions are taken to secure permanency there is hardly a trace of the original colour to be recognised, but it is possible to see a difference between those prints on white and those on tinted paper.

Provided with a few sheets of sensitized paper, the first thing to be observed is that it possesses the characteristic quality of darkening rapidly upon exposure to average daylight, the speed varying with the power of the light; and that this darkening action continues as long as it is subjected to that influence, or until there is no more silver to be reduced. The generally accepted hypothesis—and there is not sufficient evidence in proof of any other to make it a worthy substitute—is that the thin layer of silver chloride, aided by the organic compound silver albuminate, and by uncombined silver nitrate, becomes altered by the light into a sub-salt, and ultimately into silver oxide and amorphous metallic silver. Previous to exposure the salt may be represented thus:—2Ag Cl—silver chloride. When subjected to the energy of the daylight it becomes Ag_2 Cl and Cl—silver subchloride plus chlorine disengaged. The chlorine thus liberated in the re-action does not escape, but aids in the reduction of more silver; and, as a result, a vigorous image is built up. The part played by the organic compounds is more a matter of experimental fact and practical utility than of very definite science; but it is certain the product of those compounds, after exposure, is a good basis upon which to construct a permanent image in gold, as we shall see in dealing with the next process.

It will now appear obvious that sensitized paper should not be subjected to the action of light for any appreciable time except during printing under a negative, and the apartment in which the paper is cut to shape, or adjusted upon the negative, or in which the prints are trimmed as they come from the frames, should be shielded by some yellow medium on the windows. Perhaps "golden fabric" is the best stuff to recommend, as it admits plenty of illumination, and is a perfectly safe medium to employ. Care must be taken to renew it when it begins to fade, which it will do in strong daylight in about a year, and, if exposed to sun, in a shorter time.

Safety thus provided, the back of the negative to be printed is cleaned, and laid glass side downwards in the rabbet of a printing frame, such as is procurable at any dealers in photographic requisites. Fig. 22 resembles a frame with plate-glass bed on which any smaller-sized negative may rest. It is always well before using a new frame to see that the bed upon which the glass rests is flat—more especially if the cheap form without plate-glass bottom is used—for if the negative can be rocked upon it in either direction, it is very likely to break under the prolonged pressure. Such a frame should not be used unless it is first made fairly true with a chisel and glass-paper. Upon the negative now in position a piece of sensitized paper is laid, the glazed side being in contact with the gelatine side of the negative. Next follows a pad at least as large as the paper, which may be of any clean, flexible material, such as a few sheets of white blotting paper, or a piece of stout cloth will answer.

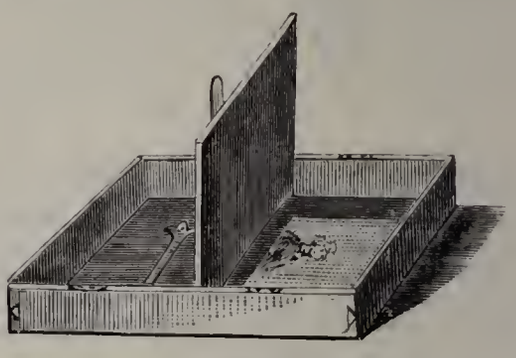


Fig. 22.

Whatever is used, a fairly smooth surface should be obtained, and the hinged back is placed in position and the spring strips closed to produce good and equal pressure. The sensitized paper ought to be in such close contact with the surface of the negative that the light which passes through from the glass slide defines clearly upon it all the detail which is there with approximate sharpness. If after closing the frame the negative can easily be shifted about in the rabbet, there is evidently insufficient pressure, so the springs should be bent or more padding added. Indistinct prints from a well defined negative image may often be the result of overlooking this comparatively trifling condition. The negative is now ready to be placed in daylight, glass slide uppermost, and, unless it be a very dense one, or much discoloured, or the light be very dull, it can be removed in five or ten minutes for the purpose of examining the progress of the printing. Until some little experience has been gained, it is safer to remove the frame to where it was filled for this purpose. The beginner may avoid disappointment by commencing to release one spring, while the other half of the frame is held firmly, then the released portion may be folded back along with the pad or pads, and one corner of the sensitive paper carefully raised sufficiently high to just admit of examination.

Supposing the merest trace of an image to be indicated the frame must be cautiously closed and returned to the daylight for a longer period, when the process of examination can be repeated until a vigorous image is obtained some shades deeper than is really required for the finished picture. After some practice, the progress of printing can be watched in open daylight by shielding the sensitive surface with one hand. When a print is judged to be dark enough a fresh piece of sensitive paper takes its place, and so the process may be repeated *ad libitum*, taking as much care to protect those that leave the frame from the influence of light as though they were pieces of unexposed sensitized paper.

Vignettes are prints the margins of which have been protected from the light while the centre figure or portion has been exposed to it, and by simple means the change from black to white may be so graduated as to produce the effect of blended colours softened off. It is generally sufficient to cut an egg-shaped hole or other suitable opening in a piece of cardboard at least as large as the printing frame, and secure it about an inch above the glass. Sometimes such an arrangement is turned round at intervals of a few minutes, and it is also an advantage in vignetting for the printing board to be suspended by attaching strings at the four corners; these may be tied

together and fastened to a stout pin, beam, or other suitable place of sufficient height when a turn-table motion is efficiently provided. It is also a good plan to gum a piece of tissue paper over the opening to help in diffusing the light and so softening the shadows. Vignette printing should never be done in sunshine, nor indeed should the printing of any gelatine negative except those which are exceptionally dense.

Another plan of making a white margin around the figure is by means of masks, which are pieces of opaque or orange paper with oval, cushion, square, or diamond shaped holes cut in them. These are laid upon the film side of the negative, and underneath the sensitive paper, and the result is, that a sharp, white margin is produced corresponding in shape with the device used. After printing, any tint can be given to the margins by covering the printed portion with the paper that was cut out to form the hole in the mask. The tint depends upon the time the margins are exposed to the light, and it is better to lay the print on a clean glass to keep it flat, and cover it with another which is free from dirt and spots, with the disc or other shape of paper secured to the underside of it by the least touch of gum ; then the adjusting of the same over the printed centre is more easily managed.

Defective skies may be blocked out with black varnish, orange paper, &c., and any depth of printing from a suitable cloud negative substituted ; but to do this effectively requires skill which comes only by much practice.

When several prints are thus made, it is usual to trim them, and the next process is that of washing them in several changes of water, which by its milky appearance signifies that there is free silver removed from the surface of the paper. Ready sensitized paper takes longer to wash than that freshly prepared, and rather more changes of water—four changes of five minutes each will not be found too long. A little sodium carbonate, ten grains to each gallon of water, is beneficial for the third washing. The prints, when washed, are next transferred, one by one, to a weak and preferably warm alkaline solution of gold terchloride ($Au Cl_3$), which is known as the toning bath. Formula for the preparation of this bath will be found in any of the year-books of photography, under the head of "Formula"—see also "Elemeutary Lessons in Silver Printing," by the writer (Piper and Carter, 5, Furnival Street, E.C., publishers). In order to prevent unequal action the prints ought to be kept in motion ; the redness at first remarked will give place to sepia brown, then to a purple brown, and finally to a blue tint if left long enough ; varying somewhat with different samples of paper and different toning baths. As a rule for the finished tints mostly in vogue, at the first-named stage the prints are usually considered to be toned, when they can be removed to a vessel of water in which a little common salt is dissolved, to remain there until the others have all similarly changed colour to the same extent. After another rinse, the prints are ready for the fixing process, which consists of dissolving out the remaining chloride, &c., by means of hypo—as the agent is usually called. The fixing bath is composed of sodium thiosulphate one part, water five parts, dissolved several hours before use. It is not advisable for the beginner to use it for more than one bath of prints, and the amount of it ought not to be less than one quart to a whole sheet of paper. Fifteen minutes at least should be allowed for the prints to remain therein, and they should be moved about freely to ensure each being properly fixed. As a preventive against the possible formation of blisters beneath the image, it is well to transfer them all from the fixing liquid into a salt bath of the strength of a moderate size handful of common salt dissolved in half a gallon of water, and to keep them submerged for five minutes before beginning to change the water in the process of final washing.

The concluding operation is of the utmost importance, and there are many methods and several mechanical contrivances for effecting the purpose. They all, however, have the same object in view, and act on the same principle of supplying to the prints a constant succession of changes of water, with more or less of agitation, and extending over a period of some hours. Keeping in mind the fact that the permanency of the prints is to a very large extent dependant upon two generally admitted conditions being observed, namely, the complete action of the fixing solution as provided for in the foregoing instructions, and a thorough elimination of that agent the hypo. It must be borne in mind that the first complied with, there yet remains a chemical compound which has completely penetrated the body of the paper, and which can only be really removed by continued changes of water. It is easy to make such arrangements as will most conveniently and effectually attain the desired end. A circular pan, for instance, having a jet of water entering at the top and at one side, and a syphon to empty the vessel periodically. Numerous changes of water thus produced does the work well, and two or three hours of such treatment is vastly to be preferred to a long soaking of many hours in but few changes of water.

Reviews.

Nouveau Guide Pratique du Photograph Amateur. Par G. Vieuille. Deuxieme edition. Crown octavo, 140 pages. Price 2 francs 75 c. (*Paris ;* Gauthier-Villars et Fils, 55, *Quai des Grands Augustins.*)

In this second edition of a much appreciated little work we find a good deal of new matter, and additions which constitute a decided improvement.

A B C de la Photographie Moderne. Par W. K. Burton. Troisième edition. Crown octavo, 122 pages. Price 2 francs 25 c. (*Paris*, 1889 : Gauthier-Villars, *as above.*)

Mr Burton's English original—of which the present work is a translation—is so well known and valued that it is not necessary to say more than that the translator, M. Huberson, has done his work excellently.

Traite Pratique de Platinotypie sur Email, sur Porcelaine, et sur Verre. Par Geymet. Crown octavo, 108 pages. (*Paris*, 1889 : Gauthier-Villars, *as above*).

A convenient handbook of the substitution method of ceramic photography.

Heliographie Vitrifiable, Temperatures, Supports Perfectionnes, Feux de Coloris. Par Geymet. Crown octavo, 120 pages. Price 2 francs 50 c.

This book deals with the appliances used in enamel photography, and mainly with such details of manipulation as are not specially photographic. In short, it deals principally with those matters which are more often likely to be sources of failure in the hands of a photographer. Everyone practising enamel photography would do well to study the present work.

Dr. Vogel's Azaline for Orthochromatising Plates. One ounce bottle of solution, price 2s. (J. R. Gotz, 19, *Buckingham Street, Strand.*)

Ordinary commercial azaline must not be confounded with the preparation of Dr. Vogel, and some persons have failed in orthochromatic experiment owing to the fact that names of aniline dyes and mixtures of dyes are generally given quite arbitarily.

The preparation which has been so long known in commerce as azaline is really an acetate of the base known as rosaniline, and is practically useless as an orthochromatising

agent, while Dr. Vogel's azaline consists of quinoline red with a small proportion of cyanine.

For use, 1 ounce of Dr. Vogel's azaline solution is mixed with 3½ ounces of water, and from 45 to 50 minims of ammonia are added, the gelatine bromide plates being soaked in this solution.

Catologo delle Fotgrafie Artistiche dello Stabilimento Giacomo Brogi. Prezzo, 1 lira 50 c. (Firenze, 79, *Corzo de Tintori.*)

We have here a closely printed volume of 208 royal octavo pages, forming a list of the numerous photographs to be obtained at the stores of Mr. Brogi, the collection comprising reproductions of the various sections of Italian art, such as engravings, drawings, paintings, mosaics, monuments, and sculptures. So complete is the list, that out of twenty items we searched for, not one was absent

The photographs can be had by post at very low rates, and to the art student it must be a very great advantage to be able to readiiy obtain reproductions from the magnificent collection of Mr. Brogi.

Notes.

A photographic section is being formed in connection with the London Chamber of Commerce, and we understand that the most influential in the photographic trade have already given in their adhesion. We hope to say more about this next week.

In the last number of *La Nature* we find numerous details about the great Exhibition, and a good deal of space is given to particulars about the Eiffel Tower, this being nearly twice as high as the highest building previously existing, and opening up new possibilities in the way of scientific investigation; but it is the magnificent lighting of the Exhibition and grounds that most impresses our contemporary. Arrangements for the International Photographic Congress, to be held in Paris during the Exhibition time, are progressing satisfactoiily, and provisional arrangements arc made for the sitting, which is to extend from the 6th of August to the 17th, and will be followed by a public meeting on the 20th.

We have alrcady published particulars as to the main points to be considered, and are now able to publish—in relation to one of these matters—a suggestion which was made by Mr. W. H. Harrison in the course of a conversation we recently had with him, and had rcference to the desirability of devising a uniform and easy method of adapting various lenses to the camera. "In the front of the camera makc an apparatus on the principle of the iris diaphragm, but with the leaves made double, so as to completely exclude light. The contracting circle should grip the lens in a groove, turned to a standard width, and deep enough to cover the divergence fiom an absolutely true circle, which there must be for every dimcnsion save one." Another suggestion was that on the front or the back of the "iris" should be a rubber screen pinned to the edges of the leaves, and stretching as the aperture closes.

It is easy to see how, with the tools now available, it would be easy to construct Mr. Harrison's adaptation, so it should be really inside the camera front, and weigh no more than the largest sized flange which it would replace. Moreover, the use of such an adapter would enable opticians to very materially lighten the mounts of the lenses.

Especially interesting is a patent specification of which we gave the title last week, and the reprinting of which we commence in the present issue. There is described and figured a highly complex arrangement intended to complete and deliver a photograph in return for a coin dropped in the slot.

It seems quite reasonable to suppose that a machine constructed according to the specification of Messrs. Hines, Howell, and Howell would work satisfactorily enough, although it is a question whether, in the present state of things, it would not cost more to keep such a complex organisation in thorough working order than to keep an operator at work on the spot with a simple form of developing tent. At any rate, the laboured ingenuity of patentees in this case deserves being put on record, as a feature of the present time thought, although the practical and industrial realisation of the scheme may be a thing of the not very immediate future.

Nature again comments on the scandal caused by the "Scientific Witnesses" in the law-suits arising out of technical cases, and referring to a case in which the Court called in Professor Stokes as an independent expert, paid by neither side, and without reference to the nature of his evidence was given. Our contemporary delivers itself as follows:—"Without the services of Professor Stokes, or some similar sworn expert, we should have had half-a-dozen or more expert witnesses on one side contradicted by half-a-dozen expert witnesses on the other side; a case which would have lasted three or four days before a wearied judge—conscientiously striving to understand purely technical details—and a perplexed and confused jury; great loss to both parties; an unsatisfactory result; and, as we think, no little scandal to science and scientific men."

A curious photograph showing the effect of a minute hole in the front of the camera, is sent to us by Mr. F. Duffy, of Sava, Fiji. It is a group of about twenty persons, some inside a kind of balcony, and some seated in front on the darkish background inside the balcony, where the group is duplicated as a vague and shadowy image. The double effect was caused by a screw-hole outside the flange of the lens, and the photograph in question forms a remarkable combination of ordinary photography and "pinhole" effect.

At last there is a prospect of the National Portrait Gallery, which has of late years been bandied about from place to place in the usual helpless official fashion, finding a permanent home. The gift of a £100,000 by a private donor will enable the authorities to do what apparently has hitherto been out of their power, namely, build a proper gallery, which it is proposed will be an adjunct to the National Gallery. There can be no question as to the suitability of the sitc; the only regret is that if the present paltry building is to be increased in this piece-

meal fashion, the hope of its entire removal, and the substitution of a structure more worthy the name of a National Gallery, must be for ever abandoned.

We learn, on the authority of the *Chicago Jeweller*, that business men in that city find the detective camera very valuable in protecting them from pertinacious and objectionable visitors. A man who desires, to use the homely phrase, "to keep himself to himself" places a camera opposite the door of his office. Whenever a visitor enters, a sharp lad, well schooled in his peculiar duties, turns a knob, and takes an instantaneous photograph of the intruder. A proof from the negative forms one of a collection of photographs of undesirable visitors kept in a book for the instruction of the boy in the future. In practice, the plan works something like this:—"Well, John, anyone called this morning?" "Yes, sir, No. 14 dropped in, and I told him the usual story that you were out of town. No. 4 also called for his little bill. I said you were gone for the day," and so on. It is unnecessary to say, that the instructions for the boy written under each photograph require to be varied occasionally, or people will become suspicious.

Photography plays a very important part as a precursor of matrimony. How far the amatory passion has been fed by the constant contemplation of the features of the loved one as rendered by the camera, it is impossible to say; but it may, we fancy, be laid down as an axiom that no courtship is complete without an interchange of photographs. Coming down to those curious institutions, the offices for the negotiation of marriages, we find that without photography the officials could not conduct their delicate and difficult business. The lady is anxious to see what the gentleman is like before she makes up her mind to be introduced, and *vice versa*. Naturally, a great onus is thrown upon the photographer, and if he resorts to a little retouching he is to be excused. There are not wanting signs that a still further use may be made of photography in this direction. For instance, we understand that a novel mode of advertising for a wife has been adopted by an inhabitant of a provincial town. A photograph of the gentleman is placed in the window of a shopkeeper, and underneath is the following notice:—"Wanted, a female companion to the above. Apply at this office." This is reducing sentiment to a mere commercial commodity, with a vengeance!

Low enough as this is, a still deeper depth has been found for the use of a photograph. In the instance referred to above, the photograph was employed to bring two people together; in the case we are about to mention, it was found an effective means to separate them. The divorce court proceedings tell the story. The petitioner was deserted by her husband in 1865, and heard nothing more about him until 1870, when she received a letter from some unknown person in America informing her of her husband's death, and enclosing a photograph of a highly ornamental tombstone erected over his grave. Who could resist such a proof as this? Not the lady, anyway. For believing in the truth of the inscription on the gravestone, she married again. In course of time her second husband died, and then by accident she found that her first husband was not only alive, but residing in Sheffield with another wife. The tombstone photograph was, in fact, nothing but an ingenious ruse to impose upon her.

She obtained the wished-for decree, but no information was forthcoming on the interesting point how was the photograph produced. Query: Did it find its birth in the studio, and does some enterprising photographer in America keep a tombstone among his "properties" for such purposes?

A provincial photographer relates a droll experience in taking the picture of the interior of a large business establishment, where it was essential, in order to show the number of the staff, that each clerk should be at his desk and engaged in performing his especial functions. As the place was not over well lighted, the photographer explained that they would have to remain still for at least a couple of minutes. Just as the cap was removed, a customer of the firm came to the glass door which the prudent photographer had locked, looked through the glass, and not seeing the camera, shouted for some one to come and open the door. Not a soul moved; and his second shout bringing no response, he rushed away in affright. He afterwards confessed that he was seriously alarmed, for the curious effect of a number of men sitting motionless, apparently at work, and yet not moving their pens, was most uncanny. It was quite a relief to him when he was told they were only being photographed.

The advantages of composite photographs are, we fancy, better seen when portraits of the same individual are combined, than when those of different persons are taken and amalgamated to form what is called a "type." Certainly the difference which exists between painted portraits of the same individual is most puzzling, and in the case of photography still more puzzling. The lens can only reproduce what it sees, and yet the variations in photographs are often very wide. This is a matter of common experience. An interesting experiment has been tried by Mr. W. C. Taylor, an American photographer, who has taken eighteen portraits of Washington, divided them into three groups for convenience, according to the view of the face, and out of them made three composite pictures. The combinations (which, with their component parts, are given in this month's *Science*) convey an idea of unity of expression which is very curious.

How far composite portraiture can be applied practically in a commercial sense it is difficult to say. The amateur who has the time would certainly find the study very fascinating, and his friends might even come to like his productions, for there is a softness and amiability about most composite portraits which are rather flattering. But to combine characteristic expressions will require some ingenuity. The bored or resigned looks which anybody must have at times are easy to obtain. The request to sit down in a certain chair and gaze at the lens will generally produce one or the other. But other expressions are required. Joy, rage, annoyance, satisfaction, contentment, ought also

to be introdueed into the amalgamated picture, and how to induce these expressions without exaggeration would tax one's skill aud patience. Still the thing is not beyond the range of possibility.

The editor of the official organ of the Photographic Society of France does not take kindly to "quinol" as an abbreviation of "hydrokinone." It would appear that the introduction of "argot" into scientific nomenclature is foreign to the preciseness of the French language, which, as has been well said, is the language to reason in. The critic in question regrets the use of "hypo" and "pyro" as diminutives of the terms expressing these chemical substances, but admits that they are not so objectionable as "quinol," because in their case the chemical product did not lose its baptismal name. If, we are told, fancy becomes mixed up with the naming of photographic chemicals, photography will soon lose all scientific character, and will be absolutely unintelligible; and the editor expresses his belief that he is doing right in protesting against such a tendency.

This is very sad, but we must confess that we do not take quite such a gloomy view of things as does our friend. There is nothing whatever to prevent those who choose so to do sticking to hydrokinone and hyposulphite of soda; but all the protests in the world will not stop the creation of words so far as the English language is concerned, provided the creation is a saving of time and promotes ease of pronunciation. It is the elasticity of the English tongue which gives to it its marvellous variety. No word is too strange to become incorporated with it. In this respect it differs greatly from the French language, which is somewhat unyielding. If "quinol" be preferable to hydroquinone, people will use "quinol," and though purists may at first be shocked, they will soon get used to the innovation.

According to Mr. Rider Haggard, our Court of Probate was called on some years since to decide the knotty point whether probate could be granted of a will which had been tattooed on the back of a living young lady. American lawyers are now arguing a less sensational point, but one which also involves the proving of a will, and for which much can be said both *pro* and *con*. The case is that of a gentlemau who has found himself nominated as executor to a deceased friend under circumstances that must be, we think, uuique. Briefly, the facts are these. Mr. A. (as we will call him) died a month ago, leaving considerable property, but no near relative, and, as it seemed, no will. Due search was made through the papers, but nothing of the kind was found, though it was known to Mr. A.'s oldest friend Mr. B., that he (Mr. A.) had more than ouce spoken of having made a will. At length steps were taken to have the estate administered by the late Mr. A.'s only nephew, and then it was that (as Mr. Lawes Stephenson would say) a most strange thing happened! The nephew, with Mr. A., in going through the dead man's papers and other effects, found a box in a cupboard which proved, on examination, to be full of undeveloped dry plates, Mr. A. having dabbled, we should have said, in amateur photography. To make a long story short, these dry plates, which Mr. A. had most carefully packed and put away, were handed over to a photographer to be developed, and on one of them, strange to relate, was found a clear and unmistakeable copy of a will complete in all legal formalities, though so brief as to have been originally drawn up, seemingly, on half a sheet of foolscap. By this photographic will Mr. B. is named executor, whilst Mr. A.'s property is bequeathed, most of it, to a waiter at "Delmonicos," who had, in a way we cannot stay to describe, earned the gratitude of the eccentric gentleman.

The question is, can this dry-plate will be proved in the absence of all traces of the written document of which it is a photographic copy? The late Mr. A.'s nephew, not unnaturally, says: "No! it cannot!" whilst we may be sure that plenty of would-be wags have been ready to say "No" also, on the ground that it is impossible to "prove a negative." There is little doubt, however, but that the "dry plate" will be eventually accepted by the client, though just now the matter is being argued with considerable ingenuity, both for and against. In any case, the "dry plate" will heuceforth be regarded as anything but a dry illustration of the prosy aunals of the Probate Court of the United States.

PHOTOGRAPHY IN GERMANY.

BY HERMANN E. GUNTHER.

LIGROINE-GAS INCANDESCENT LAMP—IMPLUENCE OF ASPHALTUM VARNISH ON DEVELOPMENT—PLATINUM TONING BATH FOR GELATINO-CHLORIDE PAPER—FERROCYANIDE OF POTASSIUM IN THE HYDROQUINONE DEVELOPER — ACID IN THE PYROGALLOL DEVELOPER—EXPERIMENTS ON SOLARISATION—PERMANENT HYDROQUINONE.

Ligroine-gas Incandescent Lamp for Photographic Purposes.—Herr C. Fabricius, a skilled mechanist, of Vienna, has successfully combined a system of ligroine-gas lamps, constructed and introduced by him some years ago, with a Welsbach incandescent body, so that these lamps may be used for domestic lighting in general, but especially as an excellent illuminant for lantern purposes, and for photographic purposes generally. The lamp can be adjusted to any existing sciopticon after its paraffin lamp has been removed. It is said to produce a pure white and very actinic light of great brilliancy, approaching to the effect of the lime light. Dr. Eder, who has tried the new lamp, says that from the photographic poiut of view it deserved full attention. The new light required only the third or fifth part of the time of exposure which was wanted with the paraffiu lamp of a scioption of best construction. The new incandescent light may therefore advantageously be employed not only to enlarging purposes, but also to printing processes on emulsion films. As to the construction of the lamp, Dr. Eder gives the following description. The ligroine* is poured into a small reservoir made of strong metal, and is sucked by asbestos fibre into a thin, horizontal metallic tube, which is heated by a small spirit lamp. The tube is provided with lateral apertures, through which the developing gases escape under a certain pressure, when they are mixing with air, as in

* The highly volatile portion of petroleum known in London as "Gasoline."—ED. P. N.

the case with a Bunsen burner. After having been ignited, they will burn with a pale blue and very hot flame, over which the Welsbach incandescent body is adjusted, which then at once becomes incandescent. The lamp is provided with a safty valve and a regulator, to balance the development of the gas, should it go on too violently. If the lamp is carefully treated, no danger seems to be attendant on its use, as the doctor says.

The Injurious Influence of the Asphaltum Varnish upon Development.—Herr E. Vogel has observed the fact that developing dishes which are coated with asphaltum varnish restrain the development of the plates. In his opinion this is caused by the solubility of the asphaltum in strong alkali liquids, as they are represented by the pyro and hydroquinone developer. Dishes of this kind are especially the japanned ones, and dishes made of *papier mâche*. These may be used for all photographic operations except for alkalic development; for the latter, dishes made of red porcelain or of glass are preferable.

Platinum Toning Bath for Gelatino-Chloride Paper.—In Dr. Liesegang's interesting journal, *Der Amateur Photograph*, Mr. Alfred Stieglitz gives the following platinum toning process for gelatino-chloride printing-out paper (known as aristo paper) :—

A.—Neutral oxalate of potash	2 parts	166·66 grammes
Phosphate of potash ...	1 part	
Water		1,000 c.c.
B.—Potassium platinous chloride	1 part	
Water	20 parts.	

For use are mixed, just before toning, 6 parts of A with 1 part of B. The prints are as usually at first washed out, and then toned. To obtain a black tone, the prints are allowed to remain for twenty-five to forty minutes in the solution without moving. They will acquire in the toning bath a bluish-violet tone; after fixing, however, the blackish tones will be observed. The prints treated with this bath will keep better than prints toned with gold, as they are not affected by sulphuretted hydrogen and similar gases. They are fixed and washed as usual. M. Stieglitz promises to continue his experiments.

Ferrocyanide of Potassium in the Hydroquinone Developer.—As an addition to the pyrogallol developer this substance has been recommended already eight years ago, it having been found useful in preventing fog. Recently Captain Himly, of Berlin, has employed it up to 10 per cent. for hydroquinone development. The ferrocyanide of potassium acts similarly to potassium bromide, but it does not restrain development.

Acid in the Pyrogallol Developer.—Herr A. Lainer has made experiments on the action of various acids on the pyrogallol developer. As it will be known, the addition of the acids has the purpose to neutralize the alkalic reaction of the sodium sulphite, to prevent the pyrogallol solution from turning brown too rapidly, which solution, especially in alkalic solutions, very readily oxydizes. By addition of acids, extraordinary keeping qualities are imparted to the sulphite solutions; so, as Herr Lainer says in the *Correspondenz*, a pyro solution containing citric acid, made up six months ago, is still to-day colourless. The sensitiveness is not so much interfered with by this addition as the vigour of the negatives; by increasing the soda solution and by a slight increase of the proportion of the pyrogallic acid either of these defects may, however, be compensated, the sensitiveness being even increased by it. The following formula, giving beautiful gradation as well as perfect clearness and high sensitiveness, is recommended by Herr Lainer as a proved one :—

A.—200 grammes of sodium sulphite are dissolved in hot water, and the solution made up to 1,000 c.c.

B.—50 grammes of citric acid are dissolved in 100 c.c. of water by the aid of heat.

For use are taken :—

	C.
Sodium sulphite solution A ...	... 180 c.c.
Citric acid solution B ...	... ... 2 ,,
Pyrogallic acid ...	... ... 3 grammes

To develop a plate of 13 by 18 centimetres, mix :—

Pyro solution C ...	... ... 20 c.c.
Soda solution (1 : 5)	... ... 20 ,,
Water	... ... 20 ,,
Or,	
Pyro solution C...	... ... 20 c.c.
Potash solution (1 : 10)	... ... 20 ,,
Water	... ... 20 ,,

The potash developer gives a little more sensitiveness and density, the time of development being besides the same as with the soda developer. The pyro solution as given above is said to keep very well.

Experiments on Solarisation.—Dr. E. A. Just has made very interesting experiments with a view to decide the question whether the exposure alone, or also the manner of development, has any influence upon the solarisation with gelatino-bromide. The following table (reproduced from Dr. Eder's Year-Book in the *Wochenblatt*) shows some comparable values obtained thereby :—

Exposure in Seconds, and Illuminant.	Photometer-number in Oxalate Developer of normal strength.	Solarization.
300, Petroleum Lamp (18 candles)	... 22	...None.
5, Diffused Daylight ...	22	Up to No. 3 of the Photometer Ind.
About ⅓, Direct Sunlight...	22	Up to No. 7 of the Photometer Ind.

If, instead of the concentrated ferrous-oxalate developer, a gradually more and more diluted one was used, the resulting photometer numbers fell short of the above-given ones, but the solarisation always reached the above numbers. With the paraffin lamp, solarisation was not at all obtainable if the exposure given was below 500 seconds. It results therefrom :—1. Solarization solely depends upon exposure. 2. The solarisation is so much the greater the more intense the illuminant will be. 3. The less time an exposure requires, so much shorter will be the scale of shades relatively, and, consequently, so much the more intense the gradation. 4. The solarized portion of the image requires a more energetic developer than the not solarized one; this was apparent with the diluted developing solutions. 5. The development not at all influences the degree of solarisation; the latter, on the contrary, must always set in as soon as the energy of the light will have reached a certain effect.

Permanent Hydroquinone.—Dr. Eder has examined two preparations of hydroquinone sent him by Dr. Byk, of Berlin; one of them was a so-called permanent hydroquinone, the other one ordinary white hydroquinone in crystals. The permanent preparation showed the form of beautiful yellow, shining crystal needles, consisting, according to the statements of the manufacturer, of hydroquinone with about ⅛ to ½ per cent. of sulphurous acid, which it probably contains in loose chemical compound. Dr. Eder has found that the yellow crystallized permanent hydroquinone possesses all the properties of a good hydroquinone developer, and that it differs from the ordinary white preparation of the trade by a somewhat greater permanence of the solutions.

Patent Intelligence.

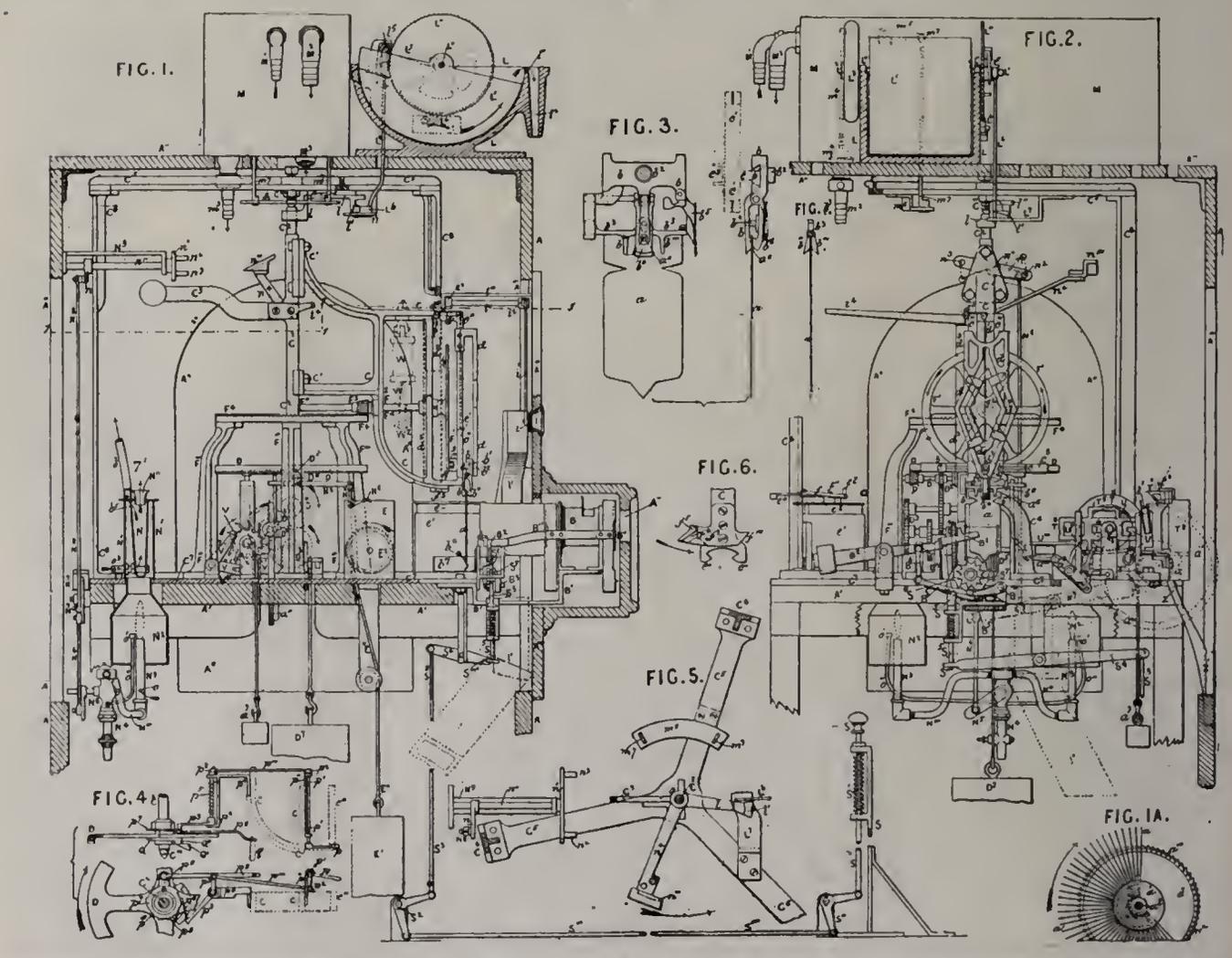
Specifications Published.

5140. James Hines, Engineer, of Dunedin Lodge, Lenzie, Dumbartonshire, Edward Howell, House Furnisher, of Inglebank, Lenzie aforesaid, and Alfred Howell, Tobacconist, of Ingleside, Pollokshields, Renfrewshire, for "Improvements in the Modes and Means or Apparatus for Taking and Producing

Photographs,and in Appliances counected therewith."—Dated 6th April, 1883.

This invention has reference to and comprises new or improved constructions or arrangements and combinations of the parts, of automatic spring and weight-moved mechanism within a dark close box stand, all self-contained and portable, and for the novel and interesting purpose or object of automatically taking the photographic likeuess or miniature portrait of any person on a small prepared plate, card, or other equivalent, picked up by a clip and traversed intermittcutly by a rotating frame or lever aud spindle, over aud into a set of baths, lenses, and drying chambers ranged in a circle, and theu delivering it to the iudividuals; all by their merely putting a certain number of copper coins (as say three pence) into a slit conveuiently formed and placed through the frout of the case, and then turning or otherwise slightly moving one, or it might be more handles placed outside in front a short time or number of seconds, according to simple instructions printed at the side of the handle or handles, and a time-piece with pointer indicating seconds might be fitted in frout, or a signal bell to assist the person in doing this. These automatic machines for enabling any person (unskilled in the art) to take and receive delivery of a photographic miniature in a few seconds or minutes, are devised for the purpose of being placed at railway and steam boat stations, public markets, parks, gardens, and other places where people congregate and have a little leisure, and may desire to give or get photographs of themselves and their friends at little expense in money or time, and thus be greatly appreciated and taken advantage of, for taking photographs or pictures of persons or simple objects.

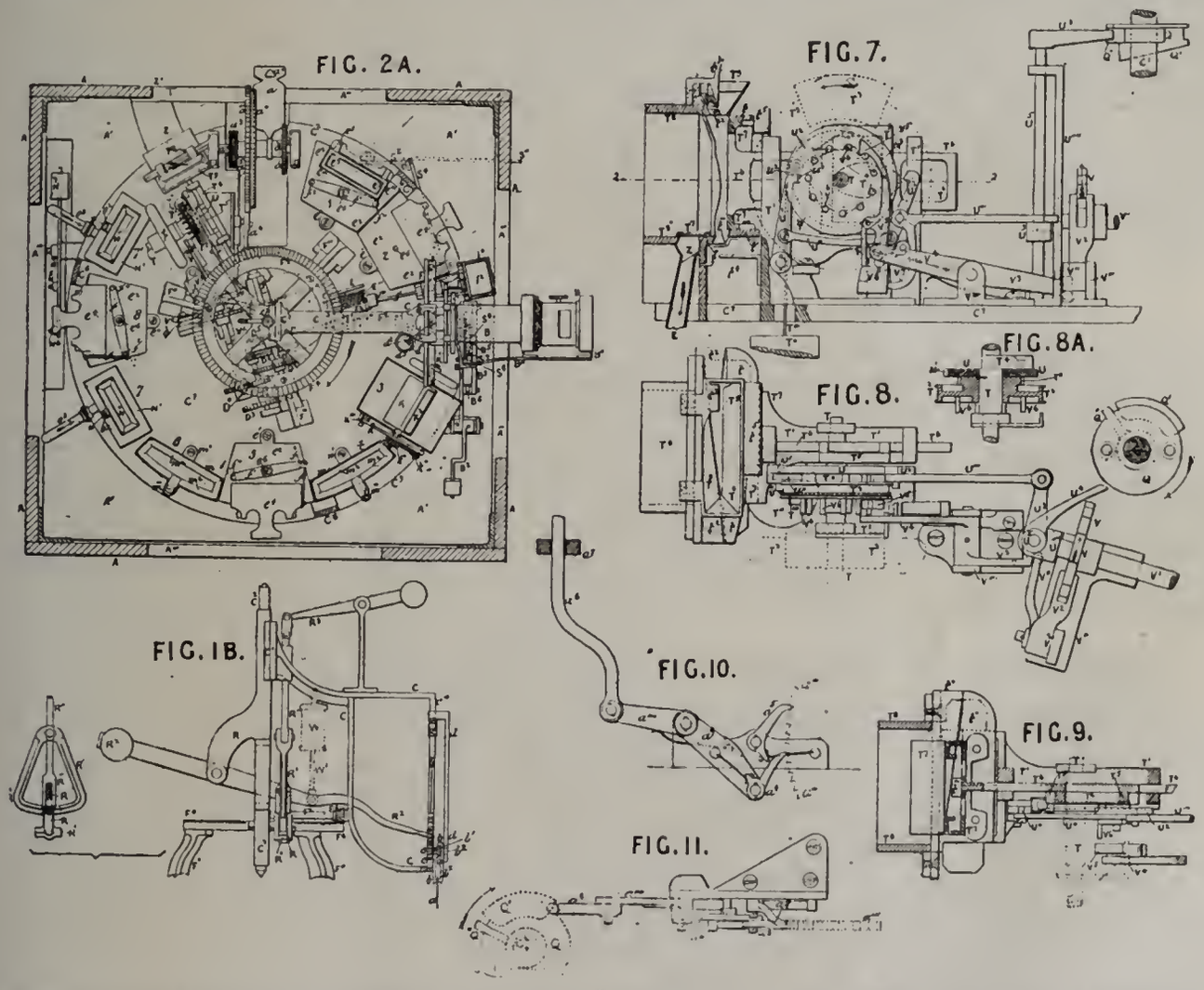
And in order that the nature, aud novelty, and improvements of our said iuvention, and the manner of performing or carrying the same into effect or practice may be properly understood, we have hereunto appended three explanatory sheets of drawings, in which the same reference letters are used to indicate corresponding parts in all the figures where shown. Fig. 1 on sheet 1 is a sectional side elevation of one modification of our new or



improved mechanism for taking and producing photographs, all in accordauce with our invention and improvements, and mounted in and on the upper part of an outer close dark wooden framing A, A^1, A^{11}, which might be ornamented outside, and be closed in by an ornamental removable canopy or top, and preferably formed with loose removable doors on the four sides, for getting at the mechanism to set and repair it, as indicated more particularly at A^{111} in figs. 1 and 2 A. Fig. 2 is a transverse vertieal section corresponding to fig. 1, but with the lenses B in frout removed. Fig. 3 shows a front and edge elevation to a large scale of the clip *b* for gripping the plates *a* on which the photographs arc to be taken, onc at a time, and carrying them rouud with a spindle C^2 and frame C, and reciprocating them vertically and laterally down into and out of the chemical and washing baths, all intermitteutly as will hercinafter be described. Fig. 4 is a sectional elevatiou and plan of the mechanism detached, for shaking or vibrating the said plate *a* within the baths and drying chambers, carried on the rotating frame C and actuated by a ratchet cam p^7, on the centre of the main spindle C^2 of this frame C. Fig. 5 is an inverted plan view of the top metal three-armed frame C^5 carrying the upper centre of the main rotating vertical spindle C^2 and guide brackets L^7, m^8, for the rods L^6, m^7, which put off and on the developing liquid and cleaning water to the baths, showing also the upper spindle n^{11} and levers n, n^1 for putting on and off the gas iu the drying chambers 7 and 7^1. Fig. 6 is an inverted plan view to a large scale, of the cam f^6 which actuates the levers f^1, for opening and shutting the lids c^4 of the baths. And fig. 1A shows a detached end view corresponding to fig. 2 of the spindle a^3 and discs a^1 a^{11}, carrying the ferrotype plates *a* to be picked up successively by the clip shown iu fig. 3.

Referriug to sheet 2, fig. 2 A is a sectional plan of the lens mechanism and baths, corresponding to fig. 1, and as taken near the irregular line 1 - - 1 in fig. 1. Fig. 1 B shows a detached side elevation of the rotating vertical spindle C^2, and bracket C, for carrying the clip *b b*× aud ferro or thin dark coated plate *a* which give these the vertical motion by a balanced crank R and lever R^2 shown in end section also to the left of the figure, instead of by the disc wheel F^1 as showu iu figs. 1 and 2. Figs. 7

and 8 are a back sectional elevation and plan respectively, to a large scale, of the mechanism for cutting the ferrotype plates *a* and delivering the same when finished. And fig. 9 is a sectional plan of the same, as taken near the line 2 - - - 2 on fig. 7. Fig. 8 A is a sectional plan of the actuating pulley T^2 and cam T^4 of this cutting mechanism as detached from fig. 8. Figs. 10 and 11 show a side elevation and a plan respectively as detached, to a large scale, of the actuating pawl lever mechanism, for turning the disc barrel a^1 a^{11} carrying the ferrotype plates *a*. Figs. 12 and 13 on sheet 3, showing a side elevation and plan of the main clock time controlling mechanism, which is started by the insertion of the coin or money, all carried on a frame E of its own, to one side under the main central vertical shaft C^2, the motion of which it regulates in the intermittent times required. And figs. 14 and 15 show side views of the two ratchet wheels H, H' of this mechanism which control the intermittent motion of the said central shaft C^2 and frame C carrying the ferrotype plate *a*, the former wheel H giving the instants of time for raising the plate out of the baths, and the latter H^1 the instants of time for inserting the plate into the bath during its rotation. Fig. 16 is an inside front elevation and a transverse section respectively, of the closing and opening mechanism of the money insertion orifice I, and spout I^1 conveying the money down to the balanced starting levers I^2, J J^1. Fig. 17 shows a sectional elevation and a plan view respectively of one of the baths 1, 2, 5, and 8 containing the collodion, the silver and fixing solutions, and the varnish respectively, and the levers and mechanism for opening and closing their lids before inserting and after removing the plate *a* from the baths. Fig. 18 shows a side elevation and plan respectively of the developing bath 3 and its actuating mechanism, for tilting it and getting a new supply of the ferro-protosulphate liquid or other developer used for each new plate *a*. While fig. 18 A shows a sectional elevation of the swivelling or tilting bath K as detached from fig. 18 for effecting the said purpose. And fig. 19 shows a sectional elevation of one of the water washing baths 4 and 6. Referring to these drawings, the



nature and novelty of the invention, and new or improved automatic machine under one arrangement, consists all as follows: — In securing by their cases B, a suitable set of photographic lenses mounted on a bracket B^1 and passed out through the front side of the outer enclosing frame A of the apparatus, as shown in the side elevation and plan fig. 1 and fig. 2 A, with mechanical or duplex closing shutter B^{11}, for excluding the light on the outside of the case A, or it might be on the inside through or opposite a hole A^{1111} in a special projection part of the front case A^{111}, at a proper height to let the rays of light in through the lenses B, from the person or object whose photographic picture is to be taken, the shutters B^{11} being actuated by a lever B^2, and ratchet mechanism B^3, B^{111}, and S to S^7 by the person pushing the handle S, outside, and shown also in the detached views figs. 12 and 13, as will hereinafter be described. On the right hand back part of the dark box or case A, a great number or set of the small (nearly rectangular) properly prepared sheet metal plates *a* (or it might be cards or paper), on which the pictures are to be taken, would be mounted radially as close together as possible by their lower ends and edges in grooves cut in rotating disc wheels a^1 a^{11} on a barrel, or ratchet wheel spindle a^2, or otherwise it might be in slit slip bars on endless bands or chains traversed on two end rollers, preferably vertically, but it might be horizontally, in any case so that each front plate *a* left, as the others are removed and used, would be brought round, and forward up against a stop or ratchet pawl, preferably in a vertical position over the axis a^2 of the wheel a^1, a^{11}, or roller, as indicated particularly in figure 2 A, and in the detached end view fig. 1 A, and turned by a weight and cord passed over a pulley a^3 on the axis a^2 of the ratchet wheel a^{1111}, which is turned one tooth at a time by pawl lever mechanism a^4 against the power of the weighted cord a^3 to bring each fresh plate *a* in vertical line, for being removed by its gripping carrying spring clip *b* with spring pawl, and projections *b* + whichtake into the holes at *a* + in the upper part of each plate *a*, and pull it out of its grooves in the discs a^1, a^{11}, so as

to have a picture formed on it, all as will hereinafter be described. The upper inner part of this gripping clip *b* is formed with a dovetail groove b^1, in it, fitted to slide transversely on a corresponding dovetail bar *c* fitted to slide vertically by the slide blocks c^1 in the central slides guides c^{11} formed or secured on the front end of the vertical bracket frame C, holted at C^1 to flanges on the main rotating vertical spindle C^2 carried in lower and upper steel centre conical pivots at C^{11}, C^{111}, or equivalent bearings secured in the lower and upper fixed brackets C^1, C^5, the latter being carried on three long standards C^6, holted to the bed plate C^7, secured so as to carry the whole of the working mechanism on the top of the wooden table frame A^1, within the outer enclosing frame A, and to which the bracket C^1 is also holted. This main central vertical spindle C^2 is turned at a slow intermittent speed by a large bevel or face wheel D near its lower end, with the teeth on its under side, gearing into a bevel pinion D^1 on a horizontal spindle D^{11}, primarily actuated by a train of spur pinions and wheels D^2,D^3,D^4, the latter being on the spindle of a wire cord barrel D^5, carried on bearing brackets at C^4, D^6, F^{111}, the cord of this barrel D^5 having a heavy weight D^7 on it, to move round the shaft C^2 and its frame C, carrying the plate *a* in its clip *b* over a set of four chemical troughs 1, 2, 3, and 5, and two washing troughs 4 and 6, and two drying chambers 7 and 7^1, and a varnishing trough 8 between the two latter, all range in a circle secured to the plate C^7, so that the plates can be dipped into them, and be raised out again after being immersed any desired regulated time, while the frame C is stopped over each trough and chamber for that purpose, as will hereinafter be described. (*To be continued.*)

Correspondence.

THE WEST LONDON PHOTOGRAPHIC SOCIETY.

DEAR SIR,—Permit me to correct an error in the report of the West London Photographic Society, given in your last issue. I am made to say that the Eastman Company had abandoned the electric light for enlarging. Evidently the reporter misunderstood me, for I did not say so. I was quite aware that the Eastman Company not only in London, but also in Amersca, do all their enlarging by electric light, and employ no other for the purpose.—Yours truly,

E. W. FOXLEE.

22, *Goldsmith Road, Acton, W. May* 12.

Proceedings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE ordinary monthly meeting of this Society was held last Tuesday evening, the 14th inst., at the Rooms, Pall Mall East, the President, Mr. JAMES GLAISHER, F.R.S., in the chair.

Capt. ABNEY was requested to make some observations on the spectrum photographs and accompanying description that had been sent by Col. Waterhouse to the Society for its previous meeting in April, and said that he thought the lengthy exposures mentioned as having been given did not promise very well for the anthracine blue. Alizarine blue he had tried, and certainly was not prepared to stand up for it. He did not find any vast improvement in the manner of taking spectrum photographs. There was yet a good deal to be done with dyes before arriving at as much as had been done with the blue bromide of silver that he had described and used years ago. He did not think the specimens shown were better than could be obtained with cyanine and eosine or erythrosine. They were, however, beautifully sharp and clean, qualities that it was not always easy to secure with orthochromatised plates. He saw some letters which probably referred to the make of plates. Perhaps Mr. Spiller could say what was intended.

Mr. JOHN SPILLER replied that the letters W. and W. referred to Wratten and Wainwright's instantaneous plates, which were what had been used by C l. Waterhouse.

Capt. ABNEY continued that in a good spectrum photograph the A line might be split up into seventeen lines; this division he considered to be the crux of a good spectrum photograph.

Mr. SPILLER said that with regard to rhodamine, he had a specimen showing it to be a very red purple dye. A question arose as to whether rhodamine was an eosine, and so came within the patents relating to that substance. Although the dyes were somewhat similar, he held that rhodamine, not being a resorcine product, could not be considered to be an eosine.

Mr. T. R. DALLMEYER then read a paper on the differences and applications of single lenses, in the course of which he said, that among the points to be examined in any lens were rapidity of action, correction of the central and excentric pencils, brilliancy, and freedom from flare spots. The brilliancy of image given by single lenses was unquestionable. As to rapidity, if the central pencils only were to be considered, they could be constructed of the same power as double lenses, but if there was any extension of the field this was not practicable. He showed drawings on the black board of the various kinds of single lenses manufactured by his firm, including the latest so-called single lens, in which the elements were separated by an air space. As a simple means for examining the properties of a lens, he advocated the use of a lamp illuminating a bulb of mercury, the reflection from which served as an artificial star. The lens should be placed at a distance of from ten to fifteen times its focal length from the bulb, and the camera image inspected first with the lens directly pointed to the object, and afterwards, for marginal definition, the lens should be swung round so that the pencil of light passed through excentrically. There was also an advantage in having an illuminated bright cross for the purpose of detecting astigmatism. The lens was assumed to be actinic. The testing for that property should be the first thing. If spherical aberration was present, the image disappeared when the lens was wheeled in. Astigmatism and coma were sometimes confounded, but astigmatism showed a difference by elongation of a spot in two directions, as the lens was turned in or out, whilst coma represented the light spot as having a halo light [sketched on black board] forming a wing shape, proceeding from one side of the spot. Coma and astigmatism were the great difficulty in stellar photography, and their presence was the cause of the limitation of the field of view to about two degrees. If these difficulties could be obviated, larger portions of the sky could be photographed at one exposure. The lens at the same time must have a flat field. The difficulty was to get flatness of field without increasing astigmation. The task of the opticiau was to make the best compromise obtainable. The new Jena glass offered very material advantages. One thing to be mentioned was that with each kind the makers sent a correct statement of its qualities, so that after making a calculation founded on their statements he had not had to make a single alteration afterwards. The makers, however, gave a danger signal with some glass that would be especially serviceable, in the form of an intimation that it could not be depended on for lasting qualities.

Mr. W. ENGLAND said that he was a great advocate for single lenses, and used them on every possible occasion. He had them from four to twenty inch focus, and except for architectural work, or when the greatest rapidity was essential, used them in preference to any others.

Mr. CHAPMAN JONES said that the method which he had used for the production of an artificial star was to have a candle in a spring socket so as to keep it at a fixed height, and to place close in front of the flame a screen pierced with a very small hole; he thought this method better than the one with the mercury bulb described by Mr. Dallmeyer, and altogether more manageable. It was very well known that single lenses were formerly made of much greater diameter in proportion to their focal length than at the present time; he had an old single lens of fourteen inch focus that covered well a 9 by 7 plate, but he had never seen a modern lens that would do anything like this. He would ask whether the diminution of size was simply for the sake of portability, or was it to save expense?

Mr. WARNERKE said that some time since he had mentioned that a photographer in St. Petersburgh, who wished to use a single lens for portraiture, did so by reversing it so that the concave side of the lens and the stop were nearest to the plate. By this means he obtained greater rapidity.

Mr. C. DAVISON said that Mr. Lyonel Clark, when taking large heads, had used a single lens of large diameter, and removed the diaphragm plate altogether, by which means he obtained rapidity, and a very pleasing quality in the picture.

Mr. T. SEBASTIAN DAVIS observed that he thought that lenses should be sent out with indication of the size of the diameter of the circle that would include 60° of the subject. About 40° of angular aperture was what could be seen clearly without altering the point of sight, and on looking at the works of painters they would see that they did not greatly exceed that limit, and never included the very large angle given by wide angle lenses.

Mr. FRIESE GREENE enquired whether Mr. Dallmeyer had found a difference in the correction required by lenses when used for artificial light compared with daylight. He had a Voightlander lens which worked true to focus with daylight, but when used with electric light it required adjustment.

Mr. DALLMEYER having replied, the meeting was adjourned to the 11th of June.

Mr. A. F. Hare and Mr. K. Agawa were elected members of the Society.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on the 9th inst., Mr. C. H. COOKE in the chair.

Mr. G. W. ATKINS exhibited an arrangement for passing diaphragms through the lens mount of a rectilinear lens. When this lens is used inside the camera all the diaphragms are made side by side, with the exception of the two smallest, in a strip of very thin metal. This is made to travel backwards and forwards across and between the lenses, the movement being effected by a small milled head in front of and rackwork inside the camera, a small notch in the metal plate opposite each diaphragm indicating when each stop is correctly centred. The front of a camera not being wide enough to admit of a strip of metal sufficiently long to take all the diaphragms, the two smaller sizes are omitted. These, when required to be used, have to be placed in position by hand from the back of the camera.

Mr. T. KERR showed a detective camera. It had three double-backs, and weighed, without plates, 4¾ lbs.

Mr. A. HADDON considered the weak point with all cameras of this class was the want of shading to the finder. In a bright light it was difficult to see any image at all on the glass.

The CHAIRMAN said, in his experience, shading the under could easily be done with the hand. A shade fixed on the camera would be very unsightly, and he thought it quite unnecessary.

Referring to the subject of the use of hydrokinone, Mr. J. T. ATKINSON had used it for some months, and he now preferred it to any other developer.

Mr. F. A. BRIDGE thought the merit claimed for hydrokinone, that several plates could be developed in the same solution, was not altogether an advantage, as each picture developed in succession became harder, until a decidedly under-exposed appearance presented itself.

Mr. W. ENGLAND considered it an excellent developer for transparencies; a very good tone could be obtained with it.

Mr. J. J. BRIGINSHAW corroborated this, as being in accordance with his experience.

A question was asked, Who first suggested coloured screens for taking negatives?

Mr. W. H. HARRISON believed that Professor Crookes was the first to use a screen consisting of a solution of sulphate of quinine. Although a colourless liquid, it was practically a coloured screen, as it cut off the violet rays and reduced the refrangibility of the blue.

A Member enquired if anyone present had seen any results from Mr. Blanchard's process?

Mr. W. ENGLAND replied in the affirmative; the prints he had seen were very good.

Mr. F. E. FRESHWATER had been printing some microscopic subjects on bromide paper; they compared unfavourably in the matter of detail with prints of the same subject made on albumenised paper.

Mr. F. A. BRIDGE said the rough surface of bromide paper would cause a loss of the finer details.

Mr. J. J. BRIGINSHAW had given up printing microscopic subjects on bromide paper; he had found Obernetter's gelatino-chloride of silver paper excellent for this class of work.

On Thursday next, May 23rd, Mr. Valentine Blanchard will give a demonstration of his new platinum toning process.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

AT the meeting on May 7th Mr. J. TRAILL TAYLOR was in the chair, and Messrs. C. M. Riches and B. Foulkes Winks were elected members of the Society.

The PRESIDENT stated that this method was devised by Mr. Latimer Clarke in 1854.

The HON. SEC. showed negatives on the Beernaert plates; Mr. E. CLIFTON, a photograph of the Eiffel Tower taken with a hand camera; Rev. E. HEALY, a 10 by 8 negative taken with an eleven-inch focus lens; and Mr. W. T. COVENTON, a stereoscopic camera constructed to rotate round any centre desired.

Mr. H. M. SMITH then gave a demonstration on "The Carbon Process."

The CHAIRMAN stated that whatever might be said of the want of permanence of other processes, the carbon print is absolutely permanent. The pigment in which the image is imbedded finally becomes vellum, and any coloured pigment may be employed.

Mr. F. W. HART passed round prints of a light blue ornament on a cream ground, to show the advantages of using Edwards's isochromatic plates; they were taken with his flash-lamp.

Mr. F. W. FEW showed some plates covered with spots in the film; also some plates fogged by a minute hole in the flexible band in an instantaneous shutter.

The next meeting will be on Tuesday, May 21st.

SHAFTESBURY PHOTOGRAPHIC SOCIAL.

THE above Club held a meeting on Friday evening last at 8.30, Mr. D. KINTONE in the chair.

MR. TOLLETT then gave his paper entitled "Working of Bromide Papers," his object of the evening being to use it for contact printing. He expressed his own practical idea as to its being suitable for weak negatives, views, &c., that it can be worked at night, and becoming, in the long run, cheaper than silver printing. He first exposed two pieces of Ilford's half-plate bromides in front of a "Bray's" ordinary burner at a distance of one foot for forty-five seconds, developing in the maker's formula of ferrous-oxalate solution, the result being very good. Then he exposed two pieces of Eastman's to the same light for thirty seconds, developed in the same solution as last, turning out very excellent results. He then exposed two pieces of bromides which Fry & Co. kindly presented the Club—two packets, one thick and one thin—twenty-four inches away from burner for fifteen seconds, and developed in hydroquinone, making satisfactory results. The whole operation was worked before the good attendance of members and visitors present. The prints were then placed beside one another to pick the best results. Eastman's seemed to be preferred.

After a vote of thanks to Mr. Tollett, the Secretary announced the coming outing to Chingford on the 18th, to meet at 2.50, outside Liverpool Street Station, under the clock. Amateurs invited.

LEWES PHOTOGRAPHIC SOCIETY.

AN ordinary meeting was held at the Glee Room, Cliffe, on the 7th inst, the PRESIDENT in the chair.

The HON. SECRETARY called the attention of members to the list of rules and classes for the Exhibition to be held in October next, in which several classes will be open to photographers resident in Sussex.

An excursion was arranged for the 20th inst., weather permitting.

The PRESIDENT then read his paper on "Enlarging." A bromide print was exposed during the reading of the paper, and afterwards developed with a solution of hydroquinone.

A collection of enlargements were exhibited by the President, and were much admired.

Mr. CORDER promised a demonstration of the Platinotype process for the next meeting, to be held on June 4th.

NORTH SURREY PHOTOGRAPHIC SOCIETY.

THE meeting of this Society on 30th ult. was devoted to an exhibition of lantern slides, and about two hundred slides, entirely the work of the members, were passed through the lantern. The majority of the pictures were of very good quality, and elicited numerous questions as to the method of production, &c. A curiosity in the shape of a cloud picture, including the sun perfectly distinct, was particularly interesting, and there were some very good examples of hand-camera work.

The Society also met on the 7th inst., when Mr. Thomas read a paper on "The Coast of Yorkshire." This paper, which was illustrated by lantern slides, was most interesting, and Mr. Thomas, thoroughly master of his subject, was able to give practical information most valuable to intending visitors to this delightful district.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

AT the meeting on May 2nd, several excellent specimen prints from Mr. Valentine Blanchard, by his platinum toning process, were exhibited, as also several by the Secretary, who stated that he had found the working of the process simple, and had no difficulty in getting tones quite equal to those of Mr. Blanchard's examples.

In concluding a discussion on "Hydroquinone," Mr. JOHN ROBERTSON said that he had used it in his studio exclusively for five or six years, but had been obliged to abandon its use

owing to the effect it had on his hands, similar to that of biehromate poisoning. On recovering he had tried the developer agaiu, to prove if it were at fault; iu a few days the old symptoms returned—first intense iteh iu the back of the hands, followed by the skin cracking and ulcers. The most efficacious cure was an old-fashioned one of a sugar aud soap poultice.

The following were elected office-bearers for the ensuing session :—

President—Dr. J. K. Tulloch.

Vice-Presidents—Messrs. John Matthewson and J. D. Cox.

Council—Messrs. W. Baxter, J. C. Cox, W. F. Hill, D. Ireland, G. G. MeLaren, L. Ower, J. Robertson, W. Salmond, A. Stewart, and W. D. Valentine.

Secretary and Treasurer—Mr. V. C. Baird, Broughty Ferry.

Talk in the Studio.

A MONKEY SHOW.—A great monkey show is to be held at the Alexandra Palace in June, and will open on the first. As the monkeys are to be allowed much more freedom than is usual at zoological gardens, and one may hope for fine weather during some portion of the time at any rate, there may be capital opportunity for photographing the monkeys. We are uuder the impression that no restrictions are placed with regard to the use of the camera at the Alexandra Palace, but shall be glad to have an assurance on the point.

PLATINUM IN CANADA.—The *Journal of Chemical Industry* says :—"A noteworthy discovery has been lately made. Platinum has been found *in place* in the nickeliferous ore of Sudbury, Canada, by Professor F. W. Clarke. This discovery was made accidentally, in the course of determinative and aualytical work upon the ore, which presents other peculiarities. While the amount found is of little or no commereial importance, it has a very great scientific significance, and is certainly something new. Platinum graius have been found in secondary rocks, such as recent sandstones, conglomerates, &c., but never before, so far as we are aware, in vein stuff, although it has long been looked for, and such an occurrence was to be expected. There is, therefore, always the chauce that actual veins of platinum-bearing material, so often falsely reported, may actually be found, and that perhaps some of them may be of a paying grade.

POROUS GLASS is a Parisian novelty. This glass does not admit of draught, but is so constructed as to ensure comfortable ventilation.—*Bury oyne's Monthly Magazine.*

ROYAL INSTITUTION.—Mr. De la Rue has presented to the Royal Institution the philosophical apparatus of the late Dr. Warren De la Rue, which will be preserved there as the historical collection commemorative of the important scientific work of Dr. Warren De la Rue, and of the eminent position he has so long occupied as a promoter of science aud of the special objects of the Institution; and a fine portrait of Sir Humphrey Davy has been presented by Mr. James Young, grandson of the late Dr. James Young, F.R.S., of Kelly, the distinguished chemist and former owner of the portrait, which makes a valuable addition to the collection of historic portraits now in the Royal Institution.

BATH PHOTOGRAPHIC SOCIETY.—There will be an excursion of members on Thursday, 23rd inst., to St. Catherine's; brake leaves Mineral Water Hospital at 1 p.m; return fare, 1s.; seats should be booked by the 19th inst. Ordinary meeting Wednesday, 29th inst.; paper on the "Emulsion Processes of Photography" will be given by the Secretary; chair taken at 8 p.m.

PHOTOGRAPHIC CLUB.—The subject for discussion on May 22nd will be "Keeping Qualities of Photographic Chemicals and Bromide Plates." Saturday outing at Potter's Bar; trains from G.N.R.

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, exceeptiug questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," (but not letters intended for insertion under the heading "Correspondence") should now be sent to Mr. Spiller, who is alone responsible for all which appears under the heading "Answers to Correspondents." Such communications, if now sent to the Editor, are forwarded by him to Mr. Spiller. Failure to attend to the above instructions may lead to disappointment.

Answers to Correspondents.

This column is now under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, is placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

M. CAPELLI.—The marbled stains on your gelatino-bromide plates may possibly be due to want of care in developing rather than to an inherent defect in the emulsion. Do they show up in the same manner with the hydrokinone developer? In any case, use plenty of developer, with constant agitation.

INQUIRER.—Celluloiding may be done with a low nitrated pyroxyline, dissolved in melted camphor, spread upon paper or cardboard, and passed through heated rollers; but the Willesden treatment with cuprammonium (metallic copper or the washed oxide dissolved in strong ammonia) is a simple process of waterproofing paper, and gives a less inflammable article.

W. S. (West Dulwich).—On page 319 of last week's NEWS you will find the name of the gentleman about whom you were making enquiries. Write to the hon. sec. of the North Middlesex Club (25, Granville Road, Stroud Green, N.), who may very likely be able to give you his address.

L. A. M.—There are several methods of reducing over-exposed silver prints. Iodine water has been recommended, also cyanide of potassium, one or two grains to the pint; but the best process is that described at page 169 of the YEAR-BOOK for 1884, which depends upon the use of a weak chromic solution, made as follows :

Potassium biehromate	10 grains
Strong nitric or hydroehloric acid	½ dram
Water	10 ounces

FOREGROUND.—The diagonal diaphragm suggested by Mr. G. S. Penny in the year 1883 might meet your case. It is fitted obliquely in a tube which rotates in front of the lens. Turned downwards, it gives the foreground a little extra exposure, sidewards as required, or upwards when the roof of an interior requires additional illumination.

PARCHMENT.—Strong nitric acid adds considerably to the strength of blotting paper. Gaine's patent parchment paper was made by immersing in a *cold* mixture of two parts of concentrated sulphuric acid to one of water (by measure), and then washing quickly in plain water.

EMULSION (Belgium).—The Eastman Company offer a very efficient form of centrifugal separator suitable for amateurs' use. It is a 4½-inch machine worked by hand, the silvered drum having a nett capacity of 15 fluid ounces. The price is ten guineas.

J. S. (Coimbra).—Henderson's enamel process was described in the NEWS of March 16th, 1883. The formula includes so much hydroehloric acid that one would not have expected to hear of the precipitation of the tin salt. Add the acid to the ingredients before pouring in the whole of the water.

R. B.—We do not know of the dye to which your description applies. Send a small sample, and we shall probably be able to identify it.

HERMETICUS (Newport, Mon.)—There is an entrance fee and one guinea annual subscription to the Institute. Candidates are nominated, and then admitted by examination. The most approved works are Sutton's "Volumetric Analysis," Fresenius's "Quantitative Analysis," and Crookes's "Selected Methods of Analysis." A consulting chemist or analyst is not absolutely required to take up the F. I. C., but he would find it advantageous to do so as proof of his qualifications.

C. G.—The gold lettering on your cabinet mounts is done with bronze powder, but the photos. sent appear to have been accidentally injured by splashes of hypo. Do you notice that the spots all have a brown nucleus, as though from this cause?

W. S. C. (Devon).—The lens mentioned is rather quicker than the corresponding rapid rectilinear, and therefore better suited for instantaneous work.

E. M.—The ballot for judges at the next Photographic Exhibition is already taken. Their names will appear in the report of Tuesday's meeting.

ESSEX.—The weather in London has been no better: for four days we did not see the sun, and the rain on Saturday last amounted to a deluge.

W. N.—Since writing to you we have tried the experiment, and find that ferrous oxalate speedily reduces the platinum, so the case stands as you have put it in your second letter, dated May 15th.

R. H. B.—The foggy stains round the edges of your plates may be due to light getting access to the interior of the dark slide. Look well to this, for double carriers are sometimes faulty at the junction. The proportions of your developer are right.

F. W.—Answered by post. Other correspondents in our next.

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THE PHOTOGRAPHIC NEWS.

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A PHOTOGRAPHIC SECTION OF THE LONDON CHAMBER OF COMMERCE.

LAST week we referred to the fact that a Photographic Section of the London Chamber of Commerce is in the course of formation, and we mentioned that some of the leading gentlemen connected with the photographic trade have intimated their willingness to take part in the work of the section.

A department of the London Chamber of Commerce, organized in relation to photography, should become a sort of standing photographic convention for the consideration of matters affecting the trading interests of photographers and photographic material dealers, matters which very often do not come fairly within the range of the ordinary photographic societies.

Among such points may be mentioned photographic copyright, the law with respect to which is in an eminently unsatisfactory condition, partly owing to the circumstance that there is no remedy against a portrait photographer who violates the confidence of his client by supplying copies of any portrait made for payment, and partly because the legal relation of all parties to the negative is now absolutely chaotic. Moreover, it has been held that the person actually taking the photograph must take part in the registration, but we require some means of knowing who "takes" the photograph. In such a case as the following, who takes it? A photographic business belongs to a person who employs a head operator, this functionary merely superintending the posing, the lighting, and the exposure, while one assistant uncovers the lens and another develops the plate, a third making the prints.

Another matter of trade interest is considering how fully the spirit and letter of the Merchandise Marks Act should be enforced in reference not only to lenses, but also to mounting boards and such like, also to photo-engraved plates and blocks intended to be printed from in this country.

The question of Custom House regulations, in especial reference to consignments of sensitive goods not accompanied by the owner, might well come under consideration, as also such matters as the purity of chemicals, fire insurance, and the ever-recurring difficulties with district surveyors appointed under the Building Acts.

The London Chamber of Commerce is a body originally constituted by private effort, but which was incorporated afterwards in the form of a limited liability association in which the members cannot take profit. The council consists of thirty-six elected councillors, assisted by the chairman of each section, and experts introduced on special occasions. Each section has a standing chairman elected in the section by equal suffrage, and a deputy chairman. The offices are ordinarily held for one year only.

To give an idea of the organisation of a section we may give some account of the printing section, of which the chairman is Mr. R. K. Causton, and the deputy-chairman Mr. Albert Spicer. The meetings of the general committee of the section are held on the last Tuesday in February, May, October, and December, at 3.30 p.m., and the following sub-sections have been formed:—

"(1) Printers' and Lithographers' Sub-section—R. K. Causton, Esq., M.P., W. C. K. Clowes, Esq., Richard Clay, Esq., E. F. Kelly, Esq., Thos. Riddle, Esq., George Unwin, Esq.

"(2) Paper Makers' and Stationers' Sub-Section—George Chater, Jun., Esq., John Evans, Esq., D.C.L., F.R.S., Albert Spicer, Esq.

"(3) Publishers' Sub-section—F. R. Daldy, Esq., H. O. Arnold Forster, Esq., G. H. Longman, Esq., W. A. Pope, Esq., R. W. Routledge, Esq.

"(4) Type Founders' Sub-section—James Figgins, Esq., A. H. Reed, Esq., F.R.G.S.

"(5) Ink Manufacturers' Sub-section—R. B. Fraser, Esq., Charles J. Todd, Esq.

"(6) Machinery Manufacturers' Sub-section—R. M. Gill, Esq., H. Harrild, Esq.

"(7) Bookbinders' Sub-section—Harvey Orrinsmith, Esq., George Simpson, Esq."

We may mention that the offices of the London Chamber of Commerce are at Botolph House, Eastcheap, London, E.C., that Mr. Kenric B. Murray is secretary, and that Sir John Lubbock is the President.

During the past eight years the Chamber has occupied itself prominently with the following subjects:—Anglo-French Treaty negotiations, affairs in Burmah, Postal and Telegraphic Rates, Coffee Adulteration, Bills of Lading Reform, Bankruptcy Law Reform, the Suez Canal, the Anglo-Spanish Treaty negotiations, the Coal and Wine Dues, Arbitration and Codification of the Laws relating thereto, Dock Charges, the Congo Treaty, Thames Communications, Railway Communication and Extensions in India and the Colonies, Home Railway Rates and Fares, Indo-Chinese Railways as projected by Messrs. Colquhoun and Hallett, the development of South Africa, the London Corn Dues, Commercial Treaties with Foreign Countries, Sixpenny Telegrams, Colonial and Imperial Federation, Emigration, the Merchant Shipping Bill of 1884, Trade Marks, the preparation of Average Wages Tables, the questions of the Royal Commission on Depression of Trade (to which the Chamber replied), the organization of the Congress of Chambers of Commerce of the British Empire (which was carried out by the Chamber), the Colonial and Indian Exhibition of 1886 (in which the West African Court was initiated by the Chamber), the State Guarantee of War Risks, Code Telegrapy, Technical and Commercial Education, Protection from Fire in London and Fire Insurance Rates, Codification of the Factor's Acts, Canadian Preference

Claims, Commercial Museums, the Imperial Institute, the Silver Question, the Shop Hours' Regulation Bill, the Baku Petroleum Conference, Decimal Coinage, Post Office Investments, Colonial and International Exhibitions' Income Tax, the Japan and Franco-Chinese Treaties, the Merchandise Marks Act, 1887, and the Submarine Telegraph Monoply.

Among those who have signified their intention to participate in the work of the Photographic section are Mr. Dallmeyer, The Autotype Company, Messrs. Fallowfield, Messrs. Marion, Mr. Walker (as representing the Eastman Co.), Mr. Elliott (of Messrs. Elliott and Fry), Messrs. Swift and Sons, Messrs. Mawson and Swan, Messrs. Samuel Fry and Co.

THE PHOTOGRAPHIC CLUB AND THE METRIC SYSTEM.

A COMMITTEE of the Photographic Club has issued the subjoined manifesto recommending the use of the metric system in photographic matters, but it seems to ignore the inconvenience and complications involved by using this system side by side with the weights and measures now in use. Let some members just try the experiment of reducing the formula occurring in one month's issue of the PHOTOGRAPHIC NEWS into working equivalent formulæ, and the difficulty of using the metric system while others are using the current standards, will be apparent.

"We, the sub-committee appointed by the Photographic Club to consider the desirability of adopting a uniform system of weights and measures, having fully discussed the matter in all its bearings, have come to the unanimous decision to recommend the adoption of the metric decimal system, pure and simple.

"The demerits of the present British system require but little consideration to condemn it. The absence of any definite unit or integral subdivisions, and the different values attaching to the denominations, lead to vagueness and error, while the difficulty of making calculations and of translating foreign formulæ is a constant source of trouble, and no modification of the present system has come before us which is free from these faults.

"On the other hand, a very little experience of the metric system proves its simplicity, and the fact that it is universally adopted in scientific literature and practice, and that it has always been in actual use on the Continent for photographic purposes, points to it as the only alternative to our own defective system. It may be mentioned that the cost of the decimal weights and measures does not exeeed that of those now in use.

"It is hoped that the Photographic Club, in adopting this system, will have the support of all the metropolitan and provincial societies of the United Kingdom, and if at the same time the representatives of photographic literature, and plate makers generally, some of whom have already signified their acquiescence, can also be prevailed upon to lend their aid, it would, perhaps, more than anything else tend to the universal employment of the metric system amongst authors and users of photographic formulæ."

DARK-ROOM WINDOWS.

Is it necessary to see during development? Undoubtedly it is not necessary in many cases. Where you have exposed to artificial light, and know the intensity of the light as also the sensitiveness of your plate or paper, then the watching of the operation of development can do little good, especially in the first stage of the process. Nay, a photographer working even in the studio, of which he has experience, and with plates, too, with which he is familiar, has frequently little need to inspect his films during development, for he times the exposure so accurately that plate and developer are in thorough accordance with one another. But it is different when you alter the conditions of your general work, or proceed to take pictures out of doors. Then you also succeed sometimes—if you have judgment and experience—without giving a glance to the negative in the developer; otherwise working in the dark is the same in photography as in everything else—you may get what you want, or you may not.

To be able to watch the progress of development then, if not indispensable, is very desirable. We have had all sorts of mediums proposed which shall enable us to see the plate, without the plate tinting, but none of them are altogether satisfactory. Dr. Eder of Vienna, and Dr. Vogel of Berlin, tell us that the "Cherry Fabric" material is one of the best to give a light with little injury to the plate; but with the "cherry" stuff it behoves one to be careful not to let it get bleached by sunlight, and to employ it two-fold to guard against interstices. The dark yellow paper generally employed for wrapping is exceedingly non-actinic, especially in conjunction with ruby glass or cherry fabric, but then very little light is admitted at all; but an excellent yellow material is now sold as "Golden Fabric"; it admits much light, and that a remarkably safe light.

And this brings us to one point in our subject that has never been fairly put forward. Many experimenters have tested the coloured glass and fabrics suggested from time to time, and have favoured us with tabular statements of the value of them for protecting dark-room windows. In these researches, their comparative worth has always been set down in the ratio in which the light that gets through them acts upon the sensitive film. Now this represents the truth, no doubt, but not the whole truth. If we are to accept it as a fact that the medium that permits the least light to penetrate is most suitable for protecting the dark room window, then it is evident that a deal board or a brick wall is best of all, for they do not allow any light to pass at all. An experimentalist will tell us that fabric A admits light to the extent of the figure 20, that B only allows 18 to pass, while C is such a capital shield against injurious light that the equivalent of 10 only gets through. We ask, why does he not go farther, and experiment with a bulkhead? He would then reach perfection, and show us a medium against which he could proudly set the figure 0.

How else is he to do it, it may be asked? But that is for him to discover, if he is going to make the experiment at all. What we protest against is, false conclusions being put before the public under the guise of a sound one. If a man has no means of judging of the best photographic illumination for the dark room, let him hold his peace, for photographers are sufficiently well acquainted with the fact that light, in greater or less quantities, is injurious to the sensitive film. They know perfectly well that, in respect to white light, the darker it is in the laboratory the safer it will be for sensitive plates, while nothing is so safe as absolute darkness. They want no learned man to tell them that. What they do want to know, however, is this:—Given a certain amount of light necessary to conduct development: how are they to obtain it with least injury to the plate? What is the safest kind of light, not darkness, to use? They must admit a certain amount of injurious light, apparently—at any rate, after the first stage of development is passed—and how are they to get the least objectionable kind of light? To tell them to use another screen or two is not meeting the difficulty, but begging it. Everybody can teach them, as we have said, how to shut out light altogether; that does not require great depth of learning. To get the greatest amount of light with the least amount of injury to their negatives is the problem to be solved.

Therefore, we say, comparisons with various dark room mediums that merely tell us how much light gets through to act upon a film, are worse than useless, since they pretend to be the results they are not. Thus, if a medium permitted injury to a film to the number of 20, it might, nevertheless, be a much better dark-room material than

one that injured only to the extent of 18; if, for instance, it should turn out that with the former the photographer could watch every gradual change that comes over the negative, while the other enveloped him in darkness. There are photographers who work in comparative light, who get negatives quite as clear and bright as those who work almost in darkness; the former taking care to use light filtered with exceeding care, and the latter stopping out all light, except the faintest ruby glimmer. Given the axiom that light is necessary to watch the negative, the problem, we repeat, is to get this amount of light with the least injury to the film. It is no use to accept the most non-actinic medium on our experimentalist's table—a material, maybe, that only admits light to the value of 10—if you cannot see what you are doing inside the laboratory. In fact, it is folly to do so; much better go into darkness altogether than let in light that is of no earthly value to you. To be brief, it does not follow that the less light a material permits to pass, the better it is for a dark-room window. On the contrary, the more light it allows to enter the dark room, the more suitable is it, only the light should be of a kind least injurious to a sensitive film.

One other remark on the subject of the spectroscopic examination of windows. Because this is the most scientific test, it does not follow that it is the most trustworthy, as anyone who has given the subject a moment's thought will see. One kind of bromide of silver, as Dr. Vogel has recently shown, is most sensitive to the blue region of the spectrum, and another kind most sensitive to the indigo; again, the admixture of other haloid salts of silver—of iodide and chloride—materially affects the nature of the light to which the bromide salts is most sensitive. Thus, if we test a ruby or orange medium with the aid of a spectroscope and a film of pure and fine bromide of silver, the result we get proves nothing more than with sensitive films of that particular kind the medium is a good one, or is a bad one, as the case may be. Even he who makes his own plates cannot be quite sure of the particular kind of bromide he is preparing, while he who buys them—and they form the great majority—knows absolutely nothing of the purity of the bromide in the film. Of what use can a spectroscopic result be to him, obtained with the aid of pure and fine bromide, when the plates he uses contain both chloride and iodide in admixture with the bromide of silver?

Many photographers—especially amateurs—work with a tiny four-inch window, doubly covered with ruby glass and red fabric. We entered a dark room of this kind the other day, in which the window was so small and so well protected, that we could not see it at first. Such a window is of no use whatever. If the window is very large, then it may well be densely covered at the beginning of the development; but within ten seconds of the developer acting, sufficient light should be admitted to see and watch the negative. One of the best dark-room windows we know of, looks into a shady yard; sunshine never reaches it, and there is a projecting roof to give additional shadow. The casement itself is large—at least a yard square—and it has a double frame; the outside one is paned with orange glass, the inside with ruby. Besides the glass, there is a spring roller blind, with a curtain of cherry fabric depending from it. At the commencement of the development, or when fitting plates into the dark slides, this curtain is pulled down; there is then but a very gloomy light, but still you can see the white developing cups exceedingly well, and two feet from the window you may examine and read any boldly written label.

After the plate has been in the developing dish a few seconds, the blind cord is released and the red curtain raised. You can now watch the formation of the image perfectly well. If the development is slow, the blind can be lowered again for a little while, but with it down, the progress of the plate cannot be properly controlled. As a rule, when the negative appears gradually and surely, the red blind may be dispensed with altogether, and as soon as the image begins to show through the film at the back of the plate, the yellow glass sash may also be raised with impunity. There is now plenty of light, and of a quite harmless character to the film in its present condition coming through the big surface of ruby glass. In fact with a window of this size, the illumination approaches that of the old wet plate dark-room, and how welcome and pleasant this is, only those who have worked under such conditions know.

In conclusion, we would recommend all photographers to judge for themselves in the choice of mediums for the dark-room window. You cannot have much light without some risk of injury to the plate, so you need not expect it; and in making experiments with a new medium, always compare the result you obtain against a similar trial on a film developed in absolute darkness. This you can easily do by cutting a plate in halves and developing one half in a dish carefully covered up from the light of your dark laboratory, and the other exposed to the full illumination of the room. By putting the two halves together subsequently you at once observe any fogging, even if this is of the slightest character. The very slight fogging may be of no importance, but still, if it exists, it is better to know of its existence than to run away with the impression that you have secured a medium that admits an absolutely safe light.

THE CENTENARY EXHIBITION AT PARIS.

BY OUR SPECIAL COMMISSIONER.

Once more to Paris, a city which, preserving its character for gaiety, and charm for pleasure-seekers, has now added the attractions of an exhibition planned on so vast a scale as to be intended to tower above all previous efforts in this direction. Vast, however, as are the plans, the execution of them has been so much interfered with by delay, that the effect of what the whole will be when complete is left very much to the power of imagination which the visitor may possess. The old and much-quoted saying, "They manage these things better in France," cannot reasonably be applied with reference to the state of completeness at the appointed time of the present display. The feature of the Exhibition which is generally the first to be mentioned, the Eiffel Tower, is raised to its full height, but as yet the public is admitted only to the second landing, for which toilsome pilgrimage they pay the sum of three francs, the lift being, like nearly everything else in the exhibition, not yet finished. In nearly every section the same confusion reigns—empty glass cases, upset packing boxes, and the notice, "It is prohibited to the public to enter here." In consequence of this, and the incessant heavy hammering and shouting of busy workmen, we advise our readers to defer their visit for a little longer, at all events.

Another of the things that they do not manage better in France—at least, as it appears to the insular understanding—is the manner of dealing with the payment for admission to the Exhibition. Money is not taken at the entrance, but admission is only by ticket; and tickets are not sold at the Exhibition itself, but must be procured elsewhere beforehand. The tickets—they have adopted the English word—are sold in many shops and are freely hawked about the streets, but at a variety of prices. Nominally one franc each, they are to be had at all prices from this sum down to half a franc, at which price the writer, taking a stroll in the early morning, heard them offered for sale in a busy neighbourhood. It appears that the admissions were sold to speculators before the opening of the Exhibition, in conjunction with what amounts to lottery tickets, for a large sum in prizes, which will have to be deducted from the amount received for them. These coupons or lottery tickets having been sold separately by the speculators, who purchased the admis-

sion tickets in bulk, the latter are now put on the market for what they will fetch. Another thing in connection with the admission arrangements is, that whilst a nominal one-franc ticket is available from ten in the morning until six in the afternoon, a two-franc ticket or two ordinary ones, are required from those who enter earlier or later than these hours. A gun is fired from the Eiffel Tower at six o'clock, and this, we were told, was to serve as a signal for everyone to quit the Exhibition, or give up another ticket. The people certainly, on hearing it, trooped out in crowds, but we did not see any means adopted for challenging those who remained as to whether the second admission had been paid or not, and imagine that if there was originally any rule requiring a second payment from those already in the Exhibition, the rule has been abandoned. As the bulk of those Exhibition buildings that have been opened begin to close soon afterwards, and there are no more bands playing, the inducements to stay consist principally in the desire to see the illumination of the building and grounds, and particularly of the fountains, which latter display, however, does not take place until between ten and eleven o'clock.

Extensive as are the Exhibition building and grounds in the Champ de Mars, the Exhibition overflows this space, and embraces the Trocadero, the building which served for the exhibition of 1878, and a considerable space of ground about three-quarters of a mile to the east, on the site of the Esplanade des Invalides. There is a very narrow guage railway with a miniature engine, and cars covered with awnings running along the Quai d'Orsay, to unite this otherwise detached portion of the Exhibition. The road along which the railway runs is so narrow, that it is necessary to put up notices warning passengers to take heed of the trees, and not to put head or foot out of the cars.

The Spanish American Republics seem anxious to come up to the front, regardless of expense, to a surprising extent, as evidenced by the very striking and handsome buildings which they have erected, or are in course of erecting—for not one of these buildings is open—and whilst workmen are occupied on the exterior of some that are obviously unfinished, others appear to be complete externally, but from their remaining closed it is to be supposed that work is still going on inside.

Apart from the Exhibition, Paris itself presents just now a gayer appearance in some respects than it can do at any other season of the year. To the bright fresh green, peculiar to the spring, that the foliage of the trees which plentifully line the Boulevards displays ere the dust and heat of the summer have destroyed its pristine brilliancy of colour, is just now added the floral gaiety of the blossoms of the horse chestnut, a tree which is much in vogue here for the purpose of street adornment.

Amongst other definitions of beauty, a quaint one describes it as the absence of ugliness. The idea conveyed in this definition explains one of the causes of the beauty of Paris compared with cities like London and New York. The ugliness referred to is that due to the unsightly mass of advertisements and bewildering maze of overhead telegraph wires that disfigure the metropolitan cities of the English speaking countries. Not that advertising posters are altogether absent, but they are so limited and regulated as not to be obstrusive.

Then, too, in the quieter and more secluded portions of the city, such as we pass through in visiting the residence of our esteemed collaborateur M. Leon Vidal, at Passy, the old world quietude and picturesqueness of some of the streets is brightened and relieved by profusely flowering lilacs and other ornamental vegetation. Inside the grounds at the Exhibition itself the same unfailing readiness of nature shows itself in contrast with the unprepared condition of things to which allusion has been made. Especially beautiful is the show of rhododendrons which adorn the banks beside the paths, and it is gratifying to the national pride of a Briton to see that these flowers, which bloom here with such magnificent richness and variety, nearly all bear English names, as shown upon the labels denoting the several kinds.

There is one very notable exception to the general condition of unreadiness of the Exhibition, and that exception, it is satisfactory to be able to relate, is shown by the British Section. It is further gratifying to find that as one of the principal causes of this completeness of the British department, the energetic activity of Mr. H. Trueman Wood is so generally recognised; a gentleman who, as our readers are aware, holds, in addition to his official position in the British Commission of the great Exhibition, the posts of secretary of the Society of Arts and vice-president of the Photographic Society of Great Britain.

The photographic exhibits sent by several countries are not as yet open at all. Amongst others, the writer looked forward with much interest to seeing the display from the United States, and it was a great disappointment to be informed by the official in charge that it would not be opened till June.

The French portion of the photographic display is, perhaps, in the most unready condition of any of those that have any pretension to being open at all. On the other hand, the British display of photographs is, with one or two exceptions, complete, and though not extensive, there are among the exhibits some few of especial interest, an account of which will occupy the next letter.

THE LIMITS OF PHOTOGRAVURE.

BY A. DAWSON.*

Having been desired to prepare a paper on Photogravure—*i.e.*, the production of intaglio plates in half-tone (although line subjects and maps are equally photogravure)—I desire to respond to the best ability that other demands will permit.

I propose in this paper to keep to the artistic aspect of the question, and so doing rather to point out the limits of the science as I have so often encountered them. Others, I am aware, frequently take a sort of pride in the capabilities of the method; but when the demands of taste have to be met, it does not allow one much time to think of anything but how to enlarge our field of work, and how to increase our production without losing quality.

Remembering that well-cut copper plates never gave the number of impressions that were desired by engravers, and that steel-plates were introduced to remedy this defect—then remembering that photogravure plates are far weaker and shallower than even copper engraved plates—it will be seen that there was much to be done, and there still is much to be done, to make it perfect.

I would suggest that the making of a fine photogravure in steel be kept in mind as the desideratum of the future.

Of course, we steel-face all plates nowadays, however engraved, so only that they are made of copper. But anyone who has had to work a plate hard knows the grief of wearing the precious film of iron (or, as it is called, steel) away. This protecting coat is the only thing that makes photogravure a possibility for book-work. And the wearing of it away is the one great hindrance to the long endurance of the plates. Partly by reason of the action of solvents in removing it, partly by incipient wear when it gives way, the second coat of steel is found always a greater load for the plate to put up with than the first—lights are smoother and darks are more levelled down to one uniform shade. This power or endurance of the first coat of steel then becomes the real limit of the number of fine first-class prints obtainable. The art of making a really good and yet thin steel face carries a deal along with it. We generally reckon 500, but often 1,000 are printed off one facing before it gives way.

It is rather hard to have to start in this tone, but it is really necessary to remove the common impression that once a copper-plate is manufactured an infinite number of the finest impressions can be produced as a matter of course. It is a great mistake in the present condition of the art.

Let me now imagine a plate from Turner's "Liber Studiorum" before you, and I would say that, putting aside the enormous power of the bitten outlines, the mellow transparent tones are

* A communication to the Conference.

what we have to get. Remember that these plates are deeply cut into the copper by the mezzotint tool, which cuts sharper and deeper than holes made by chemical means. The result is that a transparent ink made with soft colour, such as bitumen, or Vandyke brown, may be used instead of black and burnt umber. The result is that the deep plate gives a much softer and more glowing print than we do with our shallow chemical grains.

I do not think I can by all my power convey to an ordinary onlooker an idea of the great width and depth of the gulf that once separated the struggling processist from the technically perfect engraver in steel or copper. I feel sure that if the processist knew the length of the journey before him he would scarcely have desired to start on it.

But, instead of this, we found the first photogravure or the first relief photo block swaggered about and shown all over the place as a wonder and a thing to supersede the hand entirely. Now, although the automatic methods are at present very much to the fore, yet it is chiefly as rivals. Etching has made giant strides beyond all our early anticipations; scientific skill and cultured taste have placed wood-engraving quite on the platform of a fine art. The result is that, although processing is a truculent and ever-watchful rival, it is kept in a limited field; and whether in relief or intaglio, I am quite sure that human mind and skill, having brought one branch out of nothing, will bring the other out of past shortcomings to future excellence undreamed of now.

The same spirit of swagger followed the first good results of photography, and what do we find now? Simply that it is a serviceable assistant to art; but no artist building up the feeling of a composition bit by bit, line by line, tone by tone, with centuries of work and the labour of great genius piled together on his mind, can ever get more than a suggestion from it. It is certain that the photograph is a useful help, but it is no substitute for art. So it is certain that photogrovure is a useful means of producing prints—probably the best means devisable for making a high-class facsimile; yet the artist is as needful as ever, and the man of science will wait upon the artist, and the artist will help the man of science.

Thus the earlier idea of superseding and abolishing an old art must be given up, and a new idea of co-operation to a single end take its place.

I go through these points at some length because they are the result of my own laborious and energetic efforts to produce art by processing. Year after year the attack has been renewed, but though processing has advanced, it has been apparent that the goal advanced also; and that, though I could do things easily that the hand could never do so truly, yet that same hand guided by skill and taste did things that I could never catch up by my processing.

Perhaps the prettiest point in photogravure has been its power to render the texture of the surface of the picture or original. It is peculiar that in proportion as a copy without texture is employed—such as a silver print—so in proportion does it become difficult to make a plate that pleases the eye. If, however, instead of the silver print, we use the negative from which it was printed, we get a much better result—chiefly in this case, I believe, because the print on paper is a defective original compared with the negative, its tones being less accurate, and its outlines being a little furred up by the fibres of the paper.

But if we make a plate from a rough wash drawing, it is quite pleasing to see the rough paper texture. Now take a silver print of this rough paper sketch, and it immediately looks poor in comparison. We now see that the photogravure is capable in things where the photograph is weak, but the photograph is strong in the brilliant, yet tender, reproduction of natural forms, portraits, &c., though its very smoothness and perfectness unfits it for many purposes of art-reproduction.

This being so, it will be well to push each art along the line that it has shown a power over, and not to strain too much after things that it cannot do.

One of the beauties of photogravure is the power of giving steady, atmospheric greys. I am not sure that, in this great feature, it cannot break a lance with every known mode of art reproduction. The extended greys of mezzotint are certainly not better than those of photogravure, but they are very generally worse. I can scarcely call to mind a mezzotint in which the the quality of tender atmospheric grey is its one great point. Though I admit its charms of light, yet those lights are small and set up by contrast, whereas, in photogravure, we get mist whenever we like, as well as light.

This quality enables the impressionist photographer not only to fix in printing ink the happy triumphs of the camera, but to consult with others, and add art to nature's work in the refining of one part, or the strengthening of another part, and thus it must be admitted that a new feature is added to art-reproduction in these works. It may be the summer haze over the meadows, or the driving mists of a storm on the coast; they can be caught by the practised impressionist in photography, and they can also be fixed on paper by photogravure in a more living, moving way than by any other mode.

This, then, is one special point in the art. Let it be cultivated and encouraged. Nothing pleases men more permanently than a sweetly-rendered aspect of nature, whatever kind of aspect it is—all are welcome in the form of pictures and prints.

There are two branches or classes of picture-reproduction in which photogravure shows considerable power. The one is a figure picture, in which clear-cut, well-drawn forms are the chief elements, the smooth surfaces of flesh and drapery lending themselves to the same power that we noticed in the case of the impressionist landscape. The other is where powerful brush-work and flashing effects are got, in a manner that labour with a point or scraper can scarcely follow. In both these there is a field for photogravures from pictures.

But in practice I find that oil pictures are the most troublesome of subjects to work from. There is frequently a subtle irregularity in the execution or glazing, or the absence of glazing, the blue-tinted colours, rough touches of the brush afterwards painted over, and many similar things, make it slow and difficult to produce a plate. Although, therefore, one picture may be most happily and beautifully given in photogravure, it does not follow that another will, even though they both look alike in effect, colour, and execution. The camera is a great detective, and it often brings out things that cause much labour to set right. Another fault in a plate from a picture is the want of power to give a whole scale of tints below what it gives as a black. The artist's darkish grey generally comes black on the plate, and then we have to put in by hand several shades of darker tints. This is sometimes a risky and laborious affair.

There may be a dozen different textures and surfaces to render in various plates, and there are as many modes of putting in the colour. For instance, we may use the rulette, which does not go as deep as one would wish; or a small rocker, which is better for depth. Then there is the multiple graver, or the common graver. Or a strong etching ground, and bite in a lot of etched work; or a re-bite on the old granulations. Thus, added to the trouble of doing the additional work, is the trouble of finding out the most suitable mode. When it is noticed what subtle things will make a method look wrong, it makes one nervous about putting the work in. Big rough points like the teeth of a rasp suit one place; single deep cuts with the graver suit another; and acid on a re-biting ground a third. But it requires years of practice to get the knowledge.

Therefore, photogravure should not be regarded as an independent and complete power in itself, but as a new method or means of production, having great beauties when well worked, but not able to meet every case that comes before us in the way of daily requirements.

Seeing that the nature of the original is of importance to know, it would perhaps be welcome to record the results which I have myself noted.

The best working originals are the most seldom obtained in the way of business—viz., oil-painted monochrome, with a steady solid impasto treatment. The solid, yet not too solid, effect just suits the process, because it yields a peculiarly agreeable negative.

Perhaps the worst copy usually met with is a water-colour drawing in which much sponging has been used, and where blue is prominent, or neutral tint, with perhaps a warm-looking paper. The vigorous rough Indian-ink sketch is not so intractable by any means, and this must be taken to be what I have already referred to.

A crayon drawing, if not too rough and gritty, also answers well. Some of Holbein's come out very nicely, being most delicately pencilled, and having vigorous portions to bring them out.

Portraits are fairly adapted for reproduction; but it must be remembered that in them we are very captious judges—we want the minutest points in form and shade followed out, as well as a good flesh-texture. Portraits from the life are not much better adapted than portraits from painting are. The chromatic changes of the one are only more treacherous than the texture

cbanges in tbe other. Perbaps tbe most successful results are thosc from old mezzotint plates, which always give a level solid negative, containing a slight grain, which is copied from the original mezzotinting.

After these tbere comes a sort of mixture of difficulties from many sorts of originals; perhaps the mose disagreeable of all is a dear old illuminated missal or chronicle, with bighly-coloured little pictures. The surface of the vellum is fluffy in parts, the colours are uncontrollable, and the work entailed is great. Photographs from nature, such as are commonly executed for sale in favourite localities, a'so interiors of houses, garden scenes, lead-pencil sketches, sepia drawings, bric-a-brac, and mauy similar or different things, only present new phases of difficulty. No two cau be dealt with quite alike; the reason being that the eye is very critical, and the camera rather treacherous in tbe negative it provides for us. I refer at lengtb to these points rather to correct the impression that whatever you ask for in photogravurc, it is sure to come out prettily.

Tbe point I would specially press, then, is tbis, tbat all the methods of photogravure yet practised, when worked at tbeir very best advantage, produce similar results, and the samc identical difficulties meet us by wbichever mode a plate is produced. One mode does, indeed, differ from another in its power as well as in its method, but the subject in wbich one fails will most probable fail in another method, and the good subject for one method will be a good subject for another method.

The first efforts at physical pohtograpby were said to have been the production of photogravurcs by the process of priuting in a film of bitumen, then, after clearing it, to bite the plate in the clear parts. Tbis mode is still practised on the Continent for line subjects, and it is a tolerable method where skill and patience with good originals and brigbt daylight combine, but it is practically valueless in England at tbe present time.

The best line method is tbat of G. Scamoni, of St. Petersburg, who imparted all its details to me; and tbough I never gave tbe eare and labour to it that he did, I am sure it is hard to surpass it for line-work. The method is to grow a copper-plate upon an autotype mould in line. The mould is developed ou a surface covered with a fine layer of india-rubber varuish, and it is made conductive by blacklead. Tbe support may be glass, copper, or other metal, not to mention xylonite, which does very well.

This method naturally led up to the desire to get half-tones. Scamoni got toned plates from crayon drawings, but not from flat tints. Tbe mode first of all worked was by bronzing a negative or the tissue of which the mould was to be made, and this caused a multitude of punctures in the mould wbich, wben electrotyped, became points in the copper, thus causing tbe portions of tbc mould remaining to have various depths. This method now and again gave very fine results, but frequently it failed. Probably if worked more in the light of modern experience it would be much better, as in those old days twelve years ago we were more anxious to get automatic conduction by means of silver and gold on the surface of the mould than it is now found necessary. It is worth while remarking that plumbago for conducting cannot be excelled, provided all proper means are taken to insure its fineness.

Tbere were also at an early date plates called galvanoplastic. These I know not tbe method of. Tbey were weak, and required a deal of line-engraver's fine ruling, &c., to put them to rights; they are therefore now quite out of date and almost out of memory. But they lead one to refer to the process of Pretsch, which was also practised in England for a time, and which ought to have gone on better than it did. It is wortb while mentioning tbis process as the chief instanee of depositing copper on the whole mass of gelatine. There is no mould washed away. It is causcd to swell and form an automatic grain, whicb regulates the tint, and it sbould be classed witb two metbods wbich I will now detail.

Tbe great want of my own bronze-grained plates was that you could not see defects in the plate for some reason, and therefore you could not tell where and how to work on tbem. I therefore hit on a mode of making a plain autotype mould on a plate, and having no grain at all. Tbis mould or picture was then made sensitive to light again by bichromate of ammonium, and, as soon as dry, it was bronzed all over and exposed to light for fifteen minutes. After the bronze was wasbed off with benzole it was put into warm water and tbe new grain swelled up nicely. I worked this method until I felt tho want of true power in it, for it was too fino and velvety at all times, and, for reasons I could not regulato, the grain would vary considerably. But the idea of working from a swelled mould cause me to try moulds of plain sensitised gelatine poured very thin and level on a plate-glass, and, after printing tbem with a toned negative, to print again with bronzed powder on the front; tbis added a grain just as Pretscb got a grain by chemical means. I was pleased witb tbe result, and went on witb it until I found that it could not be made to produce nice flesh-tints. It bad the much-longed-for property of giving a coarser grain, according as a part got darker, and that was valuablo; so also small points of light stood out well, and detail of all kinds, but it was impotent in the very fine greys. The Klick process was then beginning to make a move. About tbis time Colonel Waterhouse invented a clever grain which we used for some time, and for a certain class of work it was excellent, but its half-tones, though powerful, were somewhat dull. Tbe metbod is to take the mould as it is first washed off, and, while still wet and soft, dust it over with fine sand. Let it dry, and when dry rub tbe sand off again. The impression left by the sand is very regular and sharp, and it retains its sharpness well during electrotyping, and although it has defects of its own, yet it is a very good metbod and quick. Its great want is more brilliancy in the dark tones, and also a smoothness in tbe lightest parts, so tbat tbey fail to separate tbemselves from the pure whites when a number have been priuted. The proper mode is to get depth enough in all parts, and then bring the lights into order by hand-work. Anotber method is coming into practice lately to cure this feebleness in tbe very light parts. It is to cast over the whole plate a fresb tint by regraining it with resin or bitumen, and biting in with acid until a tone is produced. This tone may be stopped out earlier or later in some parts to save after-work, and, when all is cleared off, a proof is taken, and the lights are put into order by band-work. This procedurc also improves the darks of many plates by steadying them. The new grain generally settles on the old prominences of copper, so that the effect is to deepen tbe old work, and not to confuse it. Moreover, tbe two degrees of tint, where they do come together, or one upon the other, are mutually helpful, and give tbe look of mystery and depth so often valuable. One depth or one layer of tone generally has a bard and prominent effect, but a double tint looks soft and suggestive. This quality was noticed by the old mezzotint engravers, who very often laid a fresh ground over a plate which to the ordinary person looked finished; tben they had all their work to scrape up again, but thc plate was rich in proportion and worth the extra trouble.

This is a proper time to describe another great want of all natural photogravure plates. It is quite absurd to suppose that what a negative bas not the power to get, the copper-plate made from it shall have. It is, however, very wise to gently work up a negative or transpareney to effect that wbich Nature cannot do for it. Tbere are various methods of doing this. If rough texture in parts is desirable, the glass may bc matt varnished on the picture side and the crayon applied on the grain. But if gentle tints are wanted, then the other side should be worked upon. It is, however, often noticeable that when the plate is produced, the band-work is too heavy or misapplied, and it is too late to go back again. This sort of work is most called for in the dark portions of the subject, and it is best not to try too much in other parts. When this is, however, dône, it is often only too plain tbat we have not depth enough in tbe plate. When an oil-painting is placed against a print, it is easily seen that our scale is much shorter than tbe oil-painting. Tberefore an abundant power in reserve, to give deptb and power to the plate, is advantageous, so that thc printer need not make an opaque heavy ink to get the print right.

The printer's ink should always bear some dilution for the start of a plate, and also for the reason tbat it is so common that a dark dull solidity comes from a plate baving no real depth in it, yet plenty of middling dark. I bave seen a plate of Goupil's (whose process I have not further gone into, beautiful though it often is) brought well out by deep etching with acid on the top of thc otber tint, tbe lines of the etcbing being bitten, as usual, through a strong ground laid on. It is difficult to really blend etching witb the tint, but if contrast is called for it will do. Some form of graver is better, because you regulate its deptb so instinctively to tbe needs of eacb part of the work. The lighter portions and the use of dry-point work, together with the scraper and burnisber in finishing, are too simple to need any time being spent on their description.

Printing deserves a word. I have found that careful work with the best possible materials is most essential. A paper with a coarse fibre, however excellent otherwise, will never do for

photogravures. So, too, size must not be allowed. Thus the paper admired for etchings is quite unable to print photogravures; it is harder in texture, and rough, so that it cannot enter into the tiny pits in the process plate. This is unfortunate, because the presence of size greatly adds to the brilliancy of the darks in a print, and that is what we most need from the process plate. However, we have to put up with the colour obtainable on an absorbent paper.

It is worth while, before concluding, to touch upon the field and opening for photogravures. It cannot be contended that every subject is best done on this plan, and as the taste of men will from time to time demand every kind of subject, it must be evident that it will rest with us to confine our efforts to such subjects as have been proved to succeed best. In the matter of publication plates, there are so many fine etchings and such very fair autotypes obtainable, that the method of photogravure wants to be particularly guarded from betrayal by some mistaken choice of a thing that will cost much labour, and then turn out a failure. In plates for books, and in those folios of pictures from some locality now so frquently seen, it cannot hurt so much if there are partial failures, because they are not exposed to the public view so constantly, and also because, if there is a failure, there will also be several successes in the same lot.

One mode of use applicable to all kinds of printed books is to leave the space for a picture blank in the printing, and have the pictures printed on a thin India paper elsewhere, perhaps six, or eight, or ten together; these are cut up and pasted in the book at their right places. Mr. Linton's important work, "The Masters of Wood-Engraving," is almost entirely photogravure, and the prints, being treated as above, look very natural, and fit in most easily without the least harm to the printed book itself, while it is not easy to ascertain that they are produced by an intaglio process at all; yet the peculiar advantages of the process come out in the result, for the experts are said to wonder how it is that these reproductions are superior to the originals. Of course, for artistic effects of great power, this method is equally applicable, and it is well known that these finer efforts are the very ones that most distress printers and producers of books; yet it is on these alone that the public sets the greatest value.

I hope I have not been too long and prolix in this little essay on so modern and interesting a subject. It appeared to me far more suitable to the requirements of all that the result of my own efforts in this branch should form the chief body of the paper, rather than to go into purely technical details and questions which are all very interesting to a very few, but which experience has taught me are quite discounted by the insatiable public on the one hand, and by the infinite demands of art on the other.

Reviews.

Academy Architecture and Annual Architectural Review, 1889. Edited by Alex. Koch and C. W. English. Crown quarto, 102 pages. Price 2s. 6d. (*London:* Koch and Co., 69, *Chancery Lane*, and Hamilton, Adams, and Co., 32, *Paternoster Row, E.C.*)

Nothing so clearly makes manifest the artistic condition of a people as their architecture; the erection of fine buildings in times of culture, and their ruthless destruction in times of degradation.

The work before us is intended to be an annual exponent of architectural work, and it may be fairly said that something of the sort has long been needed. The work scarcely contains any text, consisting really of illustrations and titles, and it is interesting to note that nearly all the illustrations are photographic reproductions. Besides the reproduction in line which has so long formed the staple means of reproducing architects' originals, we have collotypes and tint-block reproductions from originals in wash. Indeed, apart from the artistic value of the work, it has a real interest as showing what is now possible and practicable in the way of illustration by photo-mechanical means.

Notes.

The protests against the destruction of the Church of St. Mary-le-Strand—protests signed by some of the most eminent artists of the day—seem like to be powerless against the commercialist interests involved.

Much correspondence on the subject has taken place in the *Standard*, and the Rector (the Rev. L. Tugwell, of 19, Charlotte Street, Bedford Square) appeals for seven-hundred-and-fifty pounds in order that some repairs and restoration may be done. It is a significant sign of the times that when a small sum like this is wanted to restore what is not only the house of God, but also a beautiful public monument, it should not be forthcoming out of the public funds.

Perhaps some of our readers will now take photographs of the Church; there are admirable points of view available.

La Nature, in the last number, gives interesting details as to the photographing of those criminals who come within the law in France and elsewhere. In France all portraits are made to an absolute scale, the relative position of camera and sitter being fixed so that measurements made on the photographs may be main factors in establishing identity or otherwise. Something of the kind has been carried out in this country, but the arrangements for securing exact scale have been very crude.

Among notable photographs recently sent to us, we may refer to the magnificent series of instantaneous studies by Mr. Ottomar Anschutz, of Lissa.

In the first place, we have a series of twenty-four studies of the jumping horse, clear and well defined. As is now generally recognised, instantaneous photographs of animals in motion may sometimes give a result which one can regard as false from the purely artistic point of view. A phase in the sequence of things which is so short that no being ever saw it or can see it, may in no way correspond with the aim of the artist, which is to reproduce what the eye perceives. Still, some of the phases in Mr. Anschutz's photographs seem to us to correspond accurately with the artistic side, as understood by our best painters, and of these phases we intend shortly to reproduce, in block form, three which are consecutive.

Among the photographs of Mr. Anschutz may be mentioned a sheep-washing scene, figures of jumping men, athlete throwing a spear, and some very telling studies of animals.

One photograph of a monkey is particularly striking.

Another series worthy of very special commendation are the most recent of the Alpine views taken by Mrs. Main. For full gradation all through the lighter shades they are quite unrivalled by anything we have yet seen, it being in

the lighter shades that the Alpine photographs are ordinarily defective, many degrees being massed together and represented as white paper.

Of course, if one starts from white paper as only representing those points where the snow is most intensely illuminated, and the shades follow in just gradation to full black, the picture will be one which will represent all the lights and shades on a much lower scale than nature itself; a condition of things quite unavoidable when the dull surface of white paper has to do duty for the high glisten of the brightest points of light in the landscape. A photograph in true proportionate gradation may then give a "naturalistic" effect, but not altogether realistic. How, then, can one go nearer to the reality? To some extent by adopting the principle of the old diorama, and forcing light through the photographs from the back—showing them as transparencies, in fact.

In this case, the extent to which the brightest points may be illuminated is only limited by the conditions of lighting, and if the print (a large paper print is, perhaps, best) is of suitable density, and the conditions are carefully studied, not only a "naturalistic," but also a realistic effect may be attained.

Similarly with the optical lantern, it is possible to represent the gradation of light and shade extending between wide limits, the highest points glowing as with sunlight.

We take it that if Mrs. Main's Alpine photographs were made into slides of proper intensity, and exhibited with a correct adjustment of the light, the exhibition of them would become one of the popular entertainments of London, and would do much to show what legitimate photography can accomplish; the same may be said of Dr. Emerson's works, especially in more recent productions.

It is impossible to conjecture how far the teachings of Dr. Emerson, and those of his school, may have influenced Mrs. Main in her work, but certain it is that she operates according to the spirit of their teaching. To Dr. Emerson belongs the credit of having first very loudly denounced the old system of straining out or exaggerating a few degrees of gradation—in the middle of the range, as it were—and so getting what passed as a "vigorous" or "brilliant" photograph; this state of things being often wedded to the strangest freaks of so-called combination photography—skies at cross lighting, or often upside down, being printed in; and figures inserted so that if they really belonged to the scene they would be twenty or thirty feet high.

Dr. Emerson has learned the lesson from all this, and is teaching it. Those wishful to profit by his teaching should obtain his book on Naturalistic Photography.

A London newspaper man has found a mare's nest based upon a photograph. The story is that a Russian police agent was groping, with detective camera in hand and lens open, in some dark vaults occupied by well-known members of the Nihilist party in London, when there was a sudden flash, and the figure of a man was revealed close to a jar from which fire was spouting. A very small quantity of dynamite material had harmlessly exploded, it was stated, and the flash had impressed the incident upon the sensitive plate.

The story, however, was a pure fabrication, the photograph upon which it was based being one which we reproduce below in block form. It was taken by Mr. W. E.



Debenham, in a Lecture Room of the City and Guilds Institute for the Advancement of Technical Education, at South Kensington, as an experiment on the use of aluminium burning in oxygen as a lighting agent. The jar did not contain dynamite, but only three leaves of aluminium beaten out very thin like gold leaf, together with enough oxygen to fill the jar. The weight of the aluminium burned may be estimated at about half a grain, each leaf of the aluminium leaf weighing almost exactly one centigramme.

The light of aluminium burning in oxygen is, perhaps, the most intense of the various artificial lights available for photographic use, and so small is the amount of metal required, that the resulting smoke—finely divided alumina—is so insignificant as to cause no inconvenience.

The only difficulty is that of obtaining the aluminium in thin leaves like gold leaf. Some years ago it was made and sold as a substitute for silver leaf, but we have not been able to obtain it recently.

An enterprising firm of publishers has issued a series of photographs of the studios of the leading artists of Munich. Seventy-five are already in the market, and others will be added. We presume that more than one photograph of the same studio is included; if not, Munich must boast of more "renowned"—to use the word of the journal which records this intelligence—artists than any other city in the world. The chronicle adds: "The interiors of English studios would make equally interesting photos." No doubt they would—in fact, they have, for a series of reproductions from photographs of these interiors was published a few years ago in, we think, the *Magazine of Art*.

Judging from utterances which have been made during the last few days, the consensus of opinion appears to be decidedly against tacking the National Portrait Collection on to the present National Gallery. As we pointed out last week, this plan would postpone the erection of a proper building to contain the art treasures of the nation for another century. If the present useless barracks were taken away there would be ample space for such a building. And this fact now appears to be officially recognised, as Mr. Plunkett promised this week that in the event of the necessity for enlarging the National Gallery, the Government would provide a site for such enlargements on the space now occupied by St. George's Barracks. Unfortunately it is not now a question of enlarging the National Gallery, but of providing a home for the National portraits, and though the money has been provided, the matter is as far off settlement as ever.

As for the National Gallery, a splendid opportunity of providing funds for housing one of the finest art collections in the world was missed during the Jubilee year. This would have been a thoroughly national object, and would not have needed one-quarter of the sum required for that costly failure, the Imperial Institute, which nobody wanted, and the chief use of which will be to provide lucrative posts for a number of fortunate individuals whose only claim upon attention is the way in which they advertise themselves.

What is known in legal parlance as a "running down case," is invariably productive of very contradictory evidence. Whether it is that collisions either on the water or the road are usually affairs of seconds, and that the shortness of time makes it difficult for accurate observation, we cannot say; but it is a well-known fact that for every six witnesses who say one thing, half-a-dozen are to be found who will say exactly the opposite. In a recent case, however, photography disposed of the matter very quickly. It was a collision by road, and several witnesses testified that one of the vehicles was driven on the right side of the road in violation of custom. Some pretty hard swearing was done, when a photograph of the scene was put in which showed that an old excavation made driving on the right side of the road an impossibility. It need scarcely be said that the jury took the photograph's view of the matter.

Mr. George R. Martin informs us of the resignation of the late secretary of the North Middlesex Photographic Club, Mr. Damant. For the present, communications should be sent to Mr. Martin, at Haringay Park Granary, Green Lanes, Finsbury Park.

Slides intended for the competition of the Newcastle and Northern Counties Photographic Association must be sent to the Secretary, Mr. Edgar G. Lee, 11, Beverley Terrace, Cullercoats, before Friday, September 20th. The Exhibition opens on September 30th. Several medals are offered.

The letter from Mr. W. H. Harrison (a gentleman not to be confounded with Mr. W. J. Harrison, the talented joint editor of the "International Annual," or Mr. J. A. Harrison, the joint inventor of the Pantascopic Camera), which appears on p. 350, will serve to direct further attention to the need of a universal adapter for attaching lenses to the camera front, and to his suggestion of a very simple means for attaining this end. Mr. W. H. Harrison has invented many clever things in photography. He devised the magnesium flash light years before it came into general use.

The curious story about the wrong person being invited to dine with the Prince of Wales has just been counterparted in a photographic coterie.

A photographic business in a seaside town came into the hands of administrators, who, in the course of their outlook for an efficient manager, met with an applicant whose full name differed only slightly from that of the most important rival in the locality. In considerable haste they held a meeting, and at once engaged the manager under an agreement to commence in a month, with a stringent clause that he should not after this time do work in the interest of any competing establishment. It was only when the rival establishment flooded the place with notices to the effect that the proprietor had no connection with the new manager at the ——— Street Studio, that the administrators found they had engaged the wrong man.

Such mistakes as the above are much facilitated by the use of the honorific prefix "Mr." When this is not used the initials must almost perforce be added to the name. In a newspaper office, however, there is often so great a saving of time by using "Mr." that the custom will, doubtless, long prevail. Hours may be spent in searching for the correct initials, and even at the end of this time they may not be found.

The daily papers of Wednesday report a curious action at law, which brought to light the fact that a hitherto independent publication had been sold over for use by a party, and the first intimation which put the editor on his guard is said to have been given in a curious way by

means of a photographic portrait obtained from the German Embassy. The whole story will shortly be public property.

Nodus est in res was for a considerable time printed as a motto at the head of a noted Jesuit publication, instead of the ordinary motto *modus est in res*, and this was done by an editor who, when the paper was under the forced influence of a political party, took this means of intimating that something was wrong. Mr. Greenwood, however, through the photograph to which we have alluded, probably obtained a hint which opened his eyes before it was too late.

Patent Intelligence.

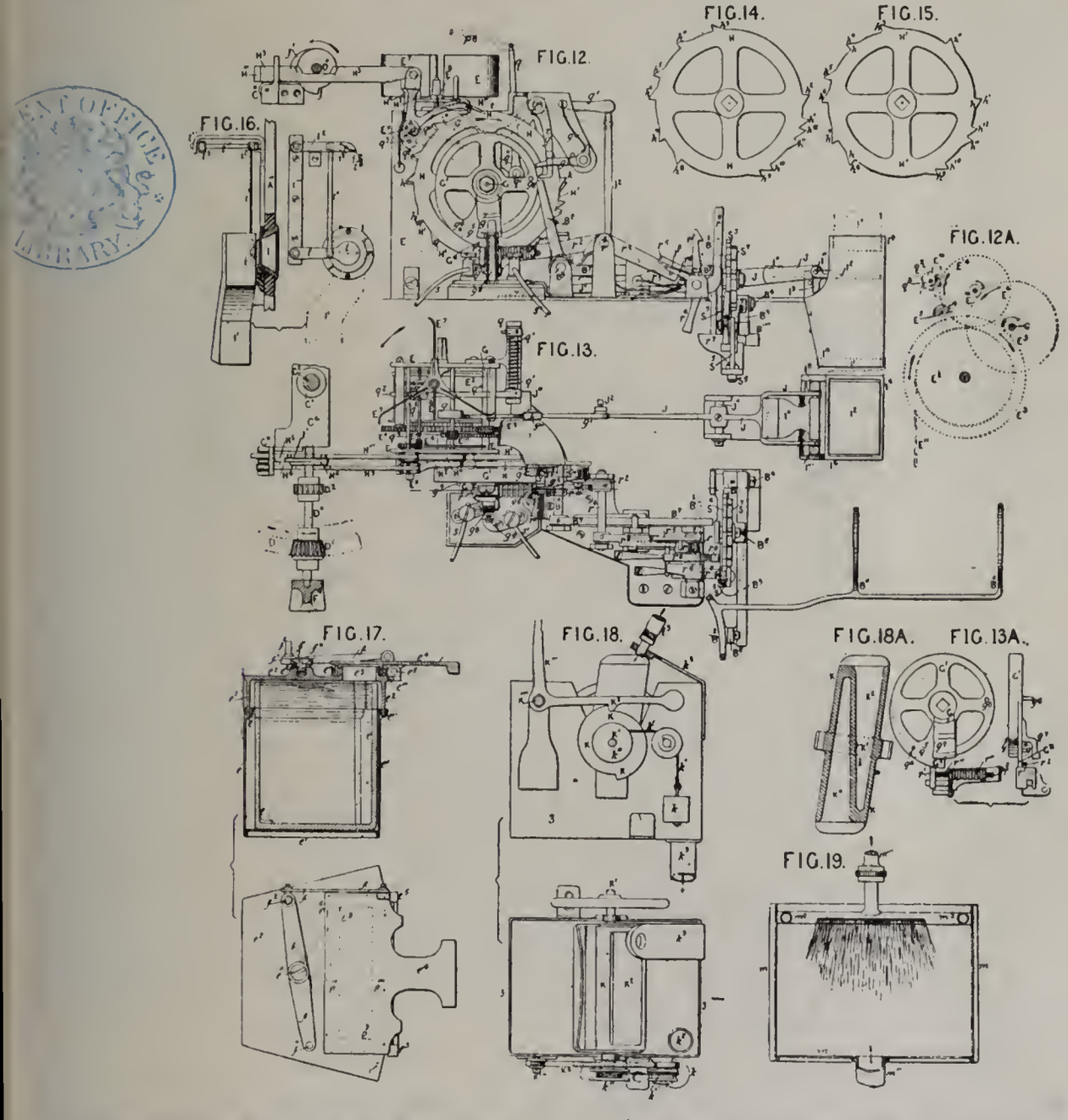
Specifications Published.

5,140 JAMES HINES, Engineer, of Duuedin Lodge, Lenzie, Dumbartonshire, EDWARD HOWELL, House Furnisher, of Inglebank, Lenzie aforesaid, and ALFRED HOWELL, Tobacconist. of Ingleside, Pollokshields, Renfrewshire, for "Improvements in the Modes and Means or Apparatus for Taking and Producing Photographs, aud in Appliances connected therewith."—Dated 6th April, 1883. (*Continued from page* 334.)

The intermittent time of motion between, aud stoppage of the frame C over each vessel for treating the plate *a*, is regulated through the time or clock mechanism carried in a special frame E of its own, actuated by a weight and cord E^1, E^{11}, passed over the cord barrel E^2 of this time mechanism, shown in fig. 1, aud particularly in the detached views figs. 12 to 15, as will hereinafter be more fully described. The silver, collodion, fixing, and varnishing baths 1, 2, 5, and 8 respectively have their chemical mixtures contained in porcelain or vulcanite removable troughs *c* supplied from time to time by attendants, at each morning or alternate morning or evening. As seen in fig. 17 these troughs *c* are enclosed within a lower metallic case c^1 secured to tho basement plate C^7, with a removable top c^2 jointed at c^{11} with a cup joint all round, filled with mercury or other liquid to prevent the escape of gases or vapour. Each of these tops or covers c^2 have narrow doorways c^3 formed in them fitted with liquid jointing cups c^{111} all round just under where the plates *a* would come down into the troughs *c*, and each fitted with a tilting or swivelling weighted cover c^4 with a deep rim for forming the liquid tight joint in the jointing cups c^{111}.

These lids c^4 are tilted on their fulcrumed joint c^5 by a link and lever, *f*, f^1, fulcrumed at c^6 on the centre of the top c^2 of each trough, and have vertical projecting pius f_2, f^{11}, in each opposite end of the lever F^1 which are oscillated by the cam bracket f^3 screwed on the lower end of the frame C, as seen in figs. 1 and 6, so that as this aud the cam f^3 come round towards each trough, the angled projection f^{111}, meeting the first pin f^2 would tilt and open the lid c^4 before the frame C stopped over the trough to lower the plate *a* into it; and just after the plate *a* was lifted out of the trough, the first motion of the frame C and angular groove f^4 would move the second pin f^{11} of the lever f^1, and tilt and shut the lid c^4 of the trough as it passed it. To allow of this first and last motions of the frame C and the inserting and withdrawing of the plate *a* at the proper time exactly, vertically over the openiugs in the troughs, a pin b^2 is fitted ou the upper outer part of the clip *b*, preferably with an antifriction roller on it, which works down the one side and up the other side of a double vertical V-shaped grooved cam *d* secured on the front end c^{11} of the frame C, while the latter is turning to and from the troughs, and particularly seen in fig. 2. The weight of the clip, and its vertical slidiug transverse bar *c* is counterbalanced by a cord d^1 attached to it passed over guide pulleys d^{11} having a weight d^2 attached to the cord, working within a protecting tube d^3 shown in dotted lines in fig. 1, and in sharp lines in fig. 2. This transverse bar *c*, c^3 is lowered, and raised by a lateral pin, and antifriction roller F on the disc F^1, working into a horizontal groove at c^3 in the back of tho bar C each time the pin and disc F, F^1, makes a full revolution. The disc F^1 is carried on a spindle F^2 in journal bearings at F^{11} in the frame C aud spindle C^7, and this disc and spindle F^1 F^2, are turned by a small bevel pinion F^3, on the spindle, working into a stationary angled, or bevel, or face wheel F^4, mounted concentrically to the shaft C^2, on the top of three standards F^{111}, bolted below by flanges to the lower sole plate C^7. The pinion F^3 turns the disc F^1 one revolution between each stoppage in passing from the one bath to the other, or during every twelfth of its revolution by the motion of the frame C and shaft C^2, given by the train of gearing wheels D to D^4, aud barrel and weighted cord D^5, D^7. The developing bath shown at 3 in the plan view fig. 1 A, and in large scale views figs. 18 and 18 A, consits of an outer trough 3, secured to the sole-plate C^7, having a double bath K, swivelling on pivot spindles K^1 in bearings in the sides and centre of the trough 3 shown in section in fig. 18 A with two pockets baths in it K^2, K^{11}, which are always filled with a new supply of developing mixture each time the bath K and spindle makes a half revolution, by the power of a weight and cord *k*, k^1, wound on the barrel K^{11} on one end of the spindle K^1, and stopped and released by the bellcrank pawl lever K^3, K^{111}, fulcrumed at K^{1111} on the side of the trough 3, the pawls of the lever K^3 taking on to checked stops at K^4, on opposite sides of the scroll ratchet cam K^5, secured on the spindle K^1, with the barrel k^{11}, so as to allow the bath K to make a half revolution each time the lever K was pressed to oue side by a projection at f^5 on the cam tappet f^3, fig. 6, of the frame C, as it passed this trough 3 and bath K, and empty the solution out of the one compartment of the bath K^2 or K^{11} into the trough 3 while turning it to fill the next one K^{11} or K^2, the waste mixture running off by the lower pike k^2 to any convenieut waste receptacle in the bottom of the case A for the purpose, the new mixture beiug filled into the compartment turned up, by a pipe k^3, from a supply trough L fitted on the top division A^{11} of the case A, as seen particularly in section in figs. 1 and 2. This supply trough 3 is made of a hollow semi-circular shape, and filled from time to time with a usual developing mixture, as each day or days required, and is fitted with a semi-circular piston L^1 on a rotating spindle L^2 with a counter balancing fly wheel L^3, aud working in bearings or rollers at L^{11} in the central sides of the trough L; and on one end of this spindle L^2 is mounted a ratchet wheel L^{111} fitted with a retaining spring pawl below at L^4, and with an actuating spring pawl L^5 at one side, actuated or pulled dowu against the power of a spring to the extent of one or more teeth by a rod L^6, working in guide brackets L^7, bolted to the upper frame C^5 of the mechanism, and depressed by the action of the outer free end l^1 of a cam lever *l* fitted either with angled surfaces, or with antifriction pulleys or otherwise at l^1 to act on a projection at the lower end of the rod L^6, and pull it down each time the frame C passed the bath 3, and tilted it as described, so as to turu the pistou L^1 sufficient to raise enough of the material over the lip l^{11} of the trough 3 down through the duct l^2 to a pipe l^3 leading into the bath K below, and steadied by a bracket k^3 over it. Tho water washing troughs, shown at 4 and 6 in fig. 2 A, and in enlarged side section in fig. 19, consist of a thin copper or other metal outer casing *m* screwed to the sole plate C^7 at m^1, and are each fitted with a drain pipe m^{11} and with a rose pipe m^2 round their upper internal surface, supplied by a coupling pipe m^{111}, leadiug down from a branch m^3 and valve m^4 for each trough 4 and 6 of a water cistern M, fitted on the top A^{11} of the outer case A. This valve m^4 is opened while the plate *a* is immersed in the cistern *m* to spray the water all over the sides of the plate *a*, and closed again when it is withdrawu, by the action of a beam lever arrangement m^5, and two rods m^6, m^7, for each trough, the former of which is attached to tho valve, and the latter fitted and guided in a bracket m^8, bolted up to the upper frame C^5, and shown dotted-in in fig. 2; and depressed by projections or rollers at its lower end, by an upper angled projection l^{11} above the projection l^1, on the cam lever *l* at the time the frame C rotates over each water trough 4 and 6, fig. 2A. A supply and overflow brauch M^1, M^2, is fitted uear the upper part of the cistern M, which might be fitted with taps to supply the water from any overhead cistern or service pipe, and may have a safety drawing off branch below, as shown at M^3. The times of motion and stoppages of this gearing mechanism D to D^5, and of the frame C and shaft C^2, as before stated, are regulated by the clock time mechanism shown in figs. 12 to 15. This arrangement of mechanism consists of the weight, cord, and barrel, E^1, E^{11}, E^2, on the winding spindle E× which by a train of speed increasing spur gearing of wheels and pinions E^4, E^{111}, and E^4, shown in figs. 13 aud 12A, actuate the horizontal spindle E^5, with the

screw wheel that works into the screw on the vertical spindle E^6, of the "fly" E^7 which regulates the speed of the turning of this time regulating mechanism when set in action, and is stopped and started essentially by the levers, g, g^1, g^2, each revolution of the intermediate spindle G actuated by the wheels E^3, from the spindle E× of the barrel F^2, and which carry the time regulating ratchet wheels, H, H^1, for the turning of the frame C and spindle C^2 with the plates a and the time of their immersion in the baths 1 to 6 and 8, and drying chambers 7 and 7^1 at the back. The mechanism is first started for each picture a by the insertion of the coin down through the slit orifice I in the front of the outer case A, the coin sliding down the duct I^1 on to the tilting counterweighted lever I^2, I^{11}, fulcrumed on a forked lever J, J^1, at the side of the chamber I^4 at the bottom of the duct I^1, and within which the lever I^2 is tilted nearly vertical by the weight of the coin, so as to deliver the coin down through the bottom of this chamber; and while doing so a heel I^3 on the lever I^2 clears a pin in tilting down, and as soon as lightened by the delivery of the coin, the weighted end I^{11} of the lever I^2, and pin and heel I^3, brings the lever to its normal close position ready for receiving the coin again by the weight J^{111} at the end J^1 of the lever, as shown in this position in figs. 12 and 13. The downward action of the lever J, fulcrumed at J J^{11} by the weight of the coin, raises the arm J^1, which by a rod J^2 coupled above to the lever g^1 causes the lever g to clear a stop vane E^8 on the fly E^7, and allow the mechanism to go on. But to prevent this lever g from falling in to stop the fly E^7 again until the spindle G has made the



complete revolution as before stated, the lever g^2 is forced out over the spring pawl g^3 fulcrumed on the bracket g^{111}, and so can thus only stop the mechanism at the end of the complete circle when the pin g^4 in the cam wheel G^1, on the outer end of the shaft G, comes round and lowers the pawl g^3, a notch on the end of the lever g^2 then entering a check g^5 in the rim of the wheel g, allows the lever g to rise to its highest position and stop the fly E^7 and time mechanism; and which allows the lever J and coin lever I^2 to come back to their normal position ready for receiving new coin, and raise the lever vane i, fig. 16, and open the coin slit in the orifice I, through a link i^1 and double levers i^2, i^3, mounted on a spindle i^{11} on a bracket i^{111} bolted to the inside of the front door A^{111} of the outer frame A, and actuated by an arm i^4, secured on the counter-weighted lever C^3, of the spindle C^2, as the frame C comes round to its normal stopped position over the plate supply barrel a^1 a^{11}. Referring to the time regulating ratchet wheels H, H^1, shown detached in figs. 14 and 15, the twelve ratchet wheel teeth h^1 to h^{12}, on a first wheel H regulates the time that the clip with the plate a is raised first out of the barrel a^1 a^{11}, and subsequently out of the several baths, while the 12, ratchet wheel teeth h, 1 to 12, in the wheel A^1 regulate the time movement of dropping the plates a into the several baths and in front of the lenses; and the distances between these teeth control the time the plates a will be

in each bath. Two bellcrank spring pawl levers H^2, H^{11}, fulcrumed at E×× to the front frame E of the mechanism, work over these teeth *h*, in the wheels H H^1 respectively, and have sliding reciprocating rods H^3, H^{111}, connected at one end to their vertical arms, guided on antifriction rollers in a bracket C× secured to the bracket C^4, with catches H^4, H^5, on each of them which take under the notches *j*, j^1, of a ratchet cam H^6, mouuted between these catch rods H^3, H^{111}, on the spindle D^{11}, and close up to the catches H^4, H^5, aud which rotates the bevel pinion D^1 by the motive gearing barrel mechanism D^2 to D^5 twelve timcs during the revolution of the spindle C^2 and frame C, and at the samc speed as the spindle F^2 and pinion F^3 and the disc F^1, which raises and lowers the plate *a*, and which cam H^6 makes one revolution for eaeh revolution of the spindle G and ratchet wheels H and H^1, all turning in the direction of the arrows in the figures. And to prevent this turning and stopping shaft F^2 from having an unsteady motion in raising or lowering the plate *a* through the roller F, an oscillating air cylinder W is mounted on the frame C, having its piston rod W^1 connected to a crank W^2 on the shaft F^3, as seen dotted-in in fig. 1, or this eylinder W may be mouuted and have its piston rod W^1 connected to the oscillating lever R^2 when this is used, having small regulating air-holes in the upper and lower ends of the cylinder W, as shown in fig. 1 B. The first notch *j* iu the cam H^6 is divided so as to allow it and the spindle D^{11} to turn onc fourth of a revolution, and also the disc F^1 one fourth of a revolution, and raise the plate *a* and clip *b* by its roller b^2 to the point *d* of the first quarter of the V slide *d* ou the raising of the pawl H^2 by each tooth *h* of the whcel H, aud three-fourths of a revolution by each tooth *h* of the ratchet wheel H^1, by the freeing of the uotch j^1 in the cam H^6 for giving the time of the lowering of the picture and eausing the wheel F^1 to make three-fourths of its revolution carrying the clip roller *b* through the other three sides of the V guide *d* in front of the frame C, all after beiug started with a plate *a* to make a picture, that is so that the frame C with the plate *a* may travel from the barrel a^1 a^{11}, whcre it had picked up a fresh plate before stopping, and traverse round to and lower the plate into and raise it from the collodion and sensitising baths 1 aud 2 respectively, and then traverse it in line behind the lenses B, where it would be stopped for a certaiu time by by the notch *j* iu the cam wheel H^6, and by a pin g^6 in the eam wheel G^1 determined by a lever arrangement to be hereinafter described, be set in motion by the person in front of the lenses B whose likeuess was to be takcu, that is during the time the ratchet wheels H H^1 were turning from the tooth h^3 to h^4 past the ratchet pawl levers H^2, H^{11}. After which the ratchet tooth *j* in the cam H^6 being released by the eatch levers H^2 H_3, this cam would rotatc one-fourth of its revolution before being stopped by the pawl J, and raise the picture from the lenses, and which would be carried round and lowered during the other three-fourths of the revolution of the cam H^6 into the next developing bath 3, and so on this cam H^6 aud its shaft, making oue revolution between each set of the teeth *h*, in thc wheels H, H^1, and one revolution of the wheels H, H^1, would thus carry the plate *a* successively over and past the remaining developiug bath 3, washing bath 4, fixing bath 5, and second washing bath 6, drying chamber 7, varnishing bath 8, second drying chamber 7^1, and plate cutting mechanism 9, back by the starting position, where it would deliver the card *a* carried round through the spout Z Z^1, to the outside through the right side of frame A, or it might be into a drawer at Z^1 and then pick up a new card *a* out of the card drum a^1 a^{11} ready for a fresh start on the coin being put through the slit I. In this position thc stop pawls H^2, H^{11} would be stopped in the space between the ratchet teeth h^{12} and h^1, and as soon as the time mechanism was started the space between the tceth h^1, h^2, of the time ratchet wheel H would give the time during which the pawls would be down, and the stoppage of the cam H^6 and spindle D^{11}, and consequently of the frame C, and plate *a* being immersed in the collodion bath fig. 1; while the long spaee between the teeth h^2 and h^3, in both wheels H H^1, would give the time for passing to and immersion in the sensitising or nitrate of silver bath; but the space between the tooth h^1, aud the tooth h^{11}, the latter on the wheel H^1, would give a pause for the collodion to drip off the plate before going into the silver; the spaee between the tooth h^{11} and h^3 giving the time or pause of immersion in the silver; and the space between the teeth h^4, h^1 in both wheels H H^1, would give the pause of the frame C and the plate *a* sufficient for remaining down opposite the leuses B for taking the picture; and the spaces between the teeth h^1, h^5, would give the pause during the time the plate *a* would be immersed in the developing bath K of the trough 3; aud the recess between the teeth h^5 h^6 would give the time for the immersion of the plate within the washing bath 4; and the space between the teeth h^6 h^7 would give the time for the immersion in the clearing and fixing bath 5; and the recesses between the teeth h^7, h^8, would give the time for the immersion of the plate within the washiug bath 6; and the long space between the teeth h^8, h^9, would give the time for the insertion of the plate within the first drying chamber 7; and the rccesses between the teeth h^9 h^{10} would give the time for the insertion of the plate within the varnishing bath 8; and the space between the teeth h^{10} h^{11} would give the time for the insertion of the plate within the next drying chamber 7^1; and the recesses between the teeth h^{11}, h^{12}, would give the time for the cutting off of the lower dripping point of the plate *a*, and the gripping head part a^1; while the plate was lowered within the space between the knives *t* to t^2, of the cutting meehanism, shown particularly in figs. 7 to 9, and hereinafter described; while the reccss between the teeth h^{12} and h^1 iu the wheel H, gives the time for the movement of the frame C and clip *b* to desceud, and grip, and raise a new plate *a* from the plate barrel a^1 a^{11}. The construction of the drying chambers 7 and 7^1, and the meehanism for putting on and off the gas for heating them and the plate *a*, is shown more particularly in elevation in figs. 1 and 2, partly in section in the former, and in plan in fig. 2 A, and each consists of an inner close thin sheet copper or other metal vessel N, with a funnel-shaped piece N^{11}, in the top for the guiding or insertion of the plate to be dried within it. This iuner close vessel has an outer close heating vessel N^1 around it, closed in on top but open below, into which enters the open top of a combustion flame chamber N^2, up through the bottom of which a Bunsen gas burner N^3 is passed, having the gas led to each of these by separate branches N^{111}, from the main gas service pipe N^4, shut and opened by a tap and lever N^5, and rod N^6, and balanee-weighted lever N_7, the latter being actuated by a long rod N^8, by the tappet levers *n* n^1 on a spindle n^{11} carried by a bracket N^9, secured to the upper back part of the top of the frame A. The front level N^1 is a double armed lever, and has a pin n^2, n^3, in each opposite arm respectively, so that the underside of a bevel cam plate n^{111} on the lever n^4 sccured to the revolving spindle C^2, as it comes round past the pin n^2, tilts this lever n^1 to the position shown in sharp lines in fig. 2, and opens the gas cock N^5, as soon as the machine has started to make a picture; but as soon as the frame C and plate *a* have been carried past the last drying chamber 7^1, the bevel cam plate N^{111} again comes round, and acting on the pin n^3 tilts the lever n^1 and the tap N^5 to the position shown in dotted lines in fig. 2, and shuts off the gas again from the burners until another picture has to be taken. The Bunsen burners N^3 get their air from the outside through holes at *o*, and have a small pilot light always burning at o^1, led by a tube o^{11} from the main gas pipe N^4, a little below the tap N^6, which shuts off the main gas from the burners N^3, so as always to supply this light for lighting the main flame of the burners N^3. The flame and waste hot gases from the burner N^3 pass up within the outer chamber N^1 and heat the inner chamber N, so as to dry the plate *a* placed within this, and the waste gases pass up through the pipe o^2 through a hole in any convenient part of the top of the enclosing case A; while air for the circulating and carrying off of the moisture from the plate *a* in the inside of the drying chamber N is admitted by a branch o^3, led down to any convenient part of the bottom of the case A, a small hole being formed at o^5 at the top of the case N, for allowing of the escape of the moist vapour into the pipe o^2 carrrying off the waste gases.

(*To be continued.*)

LIGHT AND COLOUR.

BY CAPT. W. DE W. ABNEY, C.B., F.R.S.*

LECTURE IV.

We have, in the three preceding lectures, seen how colour is produced, aud how it depends on three factors—the kind of light falling on to the substance, the kind of substance itself, and also the eye of the observer. To-night I have to endeavour to explain in one hour what ought to take four hours, and to show you how light acts in altering the colour of pigments through what I may call mechauical means. A water-colour picture (I shall deal only with such) is exposed in the ordinary

* *Journal of the Society of Arts.* Continued from page 280, P.N.

atmosphere of a room. Sometimes that room is without a fire; consequently the atmosphere becomes more or less damp, and all absorbent objects take up moisture. At other times, when there is a certain amount of warmth, the moisture which the picture would take from the air is less; so that a picture is exposed to alternations of damp and dryness. Dr. Russell and myself concluded that it would be quite fair for testing the stability of water-colour pigments if we exposed them to the ordinary outside atmosphere, and then traced the amount of fading which took place, remembering this, that a picture inside a room would certainly be more stable, supposing moisture had

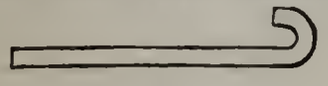


Fig. 1.

anything to do with fading. We prepared tubes, as in fig. 1, perfectly open at each end, but with a small cork in the unbent end, the cork being pierced with a large hole. A current of air could pass throughout the tube when hung on a bar by the bend and exposed to the sunlight. Inside each tube were strips of paper, covered with a pigment which had been tinted by hand in graduated tints (such as you see here.). There were eight tints in all. One such strip was placed in one end of the tube and another in the other. The lower half of the tube was covered with an opaque covering so as to protect it entirely from the light, and the other was left free to the sunlight.

By and-by I shall show you why it was we deliberately chose sunlight to which to expose our water-colours. From theoretical considerations we arrived at the conclusion that fading would take place in a shorter time in sunlight than it would do if we exposed it to the open sky alone.

In such a series of tubes, containing in all somewhere about 100 colours—39 being simple colours, the others being mixed colours—were exposed. The first reading of the amount of fading was taken in August, 1886, or after four months' exposure, and we found that in many of the colours fading had taken place to a certain extent, although perhaps not to so large an extent as might have been anticipated. From time to time after that date the tubes were examined, and the amount of fading noted, our notes showing the deepest tint which was visibly acted upon. Finally, we were obliged to conclude our experiments, owing to the impatience of certain gentlemen who were anxious to get the results we had obtained, apparently for their own advantage rather than for that of the public. We thus stopped our first series of experiments in March of this year, or after these tubes had been exposed about one year and nine months outside my laboratory at South Kensington.

In these tubes, then, we had the ordinary atmosphere, to which moisture and air had free access. If the tube got the least bit heated a current passed through it, much in the same way as would be the case in a chimney. The great point to settle was whether the fading which we knew must take place, and which we subsequently noted, was due to the air itself, or to the air plus moisture, or to the moisture alone. In order to test that, we passed air over various drying materials, and dried the papers and tubes very thoroughly. The papers were then placed in straight tubes sealed at one end, and when filled with dry air the other end was sealed off, and they were exposed to sunlight, one paper being shaded from it as before. In the case of the open tubes we found out of 39 simple colours only 12 were not acted upon; and in Table I. you have the 39 single colours in the order of their fugitiveness.

Vermilion is ordinarily supposed not to change at all, but, as a matter of fact, it does change, and in every sample there has been a little blackening. Those last on the list, yellow ochre, Indian red, and so on, show no change whatever after being exposed to as much sunlight as there was in one year and nine months. They remained perfectly unaltered, and, if you begin with rose madder (all below which may be said to be practically permanent) you have a very good gamut on which an artist could work in water colour.

In the closed tubes with dry air, out of thirty-eight sample colours which were exposed, twenty-two were not acted upon, so that it is evident that moisture had something to do with the fading of some.

The next series was interesting. The same kind of tube was taken and filled with hydrogen, and also with as much moisture as the hydrogen and paper would take up. The tubes were then sealed and exposed to light approximately for the same length of time as the other tubes. As a matter of fact, out of thirty-six colours twenty-two remain unchanged, the same as before. Hydrogen, I may say, is partially an inert gas for this purpose, as we proved subsequently.

TABLE I.

Carmine.	Permanent blue.	
Crimson lake.	Antwerp blue.	
Purple madder.	Madder lake.	
Scarlet lake.	Vermilion.	
Payne's grey.	Emerald green.	
Naples yellow.	Burnt umber.	
Olive green.		
Indigo.		
Brown madder.	Yellow ochre.	Show no change.
Gamboge.	Indian red.	
Vandyke brown.	Venetian red.	
Brown pink.	Burnt sienna.	
Indian yellow.	Chrome yellow.	
Cadmium yellow.	Lemon yellow.	
Leitches blue.	Raw sienna.	
Violet carmine.	Terre verte.	
Purple carmine.	Chromium oxide.	
Violet carmine.	Prussian blue.	
Purple carmine.	Cobalt.	
Sepia.	French blue.	
Aureolin.	Ultramarine ash.	
Rose madder.		

TABLE II.

Name of Colour.	Dry Air.	Name of Colour.	Dry Air.
Carmine ...	... Faded to 7.	Terre verte ...	... No change.
Crimson lake	... Gone to 5.	Chrom. oxide	... No change.
Scarlet lake . .	Faded and darkened.	Olive green ...	... No change.
Vermilion ...	... Gone black.	Antwerp blue	... Faded to 3.
Rose madder	... No change.	Prussian blue	... Faded to 5.
Madder lake	... No change.	Indigo blue ...	... Faded to 7.
Indian red ...	... No change.	Cobalt blue ...	... No change.
Venetian red	... No change.	French blue ..	... No change.
Brown madder	... Faded to 4.	Ultramarine ash	... No change.
Burnt sienna	... No change.	Leitches blue	... Faded to 5.
Gamboge ...	... Faded to 3.	Permanent blue	... No change.
Aureolin ...	... No change.	Payne's grey	... No change.
Chrome yellow	... No change.	Violet carmine	Faded and brown.
Cadmium yellow	... No change.	Purple carmine	... Faded.
Yellow ochre	... No change.	Purple madder	... Faded to 4.
Naples yellow	... No change.	Sepia... ...	... No change.
Indian yellow	... Faded to 4.	Vandyke brown	... V. sl. faded.
Raw sienna...	... No change.	Burnt umber	... No change.
Emerald green	... No change.	Brown pink ...	... Fadod to 4.

Note.—Sl. means slightly; V. sl. means very slightly; No. 1 is the faintest tint.

Then we come to the most interesting series of all, when we excluded air and moisture from the water colours. We took exactly similar tubes, dried the papers very carefully indeed, dried the tube, inserted the papers, put a Sprengel pump to work, and made a vacuum, and then when the vacuum was very complete, sealed off the top and exposed them.

We here arrived at the very interesting fact that out of thirty-nine simple colours which were exposed, only five were acted upon in the very least, and the amount of change was so slight that you might almost say every colour remained perfectly unchanged *in vacuo*. The five that were changed were vermilion (which went black to a very slight extent), raw sienna, Prussian blue, purple madder, and sepia. We are apt to look on sepia as one of the most permanent pigments; as a matter of fact it is fugitive, and those who have examined sepia drawings made in the early part of the century will see there has been certainly a distinct fading of those drawings. By the process of exhaustion we arrived at the fact that it requires both moisture and air to cause the fading of these pigments.

Now the question arose—Would heat without light cause the fading of pigments? Where they were exposed to sunlight it might be surmised, perhaps fairly, that in the sunlight, which we know has a heating effect, the fading might be due to this cause in the open tubes.

This could not be the case in the closed tubes, as in them the colours did not fade. To test the action of heat alone, we took tubes in which the papers were sealed up with moist air, and exposed them for three or four weeks, at the temperature of boiling water, in the dark. There was a certain amount of fading in these colours, but I need scarcely say that the fading was small, and also that the temperature to which they were exposed was something far beyond that to which colours in our open tubes were subjected. If you put a thermometer up one of the open tubes when it is in full sunshine, the difference between the temperature of the air inside it and the air outside only varied be-

tween three and four degrees. That was simply due to the fact that there was a draft created up the tube, as already pointed out.

But another point, and a very fair point for the critics to take hold of, is this. It is all very well to say light alone causes fading, but how about light and heat together—would not the heat aid the light? This possible criticism was combated, I hope in a successful way. A certain series of pigments were taken and exposed on a vessel containing boiling water; another similar paper was exposed to the sunlight free, that is to say, without the presence of the boiling water. In some few cases the fading was rather more rapid, in others less, and you will very readily see why in some cases it was rather less rapid. You require moisture plus air in order to cause fading, and if you heat the paper, of course you take away part of the moisture—one of the agencies which are conducive to fading. But the difference between those exposed on boiling water, and those exposed without, was so small that you might take the action of light plus heat as equivalent to the action of light alone.

TABLE III.

Name of Colour.	Vacuum.	Name of Colour.	Vacuum.
Carmine ...	No change.	Burnt sienna and Naples yellow	V. sl. faded.
Crimson lake	No change.	Indigo, Indian yellow, raw and burnt sienna	No change.
Scarlet lake	No change.	Indigo & Gamboge	Gone blue.
Vermilion	Gone black.	Prussian blue and Gamboge	Gone green.
Rose madder	No change.	Burnt sienna and Antwerp blue	Gone red.
Madder lake	No change.	Raw sienna and Antwerp blue	Gone brown.
Indian red	No change.	Prussian blue, raw & burnt sienna, & Indian yellow	Gone brown.
Venetian red	No change.	Prussian blue and burnt sienna	Gone brown.
Brown madder	No change.	Indigo and Vandyke brown	Faded.
Burnt sienna	No change.	Prussian blue and burnt sienna	Gone brown.
Gamboge	No change.	Prussian blue and raw sienna	Gone red.
Aureolin	No change.	Indigo and raw sienna	No change.
Chrome yellow	No change.	Indigo and burnt sienna	No change.
Cadmium yellow	No change.	Indigo, raw and burnt sienna	No change.
Yellow ochre	No change.	Prussian blue and Vandyke brown	Gone brown.
Lemon yellow	No change.	Indigo and Venetian red	No change.
Naples yellow	No change.	Prussian blue and Indian red	Gone red.
Indian yellow	No change.	Indigo and Indian red	No change.
Raw sienna	Sl. darkened.	Prussian blue and crimson lake	Gone pink.
Emerald green	No change.	Antwerp blue and crimson lake	Gone pink.
Terre verte	No change.	Indigo, Venetian red, yellow ochre	No change.
Chrom. oxide	No change.	Prussian blue, yellow ochre, Venetian red	Gone red.
Olive green	No change.		
Antwerp blue	No change.		
Prussian blue	V. sl. faded.		
Indigo blue	No change.		
Cobalt blue	No change.		
French blue	No change.		
Ultramarine ash	No change.		
Leitches blue	No change.		
Permanent blue	No change.		
Payne's grey	No change		
Violet carmine	Sl. darkened.		
Purple carmine	Sl darkened.		
Purple madder	V. sl. gone.		
Sepia	Sl. faded to 6.		
Vandyke brown	No change.		
Burnt umber	No change.		
Brown pink	No change.		
Indian yellow and rose madder	No change.		
Rose madder and raw sienna	No change.		
Raw sienna and Venetian red	No change.		
Vermilion & chrome yellow	More yellow.		

NOTE.—Sl. means slightly; V. sl. means very slightly; No. 1 is the faintest tint.

There was another experiment we had to try, and that was which were the rays which caused the fading. I have shown you in my previous lectures that beautiful band of colour we call the spectrum. I daresay you noticed that the beam of light which passes through the slit to form the spectrum is uncommonly narrow; for accurate experiments we should not use it more than $\frac{1}{1000}$ inch wide, and that has to be spread out into that band of colours, so that really the light which strikes upon the screen is very feeble indeed. If we had attempted to expose some of these pigments in the spectrum we should have had to expose them for some thousands of years, and as life is shorter than this, we thought it was better to take some other means of arriving at the conclusion as to what coloured rays were the active agents; so we adopted a method which, perhaps, may be called crude, but I do not think it is crude when you know how you are going to work. We exposed slips of paper beneath coloured glass—red, blue, and green, and also white. Here are some of the pigments which were actually exposed. We got the results as shown in Table IV.

We exposed thirty-nine or forty simple colours besides compound colours, and I want you to notice how very few faded in the green, in the red less than the green, but a very great many more under the blue glass than under either of the other two.

You will see that the blue and the white were almost equally effective. Had a certain proportion of the blue rays in the white light been cut off by the glass, practically those two columns, white and blue, would have been identical. Under the red and green glasses the fading of the few pigments which succumbed was so small that it required a practised eye to distinguish it.

Now I will read you some conclusions we came to with regard to the fading of water-colours:—"Mineral colours are far more stable than vegetable colours, and amongst those colours which have remained unaltered, or have very slightly changed after an exposure to light of extreme severity, a good gamut is available to the water colour artist. The presence of moisture and oxygen is in most cases essential for a change to be effected, even in the vegetable colours. The exclusion of moisture and oxygen, particularly when the latter is in its active condition, as experiments to be described in our next report show, would give a much longer life even to these than they enjoy when freely exposed to the atmosphere of a room. It may be said that every pigment is permanent when exposed to light in *vacuo*, and this indicates the direction in which experiments should be made for the preservation of water-colour drawings. The effect of light on a mixture of colours which have no direct chemical action on one another is that the unstable colour disappears, and leaves the stable colour unaltered appreciably. Our experiments also show that the rays which produce by far the greatest change in a pigment are the blue and violet components of white light, and that these, for equal illumination, predominate in light from the sky, whilst they are less in sunlight and in diffused cloud light, and are present in comparatively small proportion in the artificial lights usually employed in lighting a room or gallery."

TABLE IV.

	White.	Blue.	Green.	Red.
Purple Madder	Faded to 2	Faded to 1	—	—
Antwerp Blue	No experiment	Faded	—	—
Leitches Blue	Sl. faded	Sl. faded	Darkened	Darkened
Violet Carmine	Faded to 1	Faded to 1	—	—
Payne's Grey	Faded to 1	Bluer	Blue	—
Indigo	No experiment	Faded to 1	—	Sl. faded.
Prussian Blue	No experiment	Sl. faded.	—	V. sl. faded
Rose Madder (2 experiments)	Sl. bleached	Sl. faded.	—	—
Brown Pink	No experiment	Faded to 3	—	—
Crimson Lake	No experiment	Faded.	Sl. faded.	Sl. faded.
Vandyke Brown	No experiment	Faded to 1	Sl. faded.	—
Vermilion	Darkened.	V. sl. darkened	—	—
Carmine	No experiment	Faded to 3	Sl. faded.	—
Gamboge	No experiment	Faded to 1	—	—
Indian Yellow	No experiment	No change	—	—
Sepia	Become lighter	Become lighter.	—	—
Burnt Sienna	No change	No change	—	—
COLOURS MIXED WITH CHINESE WHITE.				
Antwerp Blue	No experiment	Bleached	—	—
Prussian Blue	No experiment	Bleached	—	—
Purple Madder	Bleached	Bleached	—	—
Burnt Sienna	No change	No change	—	—
Gamboge	No experiment	Sl. bleached.	—	—
Indian Yellow	No experiment	Sl. bleached.	—	—
Vandyke Brown	No experiment	Bleached	—	—
Brown Pink	No experiment	Bleached to 3	—	—
Crimson Lake	No experiment	Bleached to 3	—	Sl. faded.
Carmine	No experiment	Bleached to 3	—	—
Vermilion	Blackened.	Blackened under I & 2	—	—
Rose Madder	Sl. bleached	V. sl. bleached.	—	—
Violet Carmine	Bleached to No. 1 and darkened to 2 and 3	Same as under white glass	—	—
Payne's Grey	Bleached to I	Become bluer	Become bluer.	—
Sepia	Lighter.	Lighter	—	—

NOTE.—Sl. means slightly; V. sl. means very slightly; No. 1 is the faintest tint.

Correspondence.

LENS MOUNTS AND THEIR ADJUNCTS.

SIR,—I write to thank you for the paragraphs in your last about adapters to lenses, arising out of a conversation we had about a month ago, and to add that whatever merit there may be in the suggestion, half the credit belongs to yourself, for you evidently saw farther into details than I did. My remarks bore relation chiefly to fitting one

shutter for the fronts of lenses upon different hoods or tubes of various sizes by the application of the iris diaphragm principle, and allowing the leaves of a special diaphragm or diaphragms, after biting an india-rubber band on the hood, to be clamped.

Within the last four or five years great improvements have been made in tourists' cameras, but needed improvements in lens mounts have been commercially at a standstill. What is wanted is that any lens can be slipped into its mount in the twinkling of an eye, and the mount then similarly rapidly fixed in the front of the camera by the bayonet joint plan, or otherwise. In landscape work effects are often lost from the time wasted in fiddling over the application of lenses, with the screwing and unscrewing, also the changing of camera fronts they entail. For instance, a diligence is seen tearing down an Alpine road; the photographer wishes to take it with its scenic surroundings as it nears, but knows that the apparatus sold to him will not let him get the particular lens he prefers into place until too late. A rainbow spans a valley; when his unscrewing and screwing are finished, the rainbow has gone.

The Paris Congress, in recommending some standard form of lens mount, had, I think, also better deal with standard-sized hoods for shutters, and consider the question of standard bayonet joints rather than standard screws. W. H. Harrison.

May 17th, 1889.

HELIOCHROMY.

Gentlemen,—D. Winstanley, p. 287, quotes from one of his writings a statement which he accuses me of misrepresenting. This charge, like others he has made, is absolutely false. I referred to a statement made at a different time and in a different place, *i.e.*, in the *British Journal of Photography*, October 7th, 1887, p. 628, where, under the heading of "Phosphoresence and Photography," he says: "Exposed a sheet of common writing paper (white) to sunlight for one hour. Placed on it, in a decidedly dark photographer's dark room, a piece of paper cut like a fern leaf. This piece of paper had been for four-and-twenty hours in the dark room (from which all light was excluded each time I left) with the object of permitting it to radiate any energy it might possess. Placed on this a piece of sensitized silver paper (Roscoe's standard), and enclosed the whole in a book. Examined under a yellow window after four-and-twenty hours. Result: A *photograph* of the cut-out leaf, *not a mere trace, but a bold impression.* [Italics are my own.—F. E. I.] Inference: That *photographic action* may be induced on chloride of silver paper by contact with certain substances after they have been exposed to light, although they do not emit rays visible to the eye," &c. In another part of the same paper he proposes the term "radiescence" as a *substitute* for "phosphorescence."

It will be seen that this statement is utterly unlike that which Mr. Winstanley asserts that I referred to, and that my statement was substantially correct. I should have said writing paper instead of newspaper, but the difference is quite immaterial in this connection. It may also be noted that this paper of Winstanley's contained no reference to similar experiments by Niepce, and the slur in this connection was therefore worse than uncalled for.

Evidently, anyone who would discuss any subject with Mr. Winstanley, would have to waste a great deal of time and valuable space in pointing out inaccuracies for which there is no excuse. His manner is also offensive, and I decline to discuss any subject with him so long as I can place my facts before the public in other ways.—Very respectfully yours, Fred. E. Ives.

THE DIAMETERS OF SINGLE LANDSCAPE LENSES.

Sir,—In last week's News I am reported to have said at a recent meeting of the Photographic Society, that I had an old lens of fourteen inches focus that would cover a 9 by 7 plate well, but had never seen a modern lens that would do anything like it. The point was that the old lens *working with its large aperture* covered the plate it was constructed to cover without any falling off of light even at the corners of the plate. In modern lenses, unless the aperture is reduced, and in many cases very much reduced, the pencils of light that form the image at the margins of the plate fall partly beyond the circumference of the lens, and are partly stopped by the outer part of the mount, and hence are diminished, an evil that we suffer apparently merely for the sake of portability and cheapness. Chapman Jones.

PLATINOTYPE PATENTS.

Sir,—In a paper recently read by Mr. W. Lang, jun., that gentleman makes a statement which we think we are justified in assuming, infers that the patents connected with our process are no longer in force, for he is made to say, "being protected by patent, although this no longer applies, for all are now free to use it." Mr. Lang may have intended a different meaning to be conveyed from what we consider to be the natural interpretation of the words. We will ask you to permit us to state that the patents still "apply," and that only those who use our manufactures are "now free to use" the process. In fact, the only practical difference from former times is that we do not require a fee of 5s. to be paid by licensees in the ordinary way.—We are, Sir, yours faithfully,

The Platinotype Company.

29, *Southampton Row, High Holborn, W.C., May 20th.*

Proceedings of Societies.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 16th inst., Mr. E. Clifton in the chair.

Mr. P. Everitt had tried the hydroquinone developer recommended by Capt. Himly, and published in a recent number of the *Camera*. A plate, after exposure, was cut in half; in one case the ordinary pyro developer was used, in the other the hydroquinone developer referred to, with the pyro. The image came out all right, but with the latter no trace of an image appeared, although the soda was increased gradually to four times the quantity stated in the published formula.

A question from the box asked: "How can gold be kept from depositing in an unused acetate toning bath?"

Mr. F. P. Cembrano, after taking some of the stock solution from the bath, found the gold more or less deposited. He kept the solution in the dark.

Mr. A. Mackie said this could be remedied by keeping the bath in an acid state; the bath would, of course, have to be neutralised each time it was used.

Mr. W. England showed some of Carbutt's films with spots and markings on; he was unable to trace the cause.

The Chairman thought the glyceriue in the film was attributable for the markings, and dust might be the cause of the spots.

The remainder of the evening was occupied with the projection of members' slides on the screen.

Messrs. P. Everitt, W. England, H. D. Atkinson, and Mr. T. Freshwater exhibited a large and varied selection of slides.

North Middlesex Photographic Club.

A meeting was held on Monday, May 20th, with Mr. Hiscock in the chair, when negatives were exhibited by Mr. Walker, and slides by Mr. Davall, and the question was raised as to the best means of preventing halation.

After discussing the usual method—such as backing the plates, staining the film, &c.—Mr. Hayman, the representative of Messrs. Samuel Fry and Co., said that with that special object in view, and to prevent amateurs going to that trouble, they had

introduced a plate ground on the back which almost entirely overcame that difficulty.

A print was passed round of the interior of a room including a window, one-half of the window being on plain and the other on ground glass, and taken by an amateur, that on the ground side being free from any trace of halation. Another means of obtaining the same end was to use their celluloid films, which were coated with the same emulsion as their Kingston special plates.

One of Blair's whole-plate cameras was also shown by Mr. HAYMAN, weighing only 5½ pounds, and yet included every motion necessary to a good camera, prominent among which was the revolving base-board, and a shutter to protect the focussing screen. A half-plate camera and three slides complete weighed only 5 pounds, the slides weighing 3 ounces each. He then exhibited a novelty in the way of frames for transparencies and lantern slides which it was their intention to bring out in the coming season. It was a small nickel plate metal frame, which was adjustable by means of a metal rod which formed the side, and passed through a small ball at the top and bottom corners, and was grasped in position by a screw at the back.

It was suggested by Mr. BEADLE that if the sides were made the same as the top, so as to grasp it all round (which could easily be done by means of a slot in the ball), it would be a decided advantage.

Mr. HAYMAN said in reply that it might probably be done, as they were not yet on the market, and they had not bound themselves to any particular pattern.

The first outing of the members and friends will take place on Saturday next, May 25th, to Totteridge, working to Mill Hill. Train from Finsbury Park 2.45; visitors invited.

SHAFTESBURY PHOTOGRAPHIC SOCIAL.

THE above Club held a meeting on Friday evening last, Mr. STUART in the chair.

Mr. TOLLETT showed some more specimens of bromide prints, Messrs. Bull, Baker, and Samora taking part in the discussion.

Mr. BULL then passed round some whole-plate silver prints, which were of a very pleasing character.

The outing took place on Saturday to Chingford; and on Friday next, at 8.30, the results will be shown, and also some experiments of flash-light photography under the direction of Mr. Tollett.

Members and amateur visitors are requested to bring their cameras.

Talk in the Studio.

THE LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—There is to be a full day excursion to Haddon Hall, on Monday, May 27. Train leaves Central Station, Liverpool, at 8.40 a.m.; Rowsley Station and walk to Haddon Hall, after photographing at Haddon; walk to Bakewell by the river side, and have dinner before leaving Bakewell Station at 7.40 p.m. Railway tickets, 3s. 6d. each, must be purchased in the L.A.P.A. Rooms, 3, Lord Street, before Friday morning, May 24th, at 10 a.m.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting at 5A, Pall Mall East, on Tuesday, May 28th, at 8 p.m.

PHOTOGRAPHIC CLUB.—The subject for discussion on May 29 will be "The Keeping Qualities of Gelatine Plates." Saturday outing at Chigwell; trains from Liverpool Street.

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," (but not letters intended for insertion under the heading "Correspondence") should now be sent to Mr. Spiller, who is alone responsible for all which appears under the heading "Answers to Correspondents." Such communications, if now sent to the Editor, are forwarded by him to Mr. Spiller. Failure to attend to the above instructions may lead to disappointment.

Answers to Correspondents.

This column is now under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, is placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

R. B.—Thanks for the samples. The dyo is Rhodamine, a new basic fluorescein now being used as a substitute for eosine, and the same that Colonel Waterhouse recently described as being serviceable in orthochromatic photography.

FIELD WORK.—The exhibition of Mr. J. Gale's pictures is still on view at the Camera Club; you should not miss seeing them—about 170 in number, including all the artist's finest examples.

ENQUIRER.—We cannot give you Mr. Wm. Brook's present address; he left Retford some years ago. His communication appeared in the NEWS of June 1876, when his fifteen-year's-old plate (Dr. Hill Norris's preparation) was shown at the meeting of the Parent Society.

RETOUCHER (Jersey).—Mr. J. Fallowfield, of Lower Marsh, Lambeth, supplies a camera with twelve lenses, taking thirty-six Gem portraits by means of triple repeating back, with instantaneous front, for £6. Messrs. Sands and Hunter advertise the lenses separately at the end of their catalogue. Would not a half-plate rapid rectilinear lens with suitable camera do all your other work? Or are you going in for portraits chiefly?

J. C. L.—The carbon print appears to be coloured by hand, and then heavily enamelled with gelatine. The effect is certainly very good, and some artistic skill is displayed in the colouring, although the delicate shading is mainly the work of nature.

B. A.—The meeting of the British Association will be held at Newcastle-on-Tyne (Professor W. H. Flower, F.R.S., President elect), commencing on Wednesday, September 11th. Captain Abney has been appointed President of Section A, which includes photography; and Mr. J. W. Swan, Mr. Auty, and Mr. Edgar Lee may be expected to take part in the discussions and proceedings. This event does not clash with the Photographic Convention, which meets at St. James's Hall, London, on August 19th to 24th inclusive, and of which Mr. Andrew Pringle is to be the President.

BELGE.—The Kite apparatus of M. Batut is certainly a very ingenious contrivance, but the accompanying illustration in the *Bulletin* is hardly satisfactory, being printed from a wood block instead of consisting of a veritable photographic record.

CABINET PHOTO.—Your starch paste may have been old and worthless; try, as a mountant, the use of warm glue thinned down with a little methylated spirit. What induced you to have type printing on the back, for it shows an impression through to the face of the card?

ACTINOMETER.—Mr. Warnerke's standard sensitometer can be procured of Messrs. Marion and Co. It is figured and briefly described at page 261 of their "Practical Guide to Photography."

NOT PLEASED.—Try rotation whilst printing your vignettes; the roasting jack is a common device, or an oscillating pendulum. Twist a few loose fibres of cotton wool about the edges of the cut mask.

GOLD BATH.—Five grains of sodium carbonate ought to be sufficient to neutralise the free acid in one grain of chloride of gold; but some operators use as much as twenty or thirty grains for this purpose; the bath will then be strongly alkaline.

W. N.—Your platinotype print is not very far from being a success. Tested with bichloride of mercury, it is scarcely bleached at all. Of course, if some silver be left in the paper, the effect is warmer and more pleasing; but then it will not be so permanent.

H. B. S. (Kilburn).—There is no special photographic directory, but you can get the names under headings in the Post Office London Directory, and so for the Provinces. A new list of members, Photographic Society, was published three months ago.

NOVICE (Hornsey).—1 and 6. Evaporation is often sufficient to compensate for the diminution in strength, so that adding a 60-grain solution to maintain the bulk ordinarily suffices. 2 and 4. The use of ammonia is to overcome the acidity of the bath. Add only so much as will make it faintly alkaline, or none at all when you require to keep the paper for some days. 3. Sunning the bath is only resorted to as an alternative when kaolin fails to remove the organic impurities. 5. There is no need to add methylated spirit to a printing bath. 7. By pouring off carefully, the kaolin is mostly left in the bottle, and will serve many times over without renewal.

BOOTLE.—Beyond issuing their prospectus in September, 1880, the Photo. Publishing Company did not proceed with their "Portfolio and Record." We quote from memory, but Mr. D. C. Dallas could give you the facts.

PHOTAROUS, C. M. (Brighton), E. F. (Kingston), and other correspondents in our next.

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THE PHOTOGRAPHIC NEWS.

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THE DETECTIVE CAMERA: ITS PRESENT USE, AND PROBABLE FUTURE IN CONJUNCTION WITH THE FLASH LIGHT.

THE newspapers of the week just ended probably have more allusions to the detective camera and its uses than has been the case during any period of three months which has been since the hand camera became common; for did not Mr. O'Brien defy the Irish Crimes Court magistrates at Falcarragh, on Saturday last, and take a detective camera photograph of the five almost fainting Irish women prisoners for whom no bail was taken? Mr. O'Brien did this almost within the precincts of the Court, and at the imminent risk of being committed himself, and it is said the resulting photographs will shortly be published.

More than this did Mr. O'Brien succeed in doing with his detective camera; he climbed the wall of a prison-yard, and actually photographed that cleverly-constructed battering ram which is the outcome of the joint ingenuity of Mr. Balfour and his uncle, and which is so eminently calculated to quickly demolish the houses of those Irish peasants who may be unable or unwilling to pay sufficient rent to the landlord.

The photograph of the battering ram—Mr. Balfour's "Maiden," as it is often called—may perhaps be used to point the teaching of both political parties. It may be employed by the Tory lecturer to show what will be done to the home of the Irish agriculturist who does not pay rent as he ought, and it may be perhaps expected to serve here as an emblem of the power, authority, and stability of the Government—a symbol which may awe Irish peasants into quiet submission to that lot in which circumstances have placed them; and may make them pay rent quietly, and to the utmost of their ability. On the other hand, those extreme politicians who contend that the landlord is the aggressor by the very fact that he demands cash from his poorer brethren, will, it may be expected, use the photograph of the "Maiden" in order to add fuel to the fire which already burns so fiercely in the hearts of the Nationalist party. Our own view is, however, that if Mr. O'Brien's photographs contribute in any way towards a just settlement of the differences now current in the political world, they will do excellent service. It will be remembered that the Government have persistently refused to sanction the photographing of the "Maiden," a matter which is perhaps to be regretted, as implying imperfect satisfaction with their own work.

There is, we confidently anticipate, abundant scope for the extensive use of the detective camera in conjunction with the social and political life of our time, but we think that much of the detective camera work of the future will be done by the aid of the magnesium flash light. The man who goes about the streets at night with a self-igniting flash light apparatus in one hand, and with a detective camera in the other, or perhaps both combined in one instrument, will be in a position to throw strange lights on the inner life, both of the town and the country. He may secure a picture of the burglar crouched in a doorway, and fitting his skeleton keys; of the outcasts of society deprived even of the shelter of a roof, and of the Bacchanalian returning from his revels. Indoor scenes of a stranger and often very compromising nature may also be readily secured by a combination of the flash light and the detective camera.

Of course when it is wished to photograph things as they exist in the darkness, the illumination must be produced suddenly and without warning, a matter which is most easily effected by firing a mixture of gunpowder and magnesium dust from a large-bore pistol or similar weapon. About ten grains of magnesium burned in this way at a lecture where we were present recently, gave sufficient light to enable Mr. W. E. Debenham to secure a photograph which showed distinctly the faces and features of those sitting on the benches farthest back, although the lecture-room was a large one.

Perhaps the most convenient way of setting to work in the production of that flash-light which is to start instantly out of absolute darkness, is to procure an old percussion fowling-piece, such as can readily be obtained in London for half-a-sovereign, and to cut down the barrel to a length of eight inches; the stock may also be removed, so as to leave only the "grip."

To charge the gun, first insert a pistol charge of fine powder and shake well into the nipple tube, then another pistol charge of powder mixed with ten to twenty grains of magnesium dust. A wad is generally desirable, otherwise the powder does not always ignite, being blown out by the puff from the cap; but if the powder be fine and well shaken up into the nipple tube, the wadding may often be dispensed with. Care should generally be taken to fire upward, or injury may be done to persons.

THE CENTENARY EXHIBITION AT PARIS.

BY OUR SPECIAL COMMISSIONER.

THE BRITISH PHOTOGRAPHS.

THE want of a convenient short title to denote the community to which we of the United Kingdom of Great Britain and Ireland belong, makes itself particularly evident in the photographic class catalogued as belonging to "Grande Bretagne," but in which some of the most striking exhibits hail from the sister island.

The British photographic display in the Universal Exhibition is not placed along with either the French photographic exhibits at the western side of the gallery

of the "Arts Liberaux," or in the general collection of British exhibits in the building allotted to La Grande Bretagne at the south end of the gallery of the Beaux Arts. The British photographic section occupies a rather small space set apart at the south-eastern corner of the gallery of the Arts Liberaux, a building devoted to exhibits connected with education and instruction—materials and processes of the liberal arts—and is upon the first or balcony floor.

On entering this department from the northern side the first display to be dealt with is that of a number of photographs of architectural and landscape subjects contributed by the well-known photographer Frith, of Reigate. They are of one uniform size, about twelve inches in length, and rather narrower in proportion than has been customary—something like a "panel" photograph placed horizontally instead of vertically. The whole of this exhibitor's work is mounted in optical contact with the glass, a plan which bestows the utmost liquidity and transparency upon the shadows, and shows all the detail in the dark parts which the negative is capable of yielding. It may be questioned whether the effect at the other or lighter end of the scale of gradation is so satisfactory, and just now public taste seems to have taken a turn in favour of the matt surface effect obtained with platinum printing, and with some of the bromide development methods of printing. Mr. Frith's photographs are unquestionably very fine, and may serve in many respects as examples of what can be obtained, and should therefore be striven for, by everyone who has not yet reached this level, and who is desirous of bringing his work up to a high standard. A particular point noticeable is the absence of the failing due to halation, that so often disfigures work that would otherwise be excellent. Many of the pictures in the collection now under consideration are hung too high for anything like critical inspection, but as illustrating the beauty and naturalness of effect which is only to be secured by freedom from halation, it will suffice to refer to two or three examples amongst those hung at a convenient level. One of these represents a scene on the river Dart at Sharpham, and includes, amongst other objects, a sailing boat, and a tree springing from the right-hand bank of the river, and so much in the foreground that the overhanging branches extend completely across the picture.

How often, in such a scene, do we find photographs in which the body of the tree is rendered with force enough, certainly—perhaps, with too much force; but the twigs and leaves, where they cut against the sky, are so much weakened in effect by halation as to appear as if lost in a mist or fog. The picture now mentioned offers a striking example of the beautiful natural effect of the existing near foliage standing out brightly against the sky. Another photograph, illustrating the same desirable characteristic, is one of the interior of Bodellwyddan Church. Here the tracery of the window, which occupies the centre of the picture, is shown in a way that is more often desired than achieved. There is really no visible halation, either around the window or on the frame and leading itself. The picture is a very beautiful one, too, from other considerations than the one just mentioned. There is exquisite softness, as well as brilliancy, in the delineation of the marble columns, and in the play of light and shade, which are nowhere forced and violent in effect. One might linger over these and other works in the same collection, and quit them with a pleasing memory, and a resolve to go and do, if not likewise, at least something in the same direction.

The next display that meets the eye is that of Mr. J. Thompson, of Grosvenor Street, London. This consists of portrait subjects, and includes a few cabinet portraits, some half-dozen on 15-inch plates, and one of about 20 inches by 15. The last-mentioned photograph is a remarkably artistic picture—one, indeed, of the most artistic and least conventional portrait studies of any in the whole Exhibition. A lady is seated with a book in her lap, around which three children are grouped in quite unconscious attitudes. The light and shade is good, and the whole forms, in fact, a picture. If there is any conventionality, it is not the conventionality of the photographer, but of the old school of portrait painters, and is to be found in the column, balustrade, and landscape occupying a portion of the background. These are, however, so toned down, and occupy such an inconspicuous portion of the picture, that it would be ungracious to refer to them as having much significance. It is, perhaps, in the interest of photography, to be regretted that some portion of the picture displays evidence of having been rather extensively worked upon by the brush. Another group of lady and children in the same frame is also a very artistically arranged work. The whole of Mr. Thompson's pictures are printed with matt surface, and of a rather warm black tone, probably platinotype.

Next to the pictures that have just been examined comes the set sent by Mr. H. S. Mendelssohn, well known as of London, and, as appears by the catalogue, hailing now from New York also. The first of these pictures is one that will be well-known to the readers of the Photographic News as the portrait of Mr. Perigal that was exhibited at the Exhibition of the Photographic Society of Great Britain, and of which it was freely remarked that if Mr. Mendelssohn had not that year been upon the jury, it would have secured a medal for him. Underneath hangs a very charming picture of a lady and child, taken on a fifteen-inch plate. This photograph is like the group of Mr. Thompson first mentioned—an illustration of the really picturesque effect that may be obtained in portraiture when artistic skill is brought to bear upon the photographic work. Another exhibit of Mr. Mendelssohn's, forming a pendant to the one last mentioned, is a picture of a child in one of the the old-fashioned dresses that are now so much in fashion again. The child is standing in profile, and the background is of a kind quite unconventional in photography, though in a style not unlike what may sometimes be seen in the production of the brush.

A group of four female subjects with lilies, and with much foliage in the picture, is in a style which is quite Mr. Mendelssohn's own, so far at least as photography is concerned, although it reminds one of the works of a certain school of modern painters. There is also a three-quarter length portrait of a lady lighted in what is called the Rembrandt style. This and the portrait of Mr. Perigal are printed on albumenised paper, but the other photographs in this exhibit are platinum prints.

The next set of photographs is one by F. W. Sutcliffe, of Whitby. This is again an exhibitor who has a decided individuality of style in his work. The most striking of the pictures in this collection is one of a number of boys bathing. The attitudes of the figures are very varied and natural, and there is a great deal of picturesqueness added to the photograph by the vigorous light and shade of the figures, and of the boats upon which some of them are hanging, contrasted with the subdued tone of the water, and of the distant shore, and hills beyond. A similar character of concentration of vigour and effect upon the principal subject of the picture pervades the photographs of horses ploughing, the main subject standing well in advance of the landscape, and of the accessory subjects forming the background. Groups of sheep and cattle, by the same exhibitor, display considerable artistic merit, and there is a picture at the bottom of the frame which is interesting from another point of view. A dozen boys are occupied in looking at something over a wall, and none of their faces are visible, but the variety of position and expression, so to say, shown by a set of backs and legs, is quaint and amusing.

The next two sets of pictures are illustrations of photolithographic and chromo-photolithographic work. The first of these is by Mr Griggs, of Hanover Street, Peckham, and includes facsimiles of the charter and arms granted by

Richard III. to the Company of the Wax Chandlers more than four hundred years ago. The ability of photography to reproduce ancient documents in this manner, and with permanent materials, must be felt by archæologists as an inestimable boon.

The Atelier of Chromo-Lithography, of Queen's Square, Bloomsbury, supplies the other set of photolithographic reproductions, some of which are described as having been executed by pupils of the establishment. The large portrait of the Queen is somewhat crude and gaudy in colouring; but this may possibly only be a true rendering of the original from which it was copied. Much more artistic and pleasing is a copy of a painting by Ludwig Passi, of Venice, entitled "My Little Model." There are also some prints of a kind intended for book illustration, and some bright representations of birds.

The name of F. Hollyer, who sends reproductions printed in platinum from prints by E. Burne Jones and G. F. Watts, R.A., is not included in the *Catalogue Général Officiel*, and in the "Official Catalogue of the British Section," printed in English, he is credited with sending photographic portraits. Some are, indeed, copies of portrait paintings, but the principal subjects are the Six Days of Creation, and the Golden Stairs. Mr. Hollyer's style is well known, and admirers of the artists whose work he reproduces will find gratification in studying the copies here displayed.

PHOTOGRAPHY IN GERMANY.

BY HERMANN E. GUNTHER.

Neutralising the Ammonia Emulsion—Eliminating Hyposulphite—Making Gelatine Plates Colour-Sensitive.

Neutralising the Ammonia in Ripened Gelatino-Bromide Emulsion.—Herr Belitzki, to whom we are indebted for many improvements and investigations in the scientific department of photography, has worked out a modification of the well-known ammonia emulsification process, which is probably destined to assume considerable importance. If gelatino-bromide emulsion is prepared with ammonia, an inconvenience is met with by which this process is made a very uncertain one. This consists in the fact that the emulsion, owing to the remaining ammonia, shows a more or less decided tendency to continue ripening between the setting and washing process. According to the prevailing conditions the result of this after-ripening will be a very different one; it will be more intense if the emulsion has been digested at a higher temperature than usual; the same will be the case if larger quantities of emulsion are prepared, cooling rather slowly; also the condition of the vessels, the temperature of the cooling water, &c., but especially the time elapsing between the interruption of the digestion and the squeezing and washing of the threads of gelatine, very materially alters the quality of the emulsion. Now Herr Belitzki has tried to suddenly interrupt the action of the ammonia immediately after finishing the ripening process, by neutralizing it with a suitable acid. Citric acid was tried as well as hydrochloric, nitric, and sulphuric acid, but the latter was found answering the purpose best, and the author has used it for at least five years with always the same perfect success. The sulphuric acid is not only the cheapest one, but it also offers the advantage that it forms an entirely indifferent salt together with the ammonia. By the addition of sulphuric acid an emulsion is obtained which works much more vigorously and shows much less tendency to fog than an emulsion not so treated, the sensitiveness remaining unaltered. This is, of course, important; but at the same time the emulsion, though it has been more diluted, forms a mass of greater stiffness after setting, which, during the washing of the threads, sucks up by far less water than an ordinary ammonia treated emulsion, this being convenient, especially if soft gelatine is used, and in summer. The reason is obvious: the ammonia affects the gelatine so much the more, and renders it so much the more mellow, the longer it will act upon it. It should, however, be borne in mind that it is not advisable to neutralise the whole of the ammonia, since the smallest trace of free acid would entirely destroy the sensitiveness of the emulsion. The remaining quantity of the ammonia will then be removed during the washing of the threads; consequently, the quantity of the acid required for the nearly complete neutralisation of the ammonia must previously be exactly determined, so that any testing during the addition of the acid may be entirely avoided. The process is so certain, says Herr Belitzki, that with hundreds of emulsions not one failure has been met with by the addition of the acid. At first it is, as mentioned above, necessary to know the exact quantity of the ammonia required, and for this reason it is advisable to use always ammonia of the same strength. The author recommends to use liquor ammonia of 0·91 specific gravity at 59° F., this containing 25 per cent. of the dry ammoniac gas. To produce ammonio-nitrate of silver, to 40 grammes of pure nitrate of silver dissolved in water, exactly 32 grammes of this liquor ammonia are wanted. It is, however, advisable not to add the whole of the ammonia at once, but to keep a small portion, and to add it by drops until the silver solution becomes perfectly clear. This operation at the same time forms a certain test for the strength of the ammonia. To neutralize 68 grammes of this liquid, 49 grammes of pure monohydrated sulphuric acid (of 1·8426 spec. gravity at 64° F.) are required. It being, however, very difficult to get monohydrated sulphuric acid, and the acid of the trade generally containing between 100 and 95 per cent. monohydrate, it is recommended to carefully dilute it with water so much that double the quantity of the ammonia has to be added to the emulsion. Now 68 grammes of ammonia of 25 per cent. exactly require 51·58 parts of monohydrated sulphuric acid of 95 per cent.; therefore an acid of 1·26 spec. gravity should be prepared by adding about 412 grammes of concentrated sulphuric acid of 95 per cent. to 676 c.c. of water (not *vice versa*), well shaking all the time. As is known, sulphuric acid has an energetic attraction for water, and when the two are mixed, condensation ensues, and much heat is evolved; it will therefore be sometimes better to add at first the fourth part of the above quantity of acid to the water with much shaking; then, after the mixture has sufficiently cooled, the second quarter of it, and so on, until the whole has been mixed. Now, since not the whole of the ammonia should be neutralized, and as always a small portion of it evaporates during digestion, it will be necessary to further add to this mixture one-twentieth of the whole quantity of the water, then to take for use two parts of the sulphuric acid mixture to one part of the ammonia solution. Provided that the digestion is then carried on in well fitting vessels, failures will never be met with. Between the setting of the emulsion and the squeezing and washing of the threads, twenty-four to forty-eight hours may elapse without any essential change of the emulsion, or even any tendency to fog being feared. Finally, I may add that this important communication of Herr Belitzki has been published *in extenso* in Eder's "Year-Book" for 1889, and a table, according to which the above-mentioned sulphuric acid of 95 per cent. may be mixed, in the *Deutsche Photographen Zeitung*, 1886, No. 34.

Eliminating the Hyposulphite of Soda from Prints by Means of Common Salt.—The method of rapidly eliminating hypo from silver prints by washing them with cold and with warm water alternately, which has recently been published by Mr. W. K. Burton, has been found thoroughly efficient in the case of moderate batches of prints by one of my friends. I should like, however, to draw your attention to another method, which has been

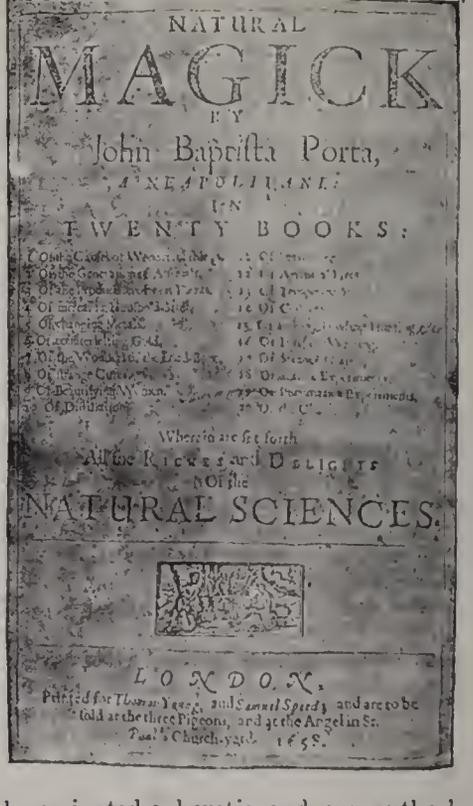
repeatedly recommended in this country of late, and which, according to my experience, is more convenient and as reliable as the one mentioned above. It consists simply in the use of a ten per cent. solution of common salt in water, into which the prints are placed directly after fixing. There will be removed every trace of hypo, and the keeping qnalities of the prints are materially increased. It is evident also that the salt solution remaining in the films must be washed off, but this is very easily done, and does not reqnire any care. Dr. Stolze snggests to combine this method with the one recommended by Mr. Burton. In his opinion, the main success of the latter method is not so much owing to the alternate use of warm and cold water, as to the acknowledged fact that it is much better to pour off a solntion containing hyposulphite of soda, until it only drips from the prints, than to remove the prints one at a time, since in this case much more hypo solution will be transferred. He therefore suggests to pour off the fixing bath, to replace it by water, and then to place the prints, one at a time, into a 10 per cent. solution of common salt. This solution should be again poured off and replaced by water, and the prints once more be placed, one at a time, into a salt bath of the same strength as before. This operation should then be repeated twice again with ordinary water, when the prints will be freed from hypo. This method seems to be an always reliable one, and besides, it offers the great advantage that it is not only applicable to albumen prints, but also to prints on emulsion paper. I should mention that, according to Dr. Stolze, such salt solutions may be equally well employed after the combined toning and fixing bath, and after all toning baths. It is well known, that after the prints have been transferred from the toning solutions to the subsequent washing water, there the toning process will continue, and that this after-toning appears in an aggravated form where two prints stick together. If, however, the prints are placed directly into a 10 per cent. salt solntion, the toning solution will be removed from the prints so rapidly that a snbseqnent colouring of the pictures will never occur. With regard to this the prints should, from the beginning, be toned a little bluer than usual.

Ordinary Gelatine Plates made Colour-sensitive by Application of Aurin-Collodion.—At the last meeting of the Photographic Society of Berlin, Dr. Meydenbauer gave some details with regard to the experiments made by the photographer of his Institnte, Herr Paul Meyer, on making ordinary gelatine plates colour-sensitive by flowing them with erythrosin-collodion or aurin-collodion. The latter substance is said to have proved especially well. With these plates photographs of fine white cirrns clouds on the blue ground of the sky have been taken for the Meteorological Institute, all other methods previously tried for the same purpose having been without result. This method of applying coloured collodion directly on the plate is certainly more convenient and efficient than the use of a yellow screen, since the latter always renders the definition of the picture difficult or even impossib'e, and gives rise to reflections. The aurin-collodion, which is recommended by Dr. Stolze also as an excellent means for backing gelatine plates (the collodion film allowing the progress of the picture during development being examined by transmitted light), may be prepared as follows:—Aurin is powdered, alcohol added, and the solutions allowed to stand for twenty-four hours, repeatedly shaking it during this time. One part of this solution, which is decanted clearly from the sediment, is added to 3 parts of a 2 per cent. plain collodion, then $\frac{1}{50}$ part of castor oil is added. This addition is absolutely necessary in order to give to the collodion film and to the glass nearly the same index of refraction. In the case of backing the plates with the aurin-collodion, the glass plates should be bordered with quite a weak gelatine solution before they are coated.

PORTA: HIS LIFE AND WRITINGS.

BY WM. LANG, JUNR., F.C.S.

Having lately come into possession of the English translation (1658) of Porta's "Natural Magic," I am enabled to complete the series of articles under the above title which appeared in the Photographic News in 1887. The copy which lies before me, and which was obtained at the recent sale of a portion of the Duke of Buccleuch's library, is a handsome small folio volume. We have reproduced the title page, from which will be seen the various contents of the twenty books into which the work is divided. The book which has more especial interest for us is the seventeenth, that which treats of strange glasses. In the preface we find Porta stating that he was barely fifteen years old when the work first appeared, and now when he is editing it at the age of fifty, he trusts it will be "more dearly entertained." The preface is what may be termed long-winded, bnt in passing we may simply refer to the very strong way in which Porta replies to sundry criticisms that had evidently been passed upon himself and works. He resents being called a witch and a conjuror, and accordingly waxes indignant at the very idea. A Frenchman who had evidently been saying hard things about


NATURAL
MAGICK
BY
John Baptista Porta,
IN
TWENTY BOOKS:
Wherein are set forth
All the Riches and Delights
Of the
NATURAL SCIENCES.
LONDON,
Printed for Thomas Young, and Samuel Speed, and are to be sold at the three Pigeons, and at the Angel in St. Paul's Church-yard. 1658.

Porta is denominated a heretic, and our author's magnanimous wish is that he be converted to the Catholic faith, and not be condemned while he lives. The titles of the various books are sufficiently self-explanatory with the exception of the last one, the twentieth—Of the Chaos—perhaps it may be as well to let Porta give his own explanation. "In this book I shut up those experiments that could be included in no classes which were so diverse and various that they could not make up a science or a book, and thereupon I have here heaped them altogether confusedly as what I had overpassed. Each book has its proeme or introductory remarks, and the quotation just given is taken from the proeme appertaining to the book in question. In the seventh book—Of the Wonders of the Loadstone—a very suggestive sentence is to be found anticipating in a measure electrical communication. Speaking of the mariner's compass, and extolling its paramount importance, Porta adds: "And to a friend that is at a far distance from us, and fast shut up in prison, we

may relate our minds, which I doubt not may be done by two mariner's compasses, having the alphabet writ about them."

Porta's experiments with magnets seem to have been very considerable, and from actual observation he is enabled to refute many of the absurd notions which in his time existed regarding the virtues of the loadstone. From what Porta says in the proem attached to this book, it is evident that he considered that in magnetism lay the germ of perpetual motion. It would be beyond the scope of the present article to refer in detail to the various books and their contents, nor would it be at all edifying to do so; so much that now appears to us childish being given in all good faith. We pass on, therefore, to the consideration of the Seventeenth Book, of "Natural Magick," wherein are propounded "Burning-glasses and the wonderful sights to be seen by them." In the frontispiece to several of the later editions of "Natural Magic" one of the experiments referred to under the operations of concave glasses is represented that of the mysterious dagger. In the PHOTOGRAPHIC NEWS of August 26, 1887, a reproduction of this frontispiece was given. The experiment, in Porta's words, is "to make an image seem to hang in the air by a concave glass," and further, "if it be a great glass you cannot but wonder, for if any man run at the glass with a drawn sword, another man will seem to meet him and to run through his hand."

Chapter VI. of this Seventeenth Book is, however, the one in which we are most interested, and in order "to see all things in the dark that are outwardly done in the sun with the colours of them," we are directed to proceed as follows, and here we have the camera-obscura in its fixed form fully described: "You must shut all the chamber windows, and it will do well to shut up all holes besides, lest any light breaking in should spoil all. Only make one hole, that shall be a hand's breadth and length; above this fit a little leaden or brass table, and glue it so thick as a paper, open a round hole in the middle of it, as great as your little finger. Over against this let there be white walls of paper or white clothes, so shall you see all that is done without in the sun, and those that walk in the streets like to Antipodes, and what is right will be the left, and all things changed; and the farther they are off from the hole the greater they will appear. If you bring your paper or white table neerer they will show less and clearer, but you must stay a while, for the images will not be seen presently, because a strong similitude doth sometimes make a great sensation with the sense, and brings in such an affection that not only when the senses do act are they in the organs and do trouble them, but when they have done acting they will stay long in them, which may easily be perceived. For when men walk in the sun, if they come into the dark, that affection continues, that we can see nothing, or very scantly; because the affection made by the light is still in our eyes, and when that is gone, by degrees, we see clearly in dark places. Now will I declare what I ever concealed till now, and thought to conceal continuously. If you put a small centicular (*sic*) crystal glass to the hole you shall presently see all things clearer – the countenances of men walking, the colours, garments, and all things as if you stood hard by; you shall see them with so much pleasure that those that see it can never enough admire it. But if you will see all things greater and clearer over against it set the glass, not that which dissipates by dispersing, but which congregates by uniting, both by coming to it and going from it, till you know the true quantity of the image by a due appropinquation of the centre; and so shall the beholder see more fitly birds flying, the cloudy skies, or clear and blew mountains that are afar off, and in a small circle of paper (that is put over the hole), you shall see, as it were, an epitomy of the whole world, and you will much rejoyce to see it; all things backwards, because they are neer to the centre of the glass; if you set them further from the centre they will show greater and upright, as they are, but not so clear. Hence you may, if you cannot draw a picture of a man, or anything else, draw it by this means. If you can but only make the colours, this is an art worth learning. Let the sun beat upon the window, and there about the hole; let there be pictures of men that it may light upon them, and not upon the hole. Put a white paper against the hole, and you shall so long sit the men by the light, bringing them neer or setting them further, until the sun cast a perfect representation upon the table against it. One that is skilled in painting must lay on colours where they are in the table, and shall describe the manner of the countenance, so the image being removed, the picture will remain on the table, and in the superfices it will be seen as an image in a glass.

Porta's next experiment is described as "that all shall appear right." As we have, perhaps, quoted Porta's language to an extent that may be deemed wearisome, it will be sufficient for our purpose to indicate how our philosopher tells us to proceed. "Put against the hole a convex glass, from thence let the image reflect on a concave glass, let the concave glass be distant from the centre, for it will make those images right that it receives turned, by reason of the distance of the centre. So upon the hole and the white paper it will cast the images of the objects so clearly and plainly that you will not wonder a little." His next idea is to show how "Hunting, Battles of Enemies, and other delusions," are to be seen in the dark chamber by having the necessary arrangements made outside in the full sunlight. For studying the appearance of the sun during an eclipse, Porta recommends the sun's image being received on the table of the darkened room. His quaint comparison between the human eye and the dark chamber is well worth noting. "The image is let in by the pupil as by the hole of a window; and that part of the sphere that is set in the middle of the eye stands instead of a crystal table."

The whole book is full of many interesting and quaint devices, but these we will not enter upon. The record of the early camera which we find described in Porta's pages is really what interests us; and the Neapolitan philosopher's dictum, "If you cannot draw a picture of a man or anything else, draw it by this means," has received by means of the science of photography a significance far beyond anything that Porta in his loftiest imagination could have deemed possible.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

BY W. M. ASHMAN.

TWENTY-SECOND ARTICLE.

PRINTING by means of silver bromide offers some marked advantages over such processes as those described in the previous chapter, in which silver chloride and albumen were employed. The most important is in the matter of speed, for instead of from two to ten copies from a negative being obtained in one day, according to light and density, it is possible to produce by this method as many as thirty to fifty in an hour, quite independent of daylight altogether. It is only necessary to have suitable mechanical contrivances by which the paper can be quickly changed, to print many hundreds in a single day. There is no preliminary washing out of free unacted-upon silver, and no toning is required, though in some cases the use of a toning bath is advocated. As a rule, the colour produced is somewhat like the black of an engraving with grey half-tones. For a large number of subjects the effects produced are superior to those resulting from the use of silver chloride in albumen, while the permanence of the prints should be guaranteed from the fact that gelatine, being a softer substance when wet than coagulated albumen, the soluble substances which might be injurious are more easily removed by washing, and each molecule of silver is protected by an envelope of transparent colloid, impervious when dry.

The practicability of using a sensitive silver bromide emulsion, thinly spread upon paper, for the purpose of positive printing, was first brought under the notice of photographers by Peter Maudsley about fifteen years ago; but to Morgan and Kidd is the credit due for having first practically brought the capabilities of the process so prominently forward. At the present time immense businesses are being done at home and abroad, in the preparation of emulsion surfaces on paper and on opal glass, and in the production of positives printed thereon. A suitable emulsion is by no means difficult to prepare, neither is the spreading of the same upon proper surfaces tedious; but as details have often been published by the writer and others, and as a reliable paper can be purchased at any dealer's, there is no need to enter fully upon the subject. It is sufficient to say that a properly compounded silver bromide emulsion in gelatine is prepared and kept fluid by means of heat, and that a roll of paper is passed over it in such a way as to leave a thin sensitive coating upon the surface. This, after drying, and sometimes hard rolling, is ready for exposure to light, but it may be stored for an almost indefinite period provided that light and damp be excluded. Such a manufacture is, of course, conducted in a non-actinic light, and the result is the article known in commerce as bromide paper. It must be remembered that in this case, although we have a surface very sensitive to light, there is no visible alteration in the appearance after exposure under a negative; but, as in the use of ordinary dry plates, the latent image will require the employment of a developer to bring it out. The difference between the developed positive image and that of the negative lies chiefly in the thickness of the emulsion and in the duration of the exposure it has had. Development also is so arranged in the first instance as to produce a colour suitable for a positive print. If a glass plate is coated very thinly and developed slightly, a positive is seen as soon as it is backed by white paper or glass. It will be gathered from the foregoing that as in this process of printing there is such a great increase of sensitiveness over what is usually termed a printing-out process, such as that in which albumenized paper is used, facility is afforded for obtaining any desired dimensions of image larger or smaller than the original negative. It only needs the intervention of a lens between the negative and the paper to increase or diminish the size of the print, while the exposure of a piece to light when in close contact with the negative will, of course, produce an image of the same size. For this reason we are accustomed to speak of this process as bromide printing by contact, or bromide enlargement.

All that has been stated in former chapters in regard to safe illumination of the dark room applies with equal force in this process; a non-actinic light of deep orange, ruby, or other safe combination, as already explained, can alone be permitted to enter the printing-room, and if daylight is employed it should be sparingly used, or perfect prints will not always be obtained. On the whole, coloured artificial light is preferable. Suppose, by way of illustration, that we are about to produce a contact print on bromide paper. Our negative is adjusted in an ordinary printing frame as with the other process, only it is better to have some diffusing medium, such as ground glass or tissue paper, secured to the front, through which the light passes during exposure. Then, in the precincts of the dark room, a package of the paper is unsealed, when it will be noticed that one side of it is yellow, and that side must be placed against the dusted film of the negative and backed by some folds of blotting-paper or a piece of cloth, and the frame closed. The exposure can be managed in several ways, but the simplest method is to burn two or three inches of magnesium ribbon a short distance from the front of the frame by means of a spirit lamp. This light can so easily be regulated as to intensity by varying the length of the ribbon, while its distance from the frame can be varied in accordance with the well-known rule of the square. Thus, if 2 inches of magnesium is sufficient at 4 inches distance, it would require 18 inches at 12 inches from the frame. The advantage of lengthening the time of exposure is sometimes very great in the case of negatives possessing but slight opacity. If weak diffused daylight be employed, a very few seconds are necessary, varying from five to twenty, according to the density of the negative and the colour. Gas also can be employed, and the duration would then have to be about ten times that of the preceding case at a few inches from an argand burner.

Having once ascertained the correct exposure, slightly over, rather than under, the exact amount, any number can be printed with a certainty of uniformity where artificial light and measured distances are used.

The next step is that of developing the latent image, and this is usally performed by means of ferrous oxalate, the proportions for the mixing of which given in the 16th chapter being suitable; but it should always be remembered that full exposure, and a developer weakened rather by excess of potassium oxalate, give the best tones. Instead of the directions then given for the development of negatives, it will be found better to substitute the following. Measure off two ounces of solution A, and add two drams of solution B, and five drops of solution C.

As many prints as have been exposed are placed in the mixed developer a few at a time, according to the size of dish and quantity of solution, and kept in constant motion. They should begin to develop in less than a minute, and be finished as to all the detail possible from the negative in about three to five minutes. Some printers prefer to pass the developed prints direct into a bath of slightly acidulated water (acetic acid 1 to 100), and changing once or twice, and then remove to wash well before the next step. The object of the acid is to dissolve any insoluble iron salt in the paper that would stain the print, and help to make the black colour somewhat greenish. The fixing bath, consisting of one part of hypo to seven parts of water, being ready, the prints should be immersed, and moved about therein for ten minutes, after which they may be thoroughly washed for several hours in many changes of water, when they are ready for drying. If at this stage any slight yellowness should appear in the lights, it can be removed by steeping the prints in water acidified with sulphuric acid in the proportion of 1 to 80. Two hours' washing after this is necessary, and it is a good plan to allow them to dry spontaneously face upward upon clean blotting-paper. In warm weather, and with some paper, it is necessary to soak the prints in a solution of common alum 1 to 10, to harden them, and prevent injury to the film. To alter the size of the image upon the paper, either by reduction or enlargement, necessitates some kind of apparatus involving the same principles as those followed in taking camera pictures; but whether an ordinary instrument can be used or not depends upon the size that the image is required to be. The simple rule that the greater the enlargement the greater the distance between the lens and the back of the camera where the paper would be, and the shorter the distance between the lens and the negative to be enlarged from, proves it is necessary to have a camera capable of extending very considerably to enlarge over as much as three diameters. Properly constructed contrivances are sold for this purpose, but where a dark room is provided with an aperture into another apartment or cupboard, it is a simple matter to enlarge up to many diameters. Artificial light, such as that provided by the oil lamps in optical lanterns, is very much used for this purpose, and the method of fixing up such an arrangement will be best understood by a reference to sketch fig. 23.

In calculating the probable exposure necessary to produce a perfect enlargement, allowance must be made for the colour of the negative. When this is rather dense in the lights, and of a yellowish colour from insufficient

sodium sulphite in a pyrogallol developer, the time required will be three or four times as long as when using a grey negative of moderate density. Again, the greater the extent to which the image is enlarged, the more the exposure will have to be prolonged. In doubtful cases it is far better to be provided with small slips of the paper, and make trial exposures, instead of wasting large sheets by incorrect calculation, or insufficient experience by which to form a judgment. If such a strip be so placed as to test a small portion of the deep shadows and highest lights, upon development it will be easy to calculate what

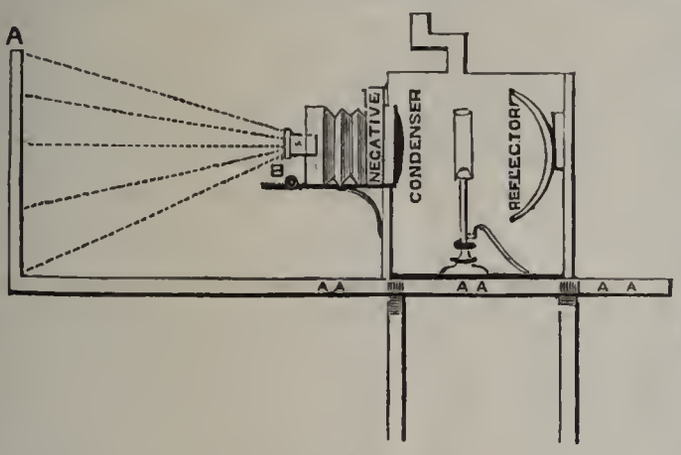


Fig. 23.

alteration is required in exposing the larger piece. As a rule, rapid rectilinear lenses are employed, of somewhat short focus to avoid extreme extension, and to make the most of the light. Ordinary portrait lenses are better for weak artificial illumination, but only portraits, chiefly vignettes, should be enlarged by them, as any lines will be more or less distorted. The new rectilinear portrait lenses are of course an exception to this rule. Commercial paper varies so much in speed, some being quite six or seven times more rapid than others, that it is difficult to give approximate time for definite enlargements. A cabinet portrait of good colour and average density might be enlarged to 12 by 10 inches in good daylight with a rapid rectilinear lens in about twenty seconds, or with a portrait lens, and proper enlarging lantern lit with an oil lamp, it would take about eighty seconds. With other paper the time required would be perhaps a great deal longer.

The negative should be placed film side towards the lens unless a reversed image is wanted, and if daylight be used, and the enlarging room is not quite free from actinic light, the space between the lens and the negative must be covered in, so that no light may reach the sensitive surface except through the lens as indicated in our rough sketch. A vertical easel travelling freely in grooves parallel with the plane of the negative, carries for focussing screen a board A covered with white paper, which also takes the sensitive paper during exposure, and A A sliding platform to bring vertical board nearer or further from lens. Any camera will serve to carry the lens between the easel and the opening in wall or shutter in which the negative is fixed, so the necessity for a large and long camera is avoided, but it is convenient to use an instrument which is adjustable with rack and pinon as shown at B. If the negative is in an opening with the outside, and a mirror inclined at half a right angle reflects the light from the sky through it, a piece of ground glass should be placed between the mirror and the negative. If the opening is into an adjoining apartment, and the illumination is artificial, the use of a condensor increases the rapidity of the process and equalises the distribution of the light; but when time is no object, some diffuser, as ground or flashed opal glass, will answer with a good strong lamp behind, if far enough distant to equally illuminate the field. After exposure the development must be conducted as with contact prints, only with one picture at a time, and fresh solution to each one. With all packets of commercial paper sold, there are found detailed directions for the working of the same, and such directions vary somewhat to suit the different emulsions used in their preparation. In all cases, however, over-exposure is to be recognized by the image flashing up very soon after the solution is poured over.

Sometimes this may be remedied by quickly adding some more bromide solution or plain oxalate of potash, but there is very little time in which to act before the mischief is past all repair. The finished print is certain to be grey and flat, without contrast or brilliancy. On the other hand, under-exposure is marked by a reluctance to develop, and a harsh appearance, the contrasts being too great, very white in the lights, and inky in the shadows. It is very difficult to make anything of such exposures.

A well-known firm of manufacturers issue the following notes with their instructions for working their paper, which it seems desirable to reproduce. "Separate dishes should be used for each operation. The developer must not be contaminated with pyrogallol or hypo, or stains will ensue. Too many prints should not be developed in one solution, as it deteriorates with each batch, and is liable to stain the prints. Wash the prints after each process as quickly as possible to avoid stains. Stop developing before the full vigour desired has been reached, as the prints appear darker after fixing."

The process of silver bromide printing will be further treated in the next article, when the subject of transferrotype and stripping films will receive some attention.

Notes.

The Amazonian lady who is reported by an American paper to have travelled some 300 miles alone on horseback through the wild timber grounds owned by her, might perhaps have saved herself a good deal of personal effort by employing a photographer to take a series of photographs before and after the cutting of the timber. Doubtless, however, she reflected on the advantage of personal inspection rather than trusting altogether to photographs, which, after all, could only represent very limited areas. Moreover, she would have been forced to depend to some extent on the photographer, and distrust of others was the spring of the whole business.

Still, she might as well herself have taken a portable camera, as even very indifferent views should have served very well in confounding those agents whom she suspected of evading her proprietary rights in the timber cut and sold.

It is many years since any photographic book has made such a stir in the photographic world as Dr. Emerson's "Naturalistic Photography," a new edition of which is expected from the publishing house of Messrs. Sampson, Low, and Co., in a few days. In the United States an edition sold by Messrs. Spon, of New York, is being rapidly bought up and read.

The tendency to turn the camera upon everybody and everything is the bane of the amateur who goes on a photographic tour. Besides the quantity of worthless pictures he produces, he also succeeds in making himself a

nuisance to his unfortunate companions, should he chance to have any, by compelling them continually to halt while he snatches a view. For this reason an instance of self-denial, related by Professor C. F. Himes, in a paper on "Amateur Photography in its Educational Relations," read before the Franklin Institute, is worth citing. In warning amateurs not to spoil a pleasure trip by making themselves slaves to the camera, he said that some years ago he took a journey to Europe, one object being to secure a number of photographs of the Zermatt region in Switzerland, no views of the district at that time being in the market. Knowing the temptation which the camera might expose him to, he had his photographic apparatus shipped direct to the locality, and having devoted the necessary time to take the views he wanted, at once re-shipped apparatus and negatives back to America. In this way he was able to enjoy his trip to Europe untrammelled by continual desires to photograph, and saw very much more than if he had been accompanied by his camera.

Though an enormous advance has been made of late years in process printing, it is doubtful whether many of the failures in printing process blocks are not due rather to the printer than to the block. The shallowness of the lines is the great drawback in photo-engraved plates. Naturally the printer prefers the wood block, because it requires much less work to make it ready on the press, and considerably less care to run it clean and effective. But as the *Inland Printer*, a Chicago technical journal which turns out some of the finest process work we have ever seen, remarks, in a time where a thousand photo-engraved plates are used to ten wood cuts, our printers will have to accustom themselves to the use of the photo plate. On the other hand, as soon as the lines in photo plates are made deeper, this otherwise valuable method will be as welcome as wood-cuts. The constant improvements now being made in photo-engraving leads to the hope that this day is not far off.

An exquisite piece of satire on the punctilious regulations of the French Exhibition, whereby exhibitors are compelled to have their photographs taken, so that the officials shall know that the right persons only are admitted, has just been enacted. On the Prefect of Police, M. Lozé, presenting himself to the constable on duty at one of the entrances, he was unceremoniously refused admission by his own subordinate. In vain the Prefect explained who he was, but the policeman was not to be taken in, declaring that people constantly demanded the entrée, calling themselves all sorts of grand names; but they didn't get over him. The sooner the Prefect has his portrait taken, and a copy presented to every man in the Paris police force, the better. For a policeman not to know his own superior officer is a climax of absurdity.

Photography is continually being called into the assistance of promoters and boards of directors of public companies. The production of a photograph or a series of photographs of mining operations, and of factories situated in distant parts of the globe, seems to be a source of comfort to shareholders, and satisfies all doubts as to the stability of the concern. A most elaborate series were handed about the other day at the statutory meeting of one of the newly-formed American brewery companies, and were gazed at with evident satisfaction. Of course such photographs prove nothing, but they are at least an improvement upon the efforts of amateur draughtsmen which used to be, and are still, occasionally exhibited. We are afraid, however, that in many cases, more especially in connection with mining properties, photographs would do more harm than good. Sometimes the object in view is to keep the shareholders in absolute ignorance of what is going on, and the history of not a few mining properties where much money has been sunk and very little raised, go to show that photography would seriously interfere with the operations of the manipulators of the shares for whose benefit certain mining companies appear solely to exist.

It is a pity *Vanity Fair* did not give a reproduction from the photograph taken of the *Sultan* when she was stranded, and previous to sinking. The drawing published is drawn to scale from the photograph in question, but is of the rudest description, and does not convey to the mind the real state of the case—namely, the proximity of the ship to the shore. The writer says: "We know the *Sultan's* length to have been something over three hundred feet, or one hundred yards, and we know that if she be not in the photograph presented broadside on, the error in length is again all in favour of her navigators. Yet we see her aground within two of her own lengths of as dangerous a coast as is often to be met with." These calculations may be correct, but, in the absence of the original photograph, it would not be fair to place absolute reliance upon them.

Photographic dealers have, for a long time, been complaining of the want of some particularly bright particular star in the society or dramatic firmament, who will not only allow herself to be photographed, but will permit her photographs to be sold. It is a long time since there has been any rush for portraits at all approaching that which marked the advent of the "professional beauty" some years ago. The sudden demand for the photographs of the late Father Damien which, it is said, has sprung up, must be very welcome. One evening paper asserts, on the dictum of a well-known photographer, that the sale "exceeds that of any professional beauty or actress for the last ten years." We should fancy this must be taken with the usual grain, and that the excessive demand is confined to the Strand dealers in the neighbourhood of Exeter Hall. The death of Father Damien happening just at the very height of the May meeting season has given the platform speakers of Exeter Hall a welcome subject for comment, and hence an interest has been created in the portrait which certainly would not otherwise have existed.

"The camera has made its way well-nigh everywhere," writes a correspondent; "but it was probably a fresh departure, even for this widely-developed apparatus, to figure as it did last week in the train of a well-known London

surgeon when on his way to perform a difficult and unusual operation in the room of a sick patient. The ominous black bag carried by that eminent surgeon's assistant was, perhaps, a little larger than usual, and as a matter of fact it sufficed to contain a small and effective photographic apparatus, in addition to that alarming assortment of bright steel implements in which modern surgery delights. The operation to be performed was, as has been said, an unusual one, and it was with a view of making known to the profession the abnormal state of things—which he hoped by his skill to transform—that the operator had resolved to secure a negative, showing the *status-in-quo* before using the knife. When the patient was once under the influence of the anæsthetic which was administered, it was the work of but a few moments to secure the desiderated photograph. And so again, when the operation had reached its successful end, the expenditure of a few more seconds sufficed to obtain a second negative, to serve as a companion for the one previously taken. When a military officer in Burmah photographed certain "dacoits" who had been actually placed in position for execution, there was a loud outcry against the callous barbarity of such a proceeding; but in the present instance it must be remembered that good results may actually follow the study of the photographs obtained under such abnormal circumstances, whilst it is certain that the patient, being absolutely ignorant of what was passing, was in no way incommoded by the novel addition made to the usual course of surgical routine. In any case, this employment of the camera by an operating surgeon is a development of photographic usefulness which may well be considered worthy of record in a journal devoted to photographic interests."

We quite agree with our correspondent that the circumstance he records is worth chronicling, and we have, in fact, long expected to hear of some such development of photography. There would seem to be no reason, either, why text-books of surgery should not be illustrated by photographs taken from the life. Seeing, indeed, how in books on billiards, and cricket, and driving, and other popular pastimes, it is now usual to show the tyro how the cue should be held, the ball kept away from the wicket, the reins fingered, and so on, by means of photographs of how these things are done by certain famous exponents of the pastimes in question, it seems to us that no time should be lost in giving students of surgery a similar opportunity of studying the way in which, under varying conditions, forceps are grasped, lancets manipulated, and other instruments wielded by the masters of modern surgery. The pains and trouble taken to ensure a successful appearance at the wicket or on the coachbox should surely not be grudged to bring about a familiar acquaintance with the more difficult phase of the healing art on the part of such as are being trained up to take the places of those on whose skill "poor humanity" so frequently has to depend.

It has long been a well-known fact that old stories and interesting paragraphs have their times of return like comets; and that having disappeared for a season or two, their reappearance sooner or later can confidently be predicted. We have noticed this repeatedly in the cases of certain photographic "wheezes," which really seem to possess a kind of journalistic orbit, if we may so term it, and revisit the columns of English and American newspapers with something approaching to regularity. We have only to-day, for example, noted the reappearance on the periodical horizon of what we may call the "photographic-album cheque fraud" anecdote—a story which has been cropping up time after time during the last lustre or two. The incident we allude to can be readily recalled to our readers' memory. The perpetrator of the fraud, having filled an album with the photographs of all his richest friends, cunningly inserts a blank cheque at the foot of each likeness, so folded that the portion where the signature is usually attached shall come beneath the narrow slit which has been so cut out at the bottom of each page of the album as to leave space for the donors of the photographs to append their autographs. Having duly inserted the blank cheques, the would-be swindler has only to go round and secure the signature of each of his friends to what they assume to be their cartes to become the possessor of a number of duly signed cheques which he can take out, fill up for large sums, and present for payment at his leisure. Of course there are a score of valid objections which could be urged to the probability of such a story as this; but it none the less, when well told, makes a very interesting narrative, and is doubtless destined, in future years, to interest generations of newspaper readers yet unborn. It is curious to notice that in the version now current the total amount obtained by the swindle is, for the first time, we think, circumstantially stated to have been £3,508 17s. 3d. A second innovation on the stereotyped original is to be found in the details now held and told with much dramatic force, too, of the attempt of one of the rich friends to withdraw his photograph in order to sign it better. This particular story is, in fact, being improved in the re-telling, and has come back to us from across the Atlantic (for the scene is now laid in Montreal) all the stronger for its sea voyage.

We have had another photographer's epitaph sent to us. Our correspondent says he copied it from a tombstone in a country village near Grantham. But be this as it may, here is what he sends us:—

Sacred to the memory of Alfred H———,
For 30 years principal Operator and Retoucher in the
Studio of Messrs. L. & S., of Liverpool.
"Oh for the touch of a vanished hand."

Possibly this is meant to be pathetic, but the most that can be said for it is, that it is a "touching inscription."

A passenger landing at Plymouth, having with him exposed plates, a Custom House officer insisted on having the plates developed, lest the latent image should be of an indecent character. Lord Salisbury, replying to a question in the House of Lords, said the officer in question was a man of inconceivable stupidity. All our readers will agree with this view.

Reviews.

The International Annual of Photography. English Editor, Mr. W. J. Harrison; American Editor, Dr. A. H. Elliott. Crown octavo, 480 pages. Price 2s. (*London:* Messrs. Iliffe and Sons, 98, *Fleet Street. New York:* Messrs. Anthony and Co.)

Mr. Harrison is to be heartily complimented on his share in the work before us—a work which will add to his already high reputation. We must, however, remember that credit for the excellent features of the "Summer Annual" as far as the American side is concerned, is due to Dr. Elliott.

The Summer Annual has already taken a creditable place in the photographic literature of the time, and we are pleased to see that, among numerous prominent experimentalists who contribute the results of their work to Mr. Harrison, are a good many who are in the habit of sending papers to us for our own Year-Book, an annual which has so long been a prominent and representative feature in the photographic world, and to which the Summer Annual of Mr. Harrison and his *collaborateur* may be regarded as a companion volume issued at the opposite point of the year.

Patent Intelligence.

Applications for Letters Patent.

7,134. Frank Colet Larkin, 12, Serjeant's Inn, Fleet Street, for "Adjusting Photographic and other Apparatus called 'Larkins' Patent Adjuster.'"—April 29th, 1889.

7,229. Hedley Marshall Smith, 2, York Street, Covent Garden, London, for "An Improved Developing Dish for Photography."—May 1st, 1889.

7,234. John Arthur Morley, 8, Quality Court, London, for "Improvements in Photographic Cameras."—May 1st, 1889.

7,235. John Arthur Morley, 8, Quality Court, London, for "Improvements in Means for Developing Negatives on Photographic Plates."—May 1st, 1889.

7,305. Thomas Wilson, 154, St. Vincent Street, Glasgow, for "An Improved Detective Camera."—May 2nd, 1889.

7,347. Richard Williams Thomas, 38, Holborn Viaduct, for "Improvements in Photographic Cameras."—May 2nd, 1889.

7,407. James Greenwood, 4, South Street, Finsbury, London, for "Improvements in the Manufacture or Production of Metallic Sodium and of Chloriue."—May 3rd, 1889.

7,939. John Thomas Daniels, 14, Smith Street, Northampton Square, for "Improvements in Combined Instantaneous and Time Shutters for Photographic Cameras."—May 13th, 1889.

7,599. John Vincent Harger and Thomas Harger, 58, Low Street, Keighley, Yorkshire, for "Improvements in Stands or 'Tripods' for Supporting Photographic Cameras, or the like."—May 7th, 1889.

7,675. Thomas Stanway, Longport, Staffordshire, for "New or Improved Holder or Lifters for Photographic Plates, Films, and Papers."—May 8th, 1889.

7,700. Archibald Turner, 1, Crowhurst Road, Brixtou, London, for "Improvements in Dark Slides, Carriers, or Apparatus for Carryiug, Exposing, aud Manipulating Glass Plates Coated with Substances Sensitive to Light for Photographic Purposes."—May 8th, 1889.

7,735. Thomas Parsons Watson and Francis Ernest Eden, 53, Chancery Lane, Loudon, for "An Improved Diaphragm for Photographic Lenses."—May 8th, 1888.

7,747. William Friese Greene, 92, Piccadilly, for "Au Invention for Rendering Cardboard, Paper, or the like Impervious to the Action of Photographic Chemicals, and therefore Suitable for Photographic Purposes."—Dated May 9th, 1889.

7,829. John Miller Turnbull. 6, Rose Street, Edinburgh, for "Improvements in Detective or Hand Photographic Comeras, and Dark Slides or Film Carriers connected therewith."—May 10th, 1889.

7,871. Richard James Appleton, 20, Charles Street, Bradford, Yorkshire, for "Improvements in or Appertaining to Photographic Cameras."—May 11th, 1889.

7,983. Walter Griffiths, Highgate Square, Birmingham, for "Improvements in Cameras for Making Lantern Slides or Copying Photographic Pictures."—May 14th, 1889.

8,274. Christopher Obee Ellison, 62, Dale Street, Livorpool, for "Improving the Means of Focussing Photographic Cameras."—May 18th, 1889.

Specifications Published.

15,723. William Crooke, Photographer, 103, Princes Street Ediuburgh, and Julius Coster, Gun Maker, 18, Frederick Street, Edinbugh, for "Improvements in Portable Head-rests Used in Photography."—Dated 1st. November, 1888.

A base or plate A, provided with a stud, into which is jointed an arm B, and to arm B is jointed another arm C, and to arm C is fitted a prong-shaped rest or a cup D. The ends of arm B, or any of said arms are provided with a ratchet (shown in drawings on arm B), and also a catch with springs, as *a* and *b* is fitted to said ratchets, to keep said arms in a desired position. When the rest is to be used, the operator places the base or

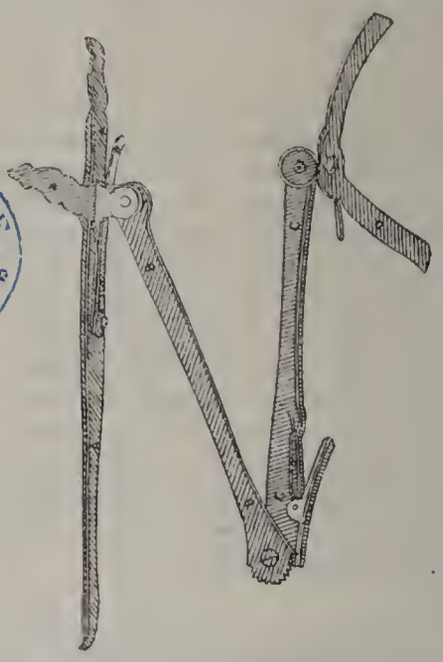


plate A against the wall (or backgrouud), and exteuds the arms A and B or any of them, till the prong-shaped rest, or cup D rests against the persons head. Any number of arms may be added, or a tube or sliding-arm substituted or added to lengthen the rest to any desired length. Such tube or slidiug arm may be provided with a rachet and spring-catch arrangement, or a finishing screw, to nx same at a desired place.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1st. A photographic rest, which requires no stand.

2nd. The said rest requires no mode of fixing to a chair or any other object, being placed against the wall or backgrounnd, and is held in position by the person to be photographed.

3rd. The mode of exteuding or contracting the rest *viz.*—by means of jointed arms, rods, or tubes.

4th. The means of checking and keeping in a desired position, the arms, rods or tubes, *viz.*—by means of the rachet and spring arrangement.

5,140. James Hines, Engineer, of Dunedin Lodge, Lenzie, Dumbartonshire, Edward Howell, House Furnisher, of Inglebank, Lenzie aforesaid, and Alfred Howell, Tobacconist, of Ingleside, Pollokshields, Renfrewshire, for "Improvements in the Modes and Means or Apparatus for Taking and Producing Photographs, and in Appliances connected therewith."—Dated 6th April, 1883. (*Continued from page* 348.

The plate *a* in its clip *b* fig. 3, is fitted with a lateral vibrating secondary clip b^3 hung on a pin b^4 in the spring clip *b*, with gripping fingers b^{111} on each side, showu in section in fig. b^3, which take a hold of the upper part of the plate *a* and vibrate it by the motiou of the lever b^5 hinged on the upper rigid part of the clip *b* and actuated when the clip *b* and plate *a* are down in

their lowest position, and the plate *a*, within the baths and drying chambers 2 to 6 and 7, 7^1, as will hereinafter be described by the mechanism shown in fig. 4. Referring to the elevation and plan fig. 4, the outer end of a vibrating lever *p* presses on the shaker b^5 acting on the clip b^3, and the weight of the clip and plate brings it back to its vertical position. This lever *p* is mounted on the lower end of a vertical spiudle p^1 carried in brackets at p^{11}, secured to the front lower part of the vertical frame C; and another lever p^2 is mounted at the top of this spindle connected by a rod p^{111} to a shaking double-armed or bell-crank lever p^3 carried on another bracket p^4, screwed to the back part of the frame C. The spindle of this bell-crank lever p^3, has a spring mounted on it at p^5, which always keeps the spring pawl p^6 against the periphery of the ratchet vibrating wheel p^7 mounted loose on the lower part of the spindle C^2 just above the motive wheel D. This ratchet wheel is oscillated by an arm and rod p^8, from the motive clock mechanism in the case E while it is in motion, by one arm of a lever Q, seen more particularly in figs. 12 and 13, which is mounted on a spring spindle q^1, carried on a bracket bolted to the frame E of the clock mechanism, and has another arm lever q^{11} at the other end of the spindle, which gets its motion from a curved star wheel q^2 on the fast revolving spindle q^3 turned by a pinion E^{1111} from the main wheel E^4 of the clock which drives the fan E^7. This star wheel q^2, raises the lever q^{11} against the power of the helical spring on its spindle q^1, which always brings it back to the bottom of the teeth, and so vibrates the levers q^{11}, *q*, to and fro, as also the rod and ratchet wheel p^8 and p^7, which in its turn only vibrates the bar mechanism *p* to p^6, where there is a ratchet tooth p^9 on the ratchet wheel p^7, these being regulated so that they vibrate the spring lever p^6, p^5, only when the frame C and these levers are brought down into the troughs 2 to 6 and 7, 7^1, respectively, there being seven ratchet teeth in the ratchet whel p^7, to give the vibrations to the plate *a* over these baths 2 to 6 and drying chambers 7 and 7^1. Instead of raising the picture *a* and its clip *b* and bar *c* by the crank pin F, in the disc F^1, this may be done as shown in fig. 1 B, by making a double crank R on the shaft F^2, so as by a bow connecting rod R^1 and rod R^{11} oscillate a counter-balance weighted lever R^2, fulcrumed on a bracket R^{111} on the spindle C^2 and frame C to raise and lower the bar *c* in the guide slides c^{11} in front of the frame C in an equivalent manner to that of the crank disc F while passing from one bath or chamber to another; and counter-balance the weight of this crank arrangement by a weighted lever R^3 mounted above the frame C, so as to prevent vibration in the movements. The arrangement of the ratchet mechanism for turning the plate barrel a^1 a^{11} is shown in figs. 10 and 11, and consists of an actuating spring pawl and lever a^4, a^{111}, and retaining spring pawl a^5 working into the ratchet wheel a^{111} of the plate barrel, the arm a^{1111} of the lever being actuated by the pushing rod a^6 working in a guide at a^7 under the segmental angled part Q^1 of a cam Q which, as it comes round, depresses the rod a^6, and turns the ratchet wheel a^{111} one tooth at a time, to bring a new plate *a* under the clip *b*, so that it may raise this just as it has completed its revolution to come to rest ready for taking a new picture when the coin is placed in the slit. When the plate *a* comes round with the frame C to the position shown in figs. 1 and 2 opposite the lenses B, it is lowered all as hereinbefore described, and steadied by a light angled plate b^6 in a shallow tray b^7, which receives all the drippings of the plate *a*, and in this position, a cam arm g^7 fixed in front of the wheel G^1 comes round and presses out one or two contact points g^8, g^9, so as to make contact with the two terminals *s*, s^1, of an electric bell arrangement, which now rings to indicate to the person who has put in the coin to have his or her likeness taken to take up their position in front of the lenses, near the spring depressing handle and standard S, and this bell continues to ring until the photograph is fully taken, when it stops ringing to indicate same, by the passing on of the cam part g^7 relieving the contact points g^8, g^9. When the party has steadied him or herself they press down the handle and rod S, against the power of the helical spring S^1, this rod being coneected through two bell cranks S^{11}, S^2, and a horizontal rod S^{111}, under the floor. The second bellcrank S^2 is connected by a rod S^3 to one arm S^4 of a lever within the case A, which pulls this down, and by the other arm S^{1111} pushes up a reciprocating spring rod and pawl S^5, to turn the ratchet wheel S^6 one tooth round. This ratchet wheel S^6 has a star wheel S^7 secured on it, turning on the same centre over two levers B^3, B^{111}, fulcrumed at B^4 on the same bracket B^{1111}, which carries the star and ratchet wheel. The pawl B^{111} has a V-retaining tooth B^5, on it, which takes into every tooth of the star wheel S^1, as it is turned, and this tooth B^5 projects over the front lever B^3, and depresses it while each tooth of the star wheel S_7, is passing over the V-piece B^5, and this lever B^3, is connected by a link B^6 to the shutter lever B^{11}, B^2, which opens the lenses, and thus the drawing down of the free end of the arm B^2 of this lever would pull down the lever B^7, and take the upright lever B^8 fulcrumed on the same spindle B^9, forward clear of the pin g^6, and allow the time mechanism to go on; and the spring catch *r* would keep the lever B^{11} down, and the lenses open, until a rubbing block r^1 on a regulating screw r^{11}, on the lever r^2 cleared the cam part G+, of the cam wheel G^1, and allowed it to rise by the power of the spring R^{111} all as shown particularly in fig 13 A, which is a side and edge view of the wheel G. This rising of the lever r^2 depresses the lever r^3 secured on the same spindle r^4, and draws the catch *r*, out of action, by the spring heel lever r^5, and allows the stop lever r^6, by its own weight to fall over a projection r^7 on the pawl rod S^5, and prevent this from being tampered with by the hand rod S outside. While the lever B^2 is also locked in its highest position, by the lever r_8 also brought under the lever B^2 by the falling of the lever r^3, all as particularly seen in the large scale views fig. 12 and 13.

When the plate *a* has been traversed and treated as described at its various stopping stages over the baths, and in front of the lenses B, and at the heat drying chambers 7 and 7^1, it then arrives with its frame C over the cutting, and delivery mechanism shown to the right behind the plate supply barrel a^1 a^{11} in the plan fig. 1 B, and to a larger scale in figs. 7, 8, and 9 on sheet 2. And referring to those figs., the cutting mechanism consists of a main horizontal spindle T carried in bearings in a frame T^1 screwed to the bed plate C. This spindle T is actuated by a weight T^{11}, and a wire or other cord T^{111}, on a motive barrel T^2 secured on the spindle T, also assisted by a counter-weighted fly wheel T^3 secured on one end; while an eccentric cam T^4 is secured on the other end of the spindle T revolving within the motive gap frame T^5 of the sliding frame T^6 working in end guides projecting up from the frame T, and carrying a hollow rectangular block T^7 in front, working within an outer hollow fixed case T^8, at the front delivery end of the mechanism. Two angled cutting flat steel knives *t* t^1 are mounted, one of the front end of the internal moving block T^7 on the top, and the other on the under side or surface, so as to work close up to corresponding angled cutting blades t^2, t^{11} secured over and under them to the under front end of the fixed outer case T^8. This outer case has a funnel mouth T^9 mounted over its inner end, to guide the plate *a* down between the fixed and moving knives in their open position. Just as the clip *b*, b^1, has so inserted the plate *a*, a projecting arm of the hinged part b^1 comes down on an angled or curved projection t^3 and opens the clips, leaving the card resting on a plate t^{111} in the lower part of the outer case T^8. A first half turn of the spindle T in wheel T^3 cuts the plate, and delivers it into the open mouth of the spout Z, beyond the direction of the arrow, by the force of the weighted cord barrel T^{11}, T^{111}, T^2, and fly lower knives t^1, t^{11}, out at the lower end opening outside the case A at Z^1. The lower pointed ends of the plates *a* as they are cut off, fall through an opening t^4 in the bottom of the outer case T^8, inside the lower fixed knife t^{11}, while the tops ends with the gripping holes a + in them fall into an angled groove or guide t^9 mounted on the inner top side of the moving cutter *t*, which receives it within the funnel piece T^9, and delivers it to one side within the case A. The other half turn of the spindle T and its cam T^4 brings back the moving knives *t*, t^1 to their open normal position as shown in figs. 7 and 8 ready for cutting the next plate as it is brought round and inserted between the cutters as described. A notched disc wheel U is also mounted on the spindle T, with a stop and retaining pawl lever U^1, U^2, coupled by a link U^{11}, and fitted on each opposite side oscillated to and fro by the cam Q and Q^{11} on it acting on the tappet lever U^4, on the same spindle U^5, as the lever U^3 steadied in the bracket U^{1111}, so as to take the first pawl lever U^1 out of its notch u^1 in the disc U, and allow it to turn the first half of the circle as described, and then be stopped for a second or so by the pawl U^2 on the projection u^2, and which on the passing of the tappet Q^{11} releases this pawl, and allows the disc to complete its circle, and the first pawl U^1 to again fall into the notch a^1, and hold the disc U, and knives *t*, t^1, ready for the cutting of the next plate *a*. The cord T^{111} is wound on the barrel T^2 of this cutting mechanism ready for each cutting action as

described, by the motive gearing mechanism D to D^7 while it is working to turn the vertical spindle C^2, and frame C round the whole circle of the baths and chambers by the use of a curved star wheel V mounted on a spindle V carried in the frame of this mechanism, and actuated by one of its wheels D × on the spindle D^3 gearing into a wheel on the spindle V^1 of the star wheel V. This star wheel V works the angled or two armed bellcrank lever V^1, V^{11}, fulcrumed on a stud in the bracket V^{111} bolted to the bottom plate C^7 of the mechanism. The arm V^{11} works one lever V^3 of a double armed spring lever V^3, V^4, fulcrumed on a bracket V^{1111}, and carrying a winding up spring pawl V^5 on the arm V^4, the upper end of which pawl takes on to star pins V^6, on the one side of the cord pulley T^2, as seen particularly in the sectional view fig. 8A, so as to wind up the weight T^{11}, and its cord T^{111}, on to the barrel T^2, all while the main motive gearing D to D^7 and star wheel V are revolving, while turning the spindle C^2, and frame C over the whole of the baths, and coming over the cutting mechanism again. This catch stop disc U has a spring ratchet pawl u + on it, gearing into a ratchet wheel T +, on the one face of the winding barrel T^2, so that this may pull round the disc U and cam T^1, all as hereinbefore described, and yet allow the barrel to be wound up as stated, the pawl V^5 being taken out of action on the pins V^6 by a heel lever V^7, V^8, on the rod U^{11}, when this allows the barrel to turn and cut the plate a as described.

Although for the motive mechanism simple winding-up wire cord barrels have been shown, and described with a single weight and cord, it will be understood that heavier weights and several pulleys, and turns of the band might be used for actuating the several motive and time and the other wheel gearing, or hydraulic power might be used where pressure service pipes were available to actuate the said gearing, or pressure air stored in accumulators within the box. And although the baths and chambers 1 to 8 have been described as being arranged stationary on the circular frame C^7, they might be made to traverse under the reciprocating arm C on said frame C^7 in an equivalent converse manner to that in which the frame C and its spindle C^2 is now made to travel, the frame C in this case being arranged stationary in the position shown in figs. 1 and 2 in line behind the lenses B, so that the same or equivalent mechanism may lower and raise the plate a always in a line behind the lenses, and over the baths as they pass round.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is or may be performed, we have to state that we do not confine ourselves to the precise details herein described and delineated, but what we claim as novel and original is the arrangements and combinations herein set forth and claimed as follows:—

First. The mode, and means, and general arrangement and combination of the parts and mechanical motions of apparatus, or spring and weight, or other motive mechanism and time regulating mechanism within dark close box or case, for taking, developing, producing, and delivering photographs of persons or objects, on depositing a given coin or coins, all automatically and sequentially in a cycle of intermittent time movements round a circle, substantially as and in the manner herein described in reference to and shown in the accompanying drawings.

Second. In an automatic machine for taking and producing photographs, the arranging of the chemical and washing baths, lenses, and drying chambers in divisions round a circular bed; and also the arranging of a frame to carry a plate or card in a circle and be lowered and raised in an intermittent manner automatically actuated by motive gearing and time regulating mechanism, substantially as and in the manner herein described and distinguished in reference to and shown in the accompanying drawings.

Third. In an automatic machine for taking and producing photographs, the arrangement and combination of motive mechanism and time regulating mechanism for bringing the cards in succession to the gripping lever, and reciprocating it, so as to hold and traverse the card sequentially over divided-off chemical and washing baths and drying chambers, and delivering it in a finished state, substantially as and in the manner herein described, in reference to and shown in the accompanying drawings.

Fourth. In an automatic machine for taking and producing photographs, the traversing of the plate or picture on a horizontal circular rotating frame, and lowering and raising it into the baths and drying chambers arranged in the cycle of operations, all sequentially and intermittently, substantially as herein described, in reference to and shown in the accompanying drawings.

Fifth. In an automatic machine for taking and producing photographs, the construction or arrangement and combination of motive and time mechanism for traversing a horizontal circular rotating frame carrying the plate or picture, and lowering and raising the latter into and out of the cycle of baths and drying chambers, all sequentially and intermitteutly, substantially as herein described and distinguished in reference to and shown in the accompanying drawings.

Sixth. In an automatic machine for taking and producing photographs, the transmitting of a shaking or vibratory motion to the plate or picture within the baths and drying chambers as it is carried round, operated by the time regulating mechanism while the plate is in the baths, substantially as and in the manner herein described, in reference to and shown in the accompanying drawings.

Seventh. In an automatic machine for taking and producing photographs, the constructing of a spring gripping and releasing clip and its fittings for carrying the card or picture traversed on the circular rotating frame, and intermittently lowered and raised into the baths and drying chambers and mechanism for opening and closing these baths before and after immersion, substantially as and in the manner herein described, in reference to and shown in the accompanying drawings.

Eighth. In an automatic machine for taking and producing photographs, the herein described arraugement and combination of mechanism for receiving the coins and setting on the gearing by their weight to traverse the plate or picture through the cycle of operations, and deliver it in a finished state, substantially as herein distinguished and illustrated in refereuce to the accompanying drawings.

Ninth. In an automatic machine for taking and producing photographs, the herein described arraugement and combination of mechanism for regulating and supplying the developing and washing baths at the proper intermittent times, substantially as herein distinguished and illustrated in reference to the accompanying drawings.

Tenth. In an automatic machine for taking and producing photographs, the herein described arrangement and combination of appliances and regulating mechanism for drying the plates by means of gas or heated chambers, substantially as and operated in the manner herein illustrated in reference to the accompanying drawings.

Correspondence.

HELIOCHROMY.

Sir,—On page 287 I asked Mr. Ives if he had ever produced a single heliochrome on paper by the process which he calls his own, in which the colours could be mistaken for those of nature; and if so, on which of the thirteen pages of his five shilling book a description of the method of production might be found. He does not answer me, but confines himself to the endeavour (which I apprehend is vain) to show that one of my statements in connection with quite another matter (phosphorescence and photography) is "absolutely false" (p. 351).

So far as I have seen, I have only twice been honoured by the notice of Mr. Ives, and in these notices (pp. 269 and 351) he has managed to give me the lie circumstantial twice, and twice the lie direct. In doing this, I would point out to him that he has travelled materially beyond the line which marks the boundary of the privileges of polemics, and that both the imputations and the charges of falsehood which he makes against me ought to be withdrawn.

On page No. 8 of his somewhat scanty work, Mr. Ives makes this remark: "Prints properly made in these colours—blue from the negative representing the red colour sensation, red from the negative representing the green colour sensation, and yellow from the negative representing the blue colour sensation—when superimposed on a white surface show the light and shade and colours of the object photographed almost as perfectly as the triple lan-

tern projections. It is possible that I fail to grasp the meaning of Mr. Ives, but if I don't so fail, I would remark that the results obtained in such a way as this can only be a fantastic libel on the colours of the object it is intended to represent. Suppose, for instance, our subject to be a cross of red upon a ground of black, and this alone. The negative, however taken—if anything at all is got—will be a cross in precipitated silver on a theoretically clear glass ground; and a print from this in blue will give us a ground of blue (not black) with a cross of lighter blue or white (but not of red) thereon. If, however, we make a transparency from this negative—*i.e.*, a picture with a ground of precipitated silver and a clear glass cross—and print in pigment red on paper which is black (the process of Winstanley, and not of Ives) the truthful representation which we seek will be obtained.—Your obedient servant,

David Winstanley.

Harpurhey, near Manchester, May 27th, 1889.

THE LONDON CHAMBER OF COMMERCE AND THE METRIC SYSTEM.

Sir,—With reference to your notice in the News of the 24th inst., of the recommendation by the sub-committee of the Photographic Club to adopt the metric decimal system of weights and measures, it may be interesting to your readers to know that an influential committee of the London Chamber of Commerce has been formed for some time past to deal with this important subject, with a view to obtain legislative sanction to the adoption of the system generally. This would effectually answer your objection to the two systems being worked side by side. The photographic section of the London Chamber of Commerce (which is now being formed) by passing a resolution on this question would considerably strengthen the hands of the Decimal System Committee, and I would urge those who have not yet joined the photo. section to do so without delay, in order that it may be properly constituted and get to work.—I am yours obediently,

Thos. R. Dallmeyer.

25, *Newman Street, London, May* 25th, 1889.

Proceedings of Societies.

Photographic Society of Great Britain.

The monthly technical meeting of this Society was held at the Rooms, Pall Mall East, on Tuesday evening last, the 28th inst., Mr. W. E. Debenham in the chair.

Specimens of a print mounted in optical contact with a bevelled edge glass called opaline, and of a cloud negative on a flexible transparent material, were handed round for the inspection of the members.

The Hon. Secretary, Capt. Mantell, showed a negative, which alone of a certain batch had come up very slowly in development, and was weak and somewhat fogged, and asked for suggestions as to the cause of these peculiarities.

It was suggested that there had been some omission, or an unobserved alteration in the constitution of the developer, and that the fogging was probably due to the prolonged exposure to the light of the dark-room window during an unusually protracted development.

Mr. A. Cowan said that complaints had been sometimes raised of a yellow staining of the film when developed with hydrokinone, whilst at other times no such colouration was noticeable. He had endeavoured to discover the reason for this diversity of behaviour, and had, he thought, found at least one cause for the yellowing of the film. He produced three transpareucies printed from one negative, a portion of which was sufficiently opaque to protect the emulsion from any action of light. One of these transparencies was developed without any restraining bromide, and showed no stain. A second transparency, which had been developed with the addition of one-eighth of a grain of bromide of potassium to the ounce, was also clear in the unlighted part; whilst a third, which had been restrained by a like quantity of bromide of ammonium, showed the yellow stain that had been referred to. To the liberation then of free ammonia by the alkali, potassium hydrate, used in the developer, he attributed the yellow stain shown.

Mr. Leon Warnerke enquired whether the yellow stain once formed could be destroyed.

Mr. Cowan replied that he had not succeeded in doing so.

Mr. Arnold Spiller suggested the use of ferrous sulphate, alum, and citric acid, for the purpose.

Mr. Cowan had tried perchloride of iron without effect, and further remarked that in a catalogue lying on the table, ammonium bromide was recommended for use as the restrainer with hydrokinone.

On it being remarked that there was no necessity to use any restraining bromide with hydrokinone,

Mr. Cowan replied that more vigour could be obtained when using it, and this was sometimes desirable.

Mr. Chapman Jones did not like hydrokinone; his experience was that such clean pictures were not obtained with it as with pyro.

The Chairman remarked upon the great clearness of the protected part of the plate, and enquired whether it was of a special manufacture for transparency work. On being informed that it was an ordinary plate, he asked whether as clear shadows would have been obtained upon it with pyro.

Mr. Cowan replied that the difference was so slight that practically it might be ignored. Hydrokinone was, he considered, better than pyro for developing transparencies, and for negatives when these were intended for printing upon chloride plates. If there was a trace of yellowness in the image, the details could not be obtained upon chloride plates.

A discussion then ensued upon celluloid plates, and Mr. Warnerke stated that one make of commercial plates coated upon celluloid, that he had tried, had been very irregularly coated. He did not himself find any difficulty in coating upon celluloid, and the method he adopted was to press the celluloid plate on to a glass plate that had been previously made sticky by a coating of a mixture of india-rubber and gum elemi. He, had experimented with coating upon cellulloid some years ago but as then manufactured, the surface of the material was not smooth enough for the purpose, and the agent of the company informed him that they could not make it fine enough to suit him.

Capt. Mantell showed a silver print on albumen paper that had been toned with platinum, the solution used being that sent out by the Platinotype Company for the cold development process. The tone was agreeable and satisfactory, but the whites were yellowed. He had not been able to prevent this. Could any member say how this yellowing could be prevented?

In reply to a suggestion for acidifying the solution, Mr. Arnold Spiller said that when acidified, the platinum was not deposited by what was known as toning action, but by substitution, and the tone of the prints was then weak and grey and slaty.

Mr. Cowan had tried the solution mentioned by Captain Mantell for toning, which, however, he had diluted with three parts of water. He had found the same result in the yellowness of the lights that Captain Mantell complained of. The toning was of a superficial and not substitutionary character, as when the print was afterwards treated with a solution of bichloride of mercury it almost disappeared.

Captain Mantell inquired what was the most satisfactory method of changing the colour of a blue print, such as those produced by the ferro-prussiate process. He had once or twice had to photograph such a print, and it was not easy to do it, the blue not affording contrast enough with the white. He had not used orthochromatic plates, and, indeed, preferred wet collodion, as the negative was required for photo-mechanical work. He had tried several published formulæ, but without much success. When silver followed by ferrous oxalate was used, the change of colour from blue to black was satisfactory, but the whites became stained.

Mr. Warnerke suggested the employment of a gallic acid solution followed by alkali.

Capt. Mantell had tried ammonia first and gallic acid afterwards.

Mr. Arnold Spiller suggested the use of an alum solution after the treatment with nitrate of silver, and before the application of the ferrous oxalate. He always used alum after cyanide of silver when the latter was used for intensifying purposes, otherwise the plate became stained with some silver that he was not able to remove.

Mr. Friese Greene proposed soaking the blue print in a solution of bichromate of potash, when the colour was changed to green, and it could be photographed very well.

The subject of orthochromatic photography having been introduced, Mr. Warnerke said that he had found that he obtained all that he required by the use of coloured illumination. He preferred to use artificial light screened by an orange glass, and had a magnesium lamp, made in Berlin, that was very convenient for the purpose. There was an arrangement in it for breaking off the burned magnesium ash at about every inch. At every break there was an audible click, so that, by counting the clicks, he knew the amount of magnesium burned, and this regulated the exposure. For copying, he exposed first with the lamp on one side of the original, and then for an equal time on the other side. By this means surface irregularities were so equally lighted as not to show in the negative. He had thus copied a print which had been received folded with a crease in the middle, but the crease did not show on the plate. He would bring the lamp to the next technical meeting for the members to see. It was also convenient, when covered with ground glass, for making enlargements upon bromide paper.

Mr. A. Spiller enquired whether the report of the committee to investigate the action of electrical current in producing an image that had been brought before the Society by Mr. Friese Greene was ready.

Mr. Greene said that he had been waiting for Mr. Sebastian Davis to call upon him, but he had not yet done so.

Mr. Chapman Jones said that if an unexposed plate was put into the developer and kept there until just short of fogging, it would be found that there would be blackish spots at the back of the film, not visible from the front. This he attributed to particles of extra-sensitive bromide that had settled down before the emulsion had set. Some makes of plates showed the effect very strongly, and could be distinguished from other makes by this means.

The Chairman did not consider that these coarse particles were necessarily more sensitive to light, but only more readily developed without light action.

The meeting then adjourned.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 23rd inst., Mr. A. Haddon in the chair.

The Hon. Secretary read a letter from the Photographic Club on the subject of the adoption in the future of the metric system of weights and measure.

The Chairman said it was beyond dispute that the system would ultimately be adopted. He suggested that in all formulæ the term parts should be used in preference to drams and ounces. Several members spoke in favour of the adoption of the metric system, and a proposition put to the meeting to this effect was carried.

Mr. W. H. Prestwich showed a plan he had devised for ensuring accuracy of register when a reverse image was taken in the camera. The plate is inserted at the front of the dark slide, and held by the pressure of two strings at the top and bottom of the rebate.

Mr. A. Pringle showed a lens mount to which was attached an iris diaphram, a small spring catch indicating the openings corresponding to the stops ordinarily used. Mr. Pringle observed that the index of the size of the opening of the diaphragm was usually placed on the top of the lens mount—a position which rendered it difficult to be read, more especially if the camera was fixed higher on a level with the sight of the operator. The mount exhibited also had an additional diaphragm slit for using with coloured films; this was inserted between the lenses in the ordinary way.

Mr. Valentine Blanchard, in proceeding to demonstrate his process of platinum toning, remarked upon the growing taste for matt surface pictures. It was another instance of history repeating itself. Fox-Talbot fifty years ago produced pictures on matt surface paper. Highly glazed albumenised prints then became the rage, until the platinotype process introduced by Mr. Willis gradually educated the taste for the artistic tone and matt surface of the platinotype print. It would be admitted, however, that platinotype printing had its difficulties arising from the uncertainty of not being able to tell exactly when to stop printing, and in consequence, unless some considerable amount of experience was brought to bear, a certain percentage of waste was inevitable. Printing the image out was a great advantage, as it could be watched until the desired depth was obtained. Shading parts of the image during printing, and many other little dodges, could also be resorted to. Another advantage claimed by Mr. Blanchard for his process was, that no special negatives were required.

Some untoned prints were passed round. These were of a dull red colour. After a preliminary soaking in plain water, the prints were transferred to the toning bath.

Mr. Blanchard said it was important that a little free silver should always be left in the prints. The toning bath containing the prints was then held over a spirit lamp. It was explained that heat was not necessary. Its application, however, facilitated toning. The required tone being reached, the prints were placed without washing in the fixing bath, consisting of one part of hypo to six parts of water.

In answer to several questions, Mr. Blanchard said the paper used in this process was rather more sensitive than ordinary albumenised paper. The toning solution would keep indefinitely, and after using could be returned and strengthened as required. A strong deposit of black sediment indicated that the toning solution was quite spent and useless. By arresting the toning at certain stages, various degrees of warmth of colour were obtainable; the colour of the print was not altered in the fixing. A print had been purposely left in the hypo bath for a long time without in any way altering the image.

Mr. Blanchard said he had been experimenting with rough paper, to which he gave a preference over the smooth paper; his experiments, however, were not yet complete in this direction.

The Chairman said the fact of two metals being in a paper favoured electrical action; with platinotype paper, only one metal being present, the paper was the more likely to be permanent. Previous to coming to the meeting he had placed a portion of a platinotype print in a bottle of chlorine water. This was passed round for inspection; it showed no alteration of any kind.

Mr. Haddon said he intended to repeat this experiment with a piece of the toned paper.

Mr. H. Starnes said several tests he had applied to platinotype prints, although resulting in no alteration of the image, turned the paper yellow.

Mr. J. Traill Taylor said some time ago it was given out that carbon prints were fading; investigation, however, proved that it was the paper turning colour, and not the image.

Mr. V. Blanchard said many preferred a toned paper; to impart this appearance, a few drops of coffee should be added to the last water the prints were washed in.

Mr. A. Cowan asked whether, in fixing the focus of a lens, it had been found in practice best to fix the focus at its longest or shortest focus.

Mr. J. Traill Taylor advised fixing it for distance; there would be comparatively less loss of definition in the foreground, than would result to the distance if the lens was fixed at its shortest focus.

East Dulwich and Peckham Photographic Society.

At a meeting held on May 17, at 76, Peckham Rye, Mr. L. Warnerke in the chair,

Mr. Newman attended and described his shutter, and also a new hand camera which he is bringing out.

Mr. Warnerke showed prints from the negatives taken by him (by means of the flash light) of the members of the Society at their last meeting. The negatives taken by him on plates of his own preparation were evidently over-exposed, while the one on Fry's film was a trifle under-exposed. This was a very severe test, as the duration of the flash was only a fractional part of a second.

Ten gentlemen were elected members of the Society.

The next meeting will be held on Friday, June 7th, at 8 p.m., at which Mr. F. W. Edwards will give a demonstration of platinotype printing.

North London Photographic Society.

At the meeting on May 21st, Mr. A. Mackie in the chair, the Hon. Secretary read a communication from the Photographic Club, recommending the adoption of the metric decimal system of weights and measures.

The Chairman opened the discussion, stating that the decimal system had every advantage over the present method; it is

quite simple, and there would be no more confusion between troy and avoirdupois weights, as at present, the grain being the only weight common to both. The Chairman showed a negative developed with hydroquinone, in which, after several trials, he had obtained all the good qualities of pyro, without any stain. The following is the formula in the decimal system :—

Hydroquinone	20 grammes
Sulphite of soda	15 „
Meta-bisulphite of potash	5 „
Methylated spirit	60 cubic centimetres
Water to make 140 c.c.	
Caustic potash	20 grammes
Bromide of potash...	1 gramme
Water to make 200 c.c.	

For use, take 1 c.c. of each to 25 c.c. of water.

On Saturday, June 1st, there will be an excursion to Waltham Cross ; first train after 2 p.m. from Liverpool Street. The next meeting will be on June 4th, when Mr. Valentine Blanchard will demonstrate his new printing process.

Leeds Photographic Society.

An ordinary monthly meeting of the Society was held in the library of the Philosophical Hall, on Wednesday evening, April 10th, Mr. Thomas Dawson, Vice-President, in the chair.

Mr. C. H. Bothamley, F.I.C., gave a lecture on "The Chemical Effects of Light." He said the ancients were well acquainted with the fact that many substances undergo change when exposed to air and light, but they failed to attribute these changes to their true cause, and it is only in comparatively recent times that accurate knowledge respecting the nature and cause of these phenomena has been obtained. A certain amount of difficulty and confusion arises from the common use of the word "light," to denote in the first place a sensation which has no existence as such apart from ourselves, and in the second place, the cause of that sensation, as for example when we speak of a "ray of light." The action of a prism shows that a beam of ordinary white light is composed of rays which produce very different colour sensations, and differ also in their refrangibility or the extent to which they are bent out of their original course by the prism. When a beam of white light is passed through a prism and allowed to fall on a screen, we get what is known as a spectrum, a coloured band in which red, orange, yellow, green, blue, and violet pass gradually into one another in this order, the red rays being the least refrangible, and the violet rays the most refrangible. There are also invisible rays less refrangible than the red rays, and known as the infra-red rays ; and others more refrangible than the violet, and known as the ultra-violet rays. When the spectrum is examined it is easily seen that the yellow seems brightest to the eye, green and orange less bright, and red, blue, and violet comparatively dark ; if a thermometer with a blackened bulb is moved along the spectrum it is found that the heating effect is almost inappreciable in the violet, gradually increases towards the red, attains a maximum in the invisible rays beyond the red, and then rapidly decreases ; if a piece of paper coated with silver chloride is exposed to the spectrum it is found that the maximum effect is exerted by the violet and the invisible rays beyond the violet, whilst no appreciable effect is produced by the yellow, orange, and red. It is evident that the maximum effect on the eye, the blackened thermometer, and the silver chloride respectively, is produced in very different parts of the spectrum, and hence it was at first supposed that the luminous, heating, and chemical effects produced by a beam of light are due to entirely different kinds of rays which were spoken of as light rays, heat rays, and actinic rays. It is now known that this supposition is erroneous. Any ray in the spectrum produces a heating effect when it falls upon lamp-black or any similar substance, and chemical effects are not due solely to violet and ultra-violet rays, but may be produced by any rays if they fall upon suitable substances. The decomposition of carbonic acid in the leaves of plants takes place mainly under the influence of orange red rays ; the bleaching of cyanin is effected chiefly by orange rays ; a gelatino-bromide plate prepared with ammoniacal erythrosin is more strongly affected by the greenish yellow rays than by any other part of the spectrum, and many other examples might be mentioned. The effect which any given ray produces depends not so much on the ray, as upon the nature of the substance on which the ray impinges, and one and the same ray may produce luminous, heating, and chemical effects. It is a well-established and fundamental principle that a substance can only be affected by those rays which it absorbs. For example, a mixture of gelatine and potassium bichromate is acted upon by the rays which the bichromate absorbs, and is therefore not affected by light which has previously passed through a solution of the bichromate ; for the same reason a mixture of ferric chloride and alcohol is not affected by rays which have previously passed through a solution of ferric chloride. Several other instances were given. Light is a sensation which has no existence, as such, apart from ourselves, and what we commonly speak of as a beam of light is really motion which originates in the moving particles or molecules of luminous bodies, and is transmitted through space by the luminiferous ether in the form of undulations or waves, much in the same way as a shake travels along a chain or a rope. These undulations or waves differ in length and also in their time of vibration, the latter being inversely proportional to the former. Matter, in all its forms, is composed of very minute particles termed *molecules*, and these are composed of still smaller elementary particles termed *atoms*. Both the molecules and the atoms of which they consist are in a constant state of vibration, and when a ray of any kind is absorbed by the molecules its motion is communicated to them, and they are thus thrown into more energetic vibration. Whether the molecules of any particular substance will or will not absorb a particular ray depends upon whether the time of vibration of the molecules is in unison with the time of vibration of the ray, just as a tuning fork or a piano string will take up the vibrations communicated to the air by another tuning fork or string with which it is in unison. The exact nature of the effect produced depends upon the nature of the substance and the intensity of the ray. If the quantity of motion communicated to the molecules of the substance is merely sufficient to increase their motion, the result is a development of heat ; but if the molecules, and consequently the atoms which they contain, are thrown into very energetic vibration, the motion of the atoms may become so violent that the chemical attraction which usually holds them together is no longer able to do so, and they fly apart from one another ; or, in other words, chemical decomposition takes place. In many cases the impact of light rays is not sufficient of itself to decompose a compound, but if some other substance is present which has a chemical attraction for one of the constituents of the compound, and thus assists the action of light, then decomposition takes place. For example, silver iodide when pure is not decomposed on exposure to light, but if mixed with silver nitrate, which has a chemical attraction for the iodine, decomposition takes place, and the yellow silver iodide becomes nearly black.

The next meeting of the Society will be held on Wednesday evening, the 29th inst., in the Library of the Philosophical Hall, at 7.30 p.m. The meeting will be a conversational one, with exhibition of prints, &c., and the question of holding a Photographic Exhibition in connection with the Exhibition of Artists' Works, to be held in the Municipal Fine Art Galleries in September, will be discussed, with a view of obtaining an expression of the members' opinion thereon.

Capt. Plummer's Paper on "Stereoscopic Photography" is postponed to a future date.

Hackney Photographic Society.

The first ordinary meeting of this Society was held on Thursday last at the Morley Hall, under the presidency of Mr. J. Hubert, when a very interesting paper was read by Mr. E. J. Wall (author of "The Dictionary of Photography") on "Defects in Negatives." He explained coatings and emulsions used in the manufacture of the different plates. Drs. Kibbler, Roland Smith, and others took part in the discussion that followed. Some prints and home-made lenses (made by Mr. Wall) were shown, and twenty-one new members proposed.

Mr. Hubert gives a paper on "Platinotype," with demonstration, on the 13th prox.

Communications to be sent to Mr. Fenton Jones, hon. sec., 1, King Edward Road, N.E.

Birmingham Photographic Society.

The ordinary meeting of the above was held at the Club Rooms, Colmore Row, on Thursday, the 23rd inst., Mr. B. Karleese V.P., in the chair.

A letter was read from the hon. secretary of the Photographic Club relating to the adoption of the metric system of weights and measures in photography. This was referred to the council for discussion.

Dr. W. W. Nichol was elected a member.

Excursions were announced for (half days) June 15, Berkowell, June 29, Warwick; (whole day) June 10, Shakespearian Villages.

Mr. C. T. Cox then gave his paper on "Composition." In the course of his remarks he dealt minutely with the nine laws of composition, viz., principality, repetition, curvature, radiation, contrast, interchange, continuity, consistency, and harmony, explaining and illustrating each law with large drawings, showing how the amateur photographer should remember and try to utilise these laws when taking landscapes; and afterwards detailed the different kinds of clouds, and cautioned the members when using separate sky negatives to be careful in choosing the sky most suitable to the time and weather when the picture was taken, especially in the case where shadows were seen. His illustrations of cloud pictures were effectively shown, and altogether the paper was very instructive and interesting, and was listened to with marked attention.

The CHAIRMAN said he regretted that a much larger number of members were not present, as he was sure those who were absent had missed a great treat. He himself would certainly put into practice, when photographing in the field, &c., many of the useful hints Mr. Cox had given them.

SHAFTESBURY PHOTOGRAPHIC SOCIAL.

A MEETING was held last Friday, Mr. BAKER in the chair.

After the minutes were read, some views were passed round which were taken by the members.

Mr. BURTON showed a shutter of his own idea, which acted behind the lens.

Mr. WHITCOMBE passed round a print, negative, and a transparency, all taken by flashlight.

Mr. TOLLETT then spoke a few words on flashlight photography in further elucidation of his remarks of last week.

After a few remarks passed, a vote of thanks was given to the chairman and speakers. Next Friday will be the usual monthly social at 8. Visitors are invited.

Talk in the Studio.

THE CENTENARY EXHIBITION AT PARIS—CONFERENCES ALL ROUND.—The *Standard*, in its issue of last Wednesday says:—"An extraordinary series of conferences has just been announced in connection with the Paris Exhibition. No speciality, no crotchet even, seems to have been overlooked. The architects and the men of letters will have an equal opportunity of ventilating their views, or of taking the world into the secret of their grievances. Agriculture, cheap dwellings, breadmaking, and the bibliography of the exact sciences afford a varied programme for the most diverse of tastes, to say nothing of artistic copyright, alcoholism, the conveyance of land, prehistoric man, and the advisability of the State intervening in the payment of wages. If the well-worn theme of technical education fails to afford a very satisfying meal, there are workmen's clubs, workmen's share in profits, co-operation, labour accidents, and the vices of joint stock companies for the visitor with a hankering after socialistic ideals. The more practical-minded are invited to go into session over chemistry, ballooning, pigeons, shorthand, primary education, fire brigades, 'money,' and the sufficiently expansive subjects of commerce and industry. Hydrology, river utilisation, meteorology, electricity, horticulture, building, photography, and chronometry will follow, and will in their turn be succeeded by the relief of the poor, higher education, criminal anthropology, and primary schools."

PHOTOGRAPHIC CLUB.—The subject for discussion on June 5th will be "Films." Saturday outing at Pinner. Bank Holiday outing at Aylesford, Kent. Trains from London Bridge, Cannon Street, and Charing Cross.

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," (but not letters intended for insertion under the heading "Correspondence") should now be sent to Mr. Spiller, who is alone responsible for all which appears under the heading "Answers to Correspondents." Such communications, if now sent to the Editor, are forwarded by him to Mr. Spiller. Failure to attend to the above instructions may lead to disappointment.

Answers to Correspondents.

This column is now under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, is placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

E. F.—The references to the Woodburytype, six descriptive articles in the NEWS, are September 14th and November 16th, 1883, and March 21st, April 4th, and 10th, and May 2nd, 1884. Two articles on the Stannotype also appeared in March 21st and 28th, 1884. Replied by post on the general question.

M. CAPPELLI.—From your second letter we gather that the imperfections only make themselves apparent in the *cold* emulsifying process. May they not be due, therefore, to working at too low a temperature, or with an insufficiency of gelatine? We presume the silver was not added too quickly, and that the agitation was properly maintained at the time of mixing.

C. M. (Brighton).—The difficulties of your particular case were discussed and philosophically treated of in a critical article by Mr. A. Mallock, which will be found reprinted in the *Journal of the Photographic Society*, of February 23rd, 1887, pages 81 to 84. Extreme rapidity in an instantaneous shutter, such as you require, is very liable to set up vibration; probably Messrs. Sands and Hunter's improved model, which works between the lenses, would be one of the most suitable. Or would Mr. Wollaston's shutter, figured in the NEWS of May 7th, 1886, do your work? It is said to be adjustable to exposures of one-hundredth part of a second.

PHOTARGUS.—Yes, Schlippe's salt ought, by the change of colour, to satisfy Mr. Cadett's special requirement. We cannot suggest any reason for his not adopting it, since the colour is permanent. But mercury intensification, with ammonia, was found to answer very well at Woolwich for line subjects and photo-lithography.

SŒHNEE.—The orange shellac is preferred for varnish-making, because of its greater solubility in alcohol, and the fact that in its application it is not liable to chill. Powdered white lac (bleached shellac) if digested in cold spirit is only partially soluble, but the decanted clear solution gives a superior film to that furnished by a varnish made by dissolving up the residual portion in hot spirit. Mr. England proposed many years ago to select and use only the cold spirit extract in this way, but even then he prefers to warm the plate before applying this varnish, and dry it off at a gentle heat. We cannot tell you where to get the old Sœhnée varnish, which was formerly made by MM. Alexis Gaudin and Frère, 9, Rue de la Perle, Paris.

F. C. S.—We agree with you in appreciating the importance of Mr. Crookes's recent address as President of the Chemical Society. The May issue of the *Journ. Chem. Soc.*, with its numerous illustrations of the spectra of the so-called rare earths, will be read with interest by all who wish to follow the latest results of spectroscopic investigation.

CHLORIDE.—Quite true; at page 67 of Professor Meldola's work on the "Chemistry of Photography," you will find the lecture demonstration of the blackening of cuprous chloride by exposure to light. In less than five minutes the white chloride turned quite dark on that side of the cylinder which was presented to the electric beam.

H. A. L.—Water glass (silicate of potash) can be had of Messrs. Rumney and Co., Ardwick Chemical Works, Manchester; and syrupy silicate of soda from Messrs. W. Gossage and Sons, of Widnes.

G. W. S.—Aurine cake is freely soluble in spirit, and with the addition of a little gum shellac, makes an excellent non-actinic varnish. With it you might succeed in touching in the high lights; but why depart from the usual practice of using a lead pencil, soft or hard, according to circumstances? For broader surfaces or under-exposed parts its use might be advantageous.

BOSTONIAN.—Take one ounce of solid carbonate of ammonia to the pound of hypo crystals. If you notice any separation of carbonate of lime from the hard water, allow this to deposit, or filter the solution. The use of carbonate of ammonia in the fixing bath does undoubtedly, we think, give advantages in securing perfect fixation, and in preventing acidity and decomposition of the hypo bath. Washing with salt and water is not necessary; but it is wise to wash the prints well, or even immerse them in a weak alkaline bath before toning.

P. M. (Devon).—The evidence in favour of ground glass for preventing halation appears to be very conclusive; see last week's NEWS, page 352. As a substitute, try coating the back of your plates with a matt varnish.

PISCATOR.—The fishing-basket equipment for holding camera and slides is an old and highly approved expedient. One must be prepared to run the gauntlet of friendly enquiries as to the success of the day's sport, and a few blades of grass will help to satisfy the curiosity of country admirers. To be consistent, the legs should be carried in a canvas case.

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THE PHOTOGRAPHIC NEWS.

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THE LONG DAYS.

THE summer days which have been looked and longed for, and which are now upon us, not only facilitate photographic operations generally, but afford an opportunity for doing work of some particular kinds, that either could not be done at all at any other season of the year, or that if done, could not be done so well under other conditions of light than those which now prevail. It is desirable, then, to review the particular cases which require for their most satisfactory treatment the light which is only available for a short period of the year, before that period has passed by, and left the photographer the alternative of working under conditions when the best result cannot be obtained, or of deferring his operations till another year.

One case of photographic work that can be best performed when the days are longest, is that of reproducing scenes in which certain objects are well illuminated only when the sun is at its greatest altitude. Such scenes occur in towns when buildings that are much surrounded, or, perhaps, face into narrow courtyards or squares, will—unless the sun is at its highest in the heavens—show the lower part in shadow, however brightly the sun may be shining upon the upper, or perhaps the greater, part of the edifice. The general tendency being to have insufficient exposure of the foreground and lower part of a building, compared with that exercised by the upper part of the erection, this tendency will obviously be greatly exaggerated when the sun is shining upon the last-mentioned portions, whilst the lower parts lie in the shadow of some adjacent building. On the other hand, the effect of direct sunshine when the luminary is high enough in the sky for it to shine on the base of the building, will go far to neutralise the difference of illumination due to the top and bottom of the edifice receiving such different amounts of light diffused from the expanse of sky. Other subjects than mural ones—such as deep valleys, and crevasses in rocks—will suggest themselves as only to be photographed with anything like equal illumination at the present period of the year.

Another and perhaps more frequently occurring set of cases, in which the light of the long days is necessary for obtaining a desired effect, is when objects having a northern aspect are to be reproduced in the camera, with the effect of sunshine upon them. In towns many buildings are thus situated, and when, as now, the sun is above the horizon for sixteen hours out of the twenty-four, and traverses such a wide circle in the sky, it becomes practicable as it can be at no other time, to photograph such objects, lighted either from the north-east or north-west, as the conditions of the subject will suggest as being best suited for it. Here again the special benefit for particular cases, of the light of the long days, is not limited to buildings in towns, or indeed to buildings at all, but many a scene of natural grandeur or beauty will occur to the landscape photographer as calling for as northerly an aspect of the sun as can be obtained, in order to achieve the most satisfactory result.

A celebrated grotto near Naples is stated by the guides to be only lighted thoroughly, so as to be properly photographed, on one day in the whole of the twelvemonth. Allowing for some exaggeration in limiting so closely the possibilities of illumination, the opportunity afforded is doubtless a very short one.

There is another and special advantage to dwellers in towns, particularly in such a smoky city as London, in the ability to work with sufficient light before the morning fires of thousands of households have contaminated the air with their volumes of smoke. Those who are not habitually early risers, but who for some particular occasion have to be up and out in the early morning of a fine day in summer, do not fail to be struck with the clearness of the air at such a time, and the distinctness with which familiar edifices are then seen, bestows a beauty and a charm upon them, which remain long fixed in the memory of the beholder. Many a photographer doubtless has been struck by this clearness and beauty of some town objects when seen in the early morning of summer time, and has resolved to secure a representation by the camera, some time or other, of the objects which have thus excited his admiration; but has allowed the opportunity to slip by, until the short space of time in which the season would favour his work has passed away, and then it is either forgotten or put off until another year, when, unless something occurs to remind him of it, it runs the risk of meeting with similar neglect until too late. It is very much with the view of supplying the necessary reminder while the opportunity is still before us, that these lines have been penned.

Other photographic work there is, that is better performed in the long days and bright light of summer: negatives of exceptional density that will not print in a reasonable time at any other period, and work requiring a powerful light or lengthened exposure, such as some of the less sensitive photographic processes; but these will suggest themselves, and do not require to be particularised here.

THE CENTENARY EXHIBITION AT PARIS.

BY OUR SPECIAL COMMISSIONER.

THE BRITISH PHOTOGRAPHS—(*continued*).

Mr. J. BURNSIDE sends a number of large photographs all printed in platinum. They are all pictures of girls or children, and titles are placed upon some of them, presumably to indicate that they are intended rather as

subject pictures than as portrait studies. One of these pictures, called "The Soothsayer," represents two girls, one of whom is supposed to be practising divination with the aid of a pack of cards. Another is a picture of a child holding a slate, upon which is an infantile delineation of what is meant for the human form, and the words "That's You," given as a title to the picture, are supposed to be the juvenile artist's description of her work. The pose and expression of the sitter's face do not appear to be particularly happy and appropriate, and the writer remembers to have seen a subject with the same title and illustrating the same ideas, at one of the Exhibitions of the Photographic Society of Great Britain (the one held in 1885, if he remember rightly) which was much better in this respect. Nevertheless, there is a good deal of sound, conscientious work in Mr. Burnside's exhibits, and they will not be likely to be overlooked.

Mr. J. P. Gibson, of Hexham, Northumberland, sends "Landscape Photographs of Northumbrian River Scenery." The photographs in this charming collection are very artistic renderings. The landscapes are enlivened by a few natural-looking figures of a small size; not large enough to be obtrusive, or to suggest that something of a subject picture is intended. They form, indeed, an exposition—and a very sound exposition—of what may be called one school of landscape photography.

West and Son, of Southsea, send a collection of photographs of a kind in which they have established for themselves a speciality: "Instantaneous Photographs of Vessels in Full Sail." In this collection, as in that of Mr. Frith, the truthfulness and beauty only obtainable by freedom from halation are very evident. The spars and rigging stand out clear against the sky, and contrast in this respect with some examples of marine photography that have been shown at our own exhibitions, in which, owing partly to halation, and partly to double printing of the sky, the upper gear has been represented as if somewhat lost in a fog or cloud of smoke. The clouds in this set of pictures appear generally to be natural, and photographed at the same time as the vessels. There is, however, one in which there is such a long straight line, that although it may have occurred, it rather suggests to the photographer, who is so accustomed to see double printing used, that in this case that artifice has been resorted to.

We now come to perhaps the most imposing and attractive of the photographic exhibits—that of Mr. J. Lafayette, of Dublin. The first to catch the eye in this display will probably be two coloured photographs – one of the Queen, and the other of Mrs. Wellesly Bernard and daughter, a picture of a lady with a child leaning over her shoulder. The colouring of both is good; that of the group struck the writer as being the best coloured photograph in the exhibition; it is rich, without being gaudy or tricky, and is delicate at the same time. These pictures are described as "permanent carbon photographs painted in water-colour on porcelain." The word porcelain must probably be taken in the photographer's sense, and would be more truly substituted by the expression opal glass. Going round the stand, we come to a portrait of the Princess of Wales, which, although a showy picture, is hardly equal to the others in the same case. The shadows round the eyes are rather too harsh for a representation of flesh. Next comes a very large portrait (for a direct one, which these all appear to be) of a lady on a plate about twenty-eight inches long. The lady is habited in a Grecian dress, and stands by a fountain on the edge of which is a bird, whilst another is perched upon her finger. The picture is rich in effect, and the definition is very equal throughout. There is a certain amount of "loudness" in some of the accessories which to the fastidious eye rather detracts from the beauty of what is certainly a remarkable production of the camera. A portrait of Lady Brooke is a very fine specimen of photography. There is beautiful modelling in the light dress, body, and skirt, a point in which photography has so often been found deficient, especially when large direct camera exposures are in question. Another picture of the same size is entitled a portrait study, and represents a little girl looking at a painting. This, again, is a rich and attractive picture, but somewhat too loud in the accessory background to be quite satisfactory. Next comes "The Young Idea," a picture representing two children with a bowl of fish, into which one has dropped a line, whilst the other looks on. "Baby Bernard," a portrait of a child standing by a glass screen, is a picture well known in England, having secured a medal some years since at the Exhibition of the Photographic Society of Great Britain. We now come to a picture with which it would be difficult to find fault—that of the Marchioness of Londonderry. It is rich, and at the same time soft and delicate. The half-tones in the light parts, the feather-fan and embroidery, are remarkably well rendered, and the background is a plain one, thereby rendering the picture agreeable to those who, whilst admiring the technical excellence of Mr. Lafayette's exhibits, are yet a little offended with the showiness of some of the backgrounds and accessories. The portrait, still of the same large size, of the Duchess of Leinster, is in many respects a magnificent production. The pose is graceful and good, and the flesh is rendered as flesh; the folds of the drapery are rich and effective. The lighting is in what is known as the Rembrandt style, and the background is, in some respects, like those adopted by portrait painters of a former generation, with folds of curtain overhead, and a pillar at the side. There is, however, a certain artificiality given to the picture by the introduction of some grapes and vine leaves on the column. This vegetation does not appear to have existed in the background originally, but to have been touched in upon the plate, with the result that as only lights and not shadows have been thus added, the fruit and foliage look semi-transparent, as though made of frosted glass. Next comes a portrait of the Prince of Wales, and then follows a "portrait of a lady in Venetian dress." The subject stands with her back to the observer, and her right hand is raised and resting upon something in the background. Behind the figure a mandoline is lying on a chair, whilst in front of her is an ornamental carved support or truss. The loudness of this accessory is the disfigurement of the picture, which is, in some respects very fine. Mr. Lafayette's exhibits are altogether amongst the most attractive in the gallery. The photography is generally excellent, and the poses original and vigorous. The tendency to showiness that is observable, particularly in the backgrounds, of most of them, is what will please some tastes, and rather offend others. That it is not a necessary concomitant of his work is evidenced by those pictures in which a plainer background is used.

RATIONAL DEVELOPMENT.

BY C. BRANGWIN BARNES.

IT is generally looked upon, now-a-days, as a very easy thing to develop a dry gelatine plate by means of the pyro-ammonia developer, made up according to this formula or that; but, as a matter of fact, there is a very great dissimilarity between the results as obtained by different persons, even when using a developer containing exactly the same proportions of each chemical required to make up the whole. In other words, there are two methods of development, which, for want of better terms, we will call the ordinary and the rational. The ordinary mode consists in making up solutions according to a given formula—that is to say, given either by the manufacturer of a special brand of plates, or by some particular writer on the subject; secondly, in mixing the solutions in the exact proportions given in the same formula; and thirdly, in using the same developer to negatives of different subjects and taken under different circumstances. Nearly all developers for which the formulæ are published err in one

notable respect: they recommend the mixture of the ammonia and the bromide in one stock solution. Now as the pyrogallic acid (so called) is really the developer, the ammonia merely an accelerator, and the bromide a restrainer, common sense would seem to point out the fallacy of mixing restrainer and accelerator together. In the event of a plate being under-exposed an addition of the accelerator is what is required; but by a blind following of formulæ the addition far too often contains a considerable quantity of an agent which, so far from being necessary, is the very agent of which less is required. So, too, when a plate is over-exposed, and an additional quantity of restrainer is required, the concocters of these same formulæ would have us add therewith an additional quantity of a perfectly needless, and, at the same time, absolutely deleterious, accelerator.

If, on the other hand, we mix the pyro (developer) and the bromide (restrainer) together in one stock solution we advance a step, but on consideration it will be clearly seen that we are still at fault, as when we add restrainer we also add developer, which acts at the same time, so to speak, as an intensifier of density.

The use of three stock solutions, instead of two, entails but very little additional trouble, and it must be found in the long run that that additional trouble is amply repaid by the better quality of the negatives all round. These stock solutions can be made by the formula most fancied, with the only alteration that the bromide solution is kept separate from the ammonia or the pyro.

The following formula is one I have personally a great fancy for, and can of course be modified to suit the special requirements of each individual operator, as I find very few use exactly the same proportions of each chemical:—

Stock Solution A.

Pyrogallic acid	... ...	1 ounce (480 grains)
Rain or distilled water	...	9½ ounces
Nitric acid	... ...	20 drops.

Stock Solution B.

Liquid ammonia 880°	...	2 ounces
Rain or distilled water	...	8 „

Stock Solution C.

Bromide of ammonium	...	1 ounce (480 grains)
Rain or distilled water	...	9 ounces

For use, add ten ounces of water to one ounce of each stock solution, and use equal quantities of each when the negatives to be developed are properly exposed, and of ordinary subjects. In the event of the negative proving under-exposed, it is then an easy matter to add a small quantity of accelerator; if over-exposed, of restrainer; and if lacking in density, of pyro. In the event of the negative being one of a lady in a white dress, or of any subject having much white in its composition, the developer should contain less pyro to avoid losing detail. The same rule should be observed with regard to flash-light pictures, which, when developed with a normal quantity of pyro, have a great tendency to harshness. Some instantaneous or drop shutter subjects, especially those taken under unfavourable circumstances of light, will be found to develop with no bromide and very little ammonia. If bromide is used at all, it must be very sparingly; and as the development is in most cases likely to be a prolonged one, it will be found of considerable advantage to introduce a small quantity of sulphite of soda into the developer to prevent yellowing of the film. Many of the yellow films of the present day owe their yellowness rather to dirty measures or dishes than to the developer itself. It would do no harm to clean all measures and dishes at least every other day with dilute hydrochloric acid.

Where rain water is obtainable, it will be found far preferable to ordinary tap water for mixing all developing solutions, especially where the tap water has a very high pressure, and is consequently impregnated with air, which has a considerable tendency to cause bubbles to adhere to the film, and give considerable additional, and at the same time needless trouble to the retoucher and the spotter. Many negatives are spoiled by under-development, and very few indeed by over. Most of those I have seen, supposed to be over-developed, were spoiled through an over-dose of ammonia, not from too long a development.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

BY W. M. ASHMAN.

TWENTY-THIRD ARTICLE.

HAVING entered into the most important details of the processes of contact printing, and enlarging upon bromide of silver paper, from ordinary negatives, including the development, clearing, fixing, and washing the prints so obtained, a few remarks upon the subject of finishing may with advantage be added.

The surface of wet bromide prints, after washing, will be found to be rather tender, and consequently require very careful handling, to avoid injury to the gelatine which carries the image in its film.

After drying, the pictures usually have a grey, dull appearance, which, at the present time, is much appreciated, owing to its resemblance, in good examples, to a lightly printed engraving. It is possible to alter the colour somewhat by steeping the print in a very weak solution of a warm aniline dye, but the lights are also coloured by this means; a fact which is taken advantage of to produce a sort of moonlight effect in street and other views, when the colour chosen is generally weak pale green, and the lamplights and moon, &c., are coated with a little thick gum, which prevents the dye from acting in those portions, and can be washed off afterwards.

The better plan is to modify the developer by adding more plain potassium oxalate or bromide, or by using a portion of old developer that has been acted upon by light in the presence of tartaric acid, giving a little more exposure to make up for the weaker developer. See also remarks on restraining ferrous oxalate developer in the sixteenth article.

The citro-ferrous oxalate developer is productive with some papers of a deeper black without any shade of green in it, but the colour is really very much dependent upon the make of the paper, and with certain samples it is much easier to get pure black and white with delicate grey half tones than with others, provided previous observations as to proportions have been complied with. The dullness of the surface is as much an objection to some as it is a charm in the opinion of others. There is no difficulty about producing a high gloss, if desired, by the simple expedient of squeezing the well wetted print into contact with a bright smooth surface, suitably prepared, and allowing it to dry slowly, when it will drop off, or can be easily removed by inserting the point of a knife under one corner and pulling gently.

A glass plate (the smoother side) free from scratches or other imperfections, and quite clean, if dusted over with powdered talc (French chalk) and polished lightly, answers perfectly. Polished vulcanite, or even any smooth varnished surface, may be used, but glass is the most desirable and the handiest. The plate, prepared as indicated, is submerged in a vessel of water, and the wet print is placed face downwards on the glass, keeping both under the surface. Upon the withdrawal edgeways, while one finger pressed on the edge of the print keeps it in position, the excess of water and any air-bells are removed by means of a simple instrument called by carbon printers a squeegee. This last contrivance is merely a strip of rubber of a suitable length for the size of pictures, of about an inch wide and one-eighth of an inch thick, fixed between two laths of wood, so as to leave about one-quarter of an inch of

the width projecting all along. If on removal from the water the plate is laid on a flat surface and covered by a piece of thin rubber cloth, or even by a piece of strong paper, and the squeegee passed over it a few times from the middle to each end successively, the water will be driven out and all air-bells with it, and the print will be found to adhere closely to the glass.

Drying should be conducted in a room of the ordinary temperature, and not hastened by heat. If the prints thus glazed are required to be mounted with the full gloss still upon them, it is better to wax the plates before putting on the talc. This can be done in several ways, the most simple being to warm the glass slightly, and make a few light marks upon it with a lump of clean beeswax, polishing with a clean flannel until there is no sign of wax upon the surface. After taleing, proceed as before, and when only surface dry cover the back of print with a strong solution of gelatine, and upon this place a piece of thin good cardboard rather less in size than the print, previously damped enough to make it flexible, and submit the whole to pressure for half an hour. Drying will then take longer than before, but should not be hastened by increase of temperature, and it must be remembered that there is always a loss of brilliancy if the picture is forcibly removed from the glass before it is really ready. In very few cases will it be thought to be any advantage to glaze bromide prints, and then only with small pictures.

Vignetting enhances the effect either of contact prints or enlargements. The former can be managed by a piece of cardboard provided with a suitably sized hole, and covered with tissue paper, fixed on the printing frame, and if artificial light be employed, the frame can be moved about during exposure to secure the necessary softness. In the case of enlargements the perforated cardboard, without tissue paper on it, can be held in the hand between the lens and the bromide paper, and be moved to and fro to produce the same result. Bromide prints may be pressed with a hot iron on the back if quite dry, but burnishing, or even hot rolling, is inadvisable, and altogether unnecessary. If it be desired to take an ordinary unglazed print of any size from one mount with a view of placing it upon another, it must on no account be bathed in hot water to dislodge it from the mountant, or the probability is that the picture will vanish, owing to solution of the gelatine that holds the silver image upon the paper.

There is a bromide paper manufactured by the Eastman Co., under the name of transferrotype, in which the gelatine is rendered insoluble at a temperature of 120° F., but, as the name to some extent indicates, it possesses the characteristic property of being easily removed from its paper base to almost any other. All the manipulations of exposure, &c., up to that of washing, are similar to those dealt with in the last chapter, but the manufacturers recommend the pyrogallol developer, and as their formulæ are most excellent for ordinary bromide plates as well as for paper, there is ample reason for quoting it here as follows:—

Developer No. 1.—Sulphite of soda 6 ounces, dissolved in hot water 32 ounces; allow to cool, then acidify with citric acid, until litmus paper turns red, then add pyrogallol 1 ounce.

No. 2.—Carbonate of soda	...	... 3 ounces
Carbonate of potash		... 1 ounce
Water ...	...	... 32 ounces
No. 3.—Bromide of potassium		... 1 ounce
Water ...	...	... 10 ounces

Take of No. 1, 1 ounce; No. 2, 2 ounces; water 2 ounces. No. 3, 6 minims.

After development—which, owing to the opacity of the paper support, must be continued until a density has been attained apparently greater than in the case of glass plates—the paper is washed in three changes of water. Then it is soaked for two minutes in an acid bath, composed of sulphuric acid one drop to each fluid ounce of water, again washed in two changes of water, fixed in hypo 1 to 4 as already detailed, and well washed. Alum must not be used as with ordinary bromide prints, otherwise the film will refuse to leave its original support. The prints, thoroughly cleansed from the fixing salt—hypo—are ready to be mounted in optical contact with any object possessing a suitable surface, such as clear or opal glass, metal, marble, &c., the former as transparencies, and the latter as positives by reflected light. The squeegee above mentioned is necessary to procure perfect adhesion between the two surfaces, as in the case of glazing prints, and when the object to be embellished has a moderately flat surface, and it is practicable, pressure is applied for from fifteen to thirty minutes; then upon immersion for a few minutes in water heated to 100° F. it will be found possible to remove the paper backing, leaving a reversed picture on the new base. To avoid such reversal the picture can be first squeegeed upon a transfer paper like the Autotype Co.'s flexible support for carbon prints, and from that transferred to the new base unreversed. The picture when permanently fixed is cleansed from any particles of dust or paper fibre, passed through the alum bath, and then dried without artificial heat. It can be varnished in the same way as negatives if desired.

While on the subject of stripping the paper support from a bromide paper print, it may be said that the Eastman Company have introduced an important modification, bromide of silver (negative) paper, which is known as the stripping films, and the principal distinguishing feature over other negative paper of the rapid type is that the gelatine film carrying the image can readily be detached from its paper support and secured to a transparent skin of insoluble gelatine, or to a glass plate.

Paper negatives are no novelty, for Henry Fox Talbot introduced them in the process of "Calotype," the first account of which he communicated to the Royal Society, June 10th, 1841. These paper negatives were made up of layers of silver iodide and silver bromide, obtained by brushing solutions of a soluble haloid and of silver nitrate upon a good quality paper, such as Whatman's; afterwards the negatives were prepared by sensitizing paper which had been previously waxed. When silver bromide emulsified in gelatine, with its great rapidity, became known, paper coated with it became a commercial article, and the roller-slide, a form of dark slide originally devised for collodion films, and fully described in an earlier chapter, was so modified by the aforesaid company and by others, as to make it a great convenience to tourists; but to get the quality and the transparency of shadows, which the glass support provided, was the difficulty. Then substances like castor oil were tried, to make the paper translucent, all more or less messy. Now we have a far higher state of perfection, where the flexibility and lightness of paper are combined with the transparency of glass, and only when very large sizes are to be used are the glass plates at all superior. To epitomise the method of working stripping films, the sensitive paper is exposed in a strained condition either in one of the roll-holders sold for the purpose, or in a specially designed frame to secure the same end, the difference being that a number of exposures can be made in a long length or roll in one instance, and only a single or double piece, the size of the camera dark slide, in the other. The paper should be developed until it appears denser than a glass plate would appear when looked through; it is then cleared as above, fixed, and washed, and ready for stripping. A glass plate is well cleaned, and either polished with talc powder, or treated with a solution of india-rubber in benzol, and dried, coated with plain collodion, put into water until the greasiness disappears, and the negative, film side, brought into contact with the collodion under water, the two are

withdrawn and squeegeed carefully as in the previous case. Several of such plates and films are piled up with blotting-paper between, left for fifteen to thirty minutes under pressure, and then transferred to water heated to about 120° Fah., when the paper comes away as before, leaving the negative reversed on the glass. For some purposes it may remain thus; but to avoid reversal and make the film safe for handling without the glass, and for packing away, flexible transparent sheets of insoluble gelatine are provided, which can be softened in glycerine and water and squeegeed down upon the film, and after slowly drying and collodionizing the film, its backing may be removed from the glass and kept in a book. The printing can be done from either side, but that in which the flexible skin intervenes is less sharp, as a rule, than the other. All details of the work are carefully explained in the directions enclosed in each package of films, but it is necessary to indicate the chief characteristics of the different processes, so that the beginner may choose that which seems best suited to his purpose.

There are other sensitive and flexible films which do not require stripping, and are remarkably transparent when fixed. A good test of the quality of these unbreakable negatives is to make lantern slides from them. The writer has seen very perfect transparencies of continental scenery made from a packet of these films which were exposed in the ordinary course of a summer ramble. Much could be written in favour of film photography, but the student will soon perceive the special advantages offered, and act accordingly.

THE EMULSION PROCESSES OF PHOTOGRAPHY.

BY W. M. ASHMAN.*

The abundance of material which has so far engrossed our attention must, I imagine, be singularly gratifying to the promoters and well-wishers of this energetic Society, as well as proving highly instructive to all of us who have been fortunate enough to attend the meetings. This state of things can only be achieved where selfish motives do not govern, and the mutual desire to help each other, as expressed in the first paragraph of our prospectus, "The general interchange of views and ideas as to the progress of the art," is honestly carried out. It would be absurd for anyone to state that this condition is not generally observed, and I trust that, as years roll on, the solid advice given by that well-known representative of science, James Glaisher, F.R.S., when he presided over the deliberations of the founders in September last, will be kept steadfastly in view. To-night it is pleasant to note we have already got through more work than would suffice as an average at some other society meetings, and I am afraid that the time I am occupying would be more advantageously spent on another topic less comprehensive than the emulsion process of photography. And here let me state that, in introducing the subject placed on the notice paper, it was the intention to review some of the capabilities of emulsions for the information of inexperienced members of this Society, rather than to deal with any one process in all its details. A general idea gathered, detailed papers relating to a specific subject may then be of increased interest, and we are fortunate enough to have experts amongst us who will doubtless lend their assistance when requested so to do.

What is an emulsion? An emulsion has been defined as oil divided and held in suspension in water by means of mucilage or some other colloid body; but we photographers use the term to signify the complete suspension of any powder which is insoluble in the vehicle chosen; the latter must, however, possess the quality of drying at moderate temperatures. The proposal to employ such an emulsion, as we understand it, composed of certain metallic sensitive salts supported in a convenient vehicle, is probably within the recollection of some present, although I think it dates back fully thirty-five years. According to Dr. Eder, in "Modern Dry Plates," published in 1881, Gaudin, as far back as 1853, wrote the first papers on the subject of a collodion emulsion, in which he alluded to analogous experiments he had then made with albumen and *gelatine*.

Following up this gentleman's experiments, we find a few years later, 1861, he published a collodion emulsion process, in which silver iodide and silver chloride is described, and to which he gave the name of photogen. He also suggested the spreading of a chloride of silver collodion emulsion on paper, as a substitute for printing on albumen paper, but it does not appear that he achieved any marked advantages over the processes then in general use, even if the results were of equal utility. It, however, serves to indicate the starting point from which many later modifications and improvements originated. The practical advance may be said to have commenced four years later, when the collodio-chloride process of Simpson, and the collodio-bromide of Sayce and Bolton, were published. The first-named was designed for printing positives right out upon paper or glass, and the second was intended for the production of negatives. In neither case was the silver halogen employed in a pure state; organic compounds were associated with them. To-day both are in use for the making of positive images on glass, that containing chloride being employed on paper as well. It is a question which of the two important and well-defined processes have, or may eventually, most influence the progress of photography. If we follow either, it leads us up to the methods practised at the present time. The collodio-chloride emulsion process of Simpson as first published were incomplete, but with the improvements of Swan, Bovey, Tunney, and others, a high degree of efficiency was reached, and an adaptation we find in the so-called Aristotype paper, now commercially issued in Germany and America, and imported into this, the country where it originated. The present success of this method of printing on a paper coated with a sensitive emulsion which will retain its properties unimpaired for a considerable time, and then yield excellent results, is rather due to the nature of the paper basis which supports the emulsion, than the particular collodion or sensitizing compounds emulsified. I have never been able in this connection to trace any chemical influence exerted by collodion in combining with silver, as albumen and gelatine undoubtedly does. This is no drawback, as suitably prepared silver compounds darken in daylight with sufficient rapidity for the ordinary purposes of printing out, and yield rich positives, which can afterwards be modified in colour, if desired, by the action of the toning bath.

Differing as regards the vehicle and the method of preparation, we have an analogous process for printing-out positives by means of silver chloride in conjunction with organic substances, combined and emulsified in a practically colourless gelatine, the strength of which may vary between ten and forty grains of the colloid to each ounce of water. Prints of this nature were first made in 1866, and described by Palmer in the PHOTOGRAPHIC NEWS at the time; but no practical use appears to have been made of the information then given. Captain Abney, in his Cantor Lectures, drew especial attention to the possibilities of this process, and gave formulæ. An extended series of experiments on many organic compounds combined with silver chloride emulsified in gelatine, and spread on white surfaces, were jointly carried out a year or two ago by R. Offord and myself, and the results embodied in a series of articles specially written by us for the pages of the PHOTOGRAPHIC NEWS; doubtless the conclusions we arrived at, and the manipulatory details given, are familiar to those who have opportunity to study these subjects, and need not be further referred to here. Like the collodio-chloride emulsion, the mixture compounded by an approved formula can be spread thinly upon any non-absorbent surface, such as opal or strong paper previously covered with a substratum. This may consist of arrowroot, or a ten per cent. plain gelatine solution rendered partially insoluble with chromo alum. An emulsion of barium sulphate in gelatine makes a capital covering for the paper, and is non-absorbent if the correct amount of chrome alum has been added. Aqueous solutions of resins are likewise suitable in cases where a smooth polished surface is a desideratum. Upon any of these substratums the liquefied and sensitive emulsion is spread in an apartment shielded from the influence of daylight, and, as soon as dry, is ready for printing. If, however, matt surface prints are required, then there is no necessity to use any preliminary coating whatever, as the absorption of a liquid emulsion containing thirty or forty grains of gelatine per fluid ounce is not very considerable, even with porous paper.

The preparation of the sensitive emulsion is such an extremely easy matter that no one need hesitate to attempt a few experiments in this direction. I think there is much more to be discovered about this interesting process, for we have by no means exhausted the combinations which are reasonably likely to be beneficial in producing an effective and rapid printing surface,

* Read before the Bath Photographic Society.

The chief obstacle is a liability for insolubility to occur some time after the emulsion has been prepared. Potassium salts are apt to bring this condition about very quickly, thus spoiling the emulsion entirely. Some other agents act in a similar manner—often before it is possible to coat the intended surface. As regards rapidity of action, an emulsion can readily be prepared which will have twice the printing speed of sensitized carbon tissue or of platinotype, and consequently five or six times that of layers of ordinary silver chloride in coagulated albumen. Further, the process is absolutely unfettered by any restrictive conditions, which is rather remarkable in these days of patents.

I will now proceed to make an emulsion of the kind referred to, in order to illustrate how simple is the method of preparation. I will use for convenience a citrate salt as my organifier, although nearly all the vegetable acids in some form or other can be introduced. These mostly present special characteristics, some useful, others to be avoided.

We have here, then, the materials—gelatine, silver nitrate, and an alkaline chloride—and as the kind of organic salt we wish to form is of some importance, we will make ours a citrate for the occasion, with citric acid and ammonia. We must bear in mind that citric acid added to a solution of silver nitrate does not produce silver citrate, but only acidified silver nitrate. It is, however, another matter if we use a citrate salt such as ammonium, magnesium, or sodium citrate, for then the nitric acid, in combination with the silver, leaves the metal for the alkaline base, and the result is an interchange by which we get a compound of silver and citric acid—silver citrate and the corresponding alkaline nitrate.

We will take 20 grains of citric acid in 100 minims of water, and, to produce ammonium citrate—a deliquescent salt—add sufficient strong ammonia to nearly neutralize the acid, leaving litmus paper still decidedly red, which, for convenience, we call A. In another vessel, B, we take 45 grains of gelatine dissolved in 1 ounce of water, and mix with A. We next take 45 grains of gelatine, 6½ grains of ammonium chloride, and dissolve in 1 ounce of water; solution C. Then 40 grains of silver nitrate dissolved in 180 minims of water to form solution D. C and D are next mixed (not in daylight), then altogether at a temperature very little above melting point.

The emulsion now formed contains a slight excess of silver nitrate, and more nitrate of ammonia than we desire, so in order to get rid of it, we let it set into a stiff jelly, then break it up into shreds by pressing the solid mass through the meshes of coarse canvas, or cut it up into small pellets with a silver spoon. In this condition washing out the soluble salts can be readily effected. Citrate of silver, which is formed in the foregoing reaction, is soluble in water, and as it is undesirable to remove this from the emulsion, only brief washes in two or three changes of water are admissable. This given, the excess of water is drained off, the shreddy pieces collected, rinsed in alcohol, and then melted, strained through fine cambric, spread on glass, paper, or any non-absorbent smooth white surface, levelled, set, dried, and printed. The remainder of the operations are—washing, toning, fixing, and again washing the prints, as in the case of ordinary sensitised paper. Positives produced in this manner will tone well in a borax bath, and if paper prints are dried in contact with glass previously rubbed over with French chalk, will leave the surface when dry with a very high polish and considerable translucency.

Returning again to the collodio-bromide, we have here a process which yields some of the finest positives on glass obtainable by any method. Especially well does it answer for lantern transparencies, the inherent slowness being no drawback for such work.

A normal collodion composed of a high temperature cotton dissolved in ether and alcohol is bromised with a cadmium or ammonium salt, and another collodion containing silver nitrate is mixed therewith, to form an emulsion of silver bromide. The solvents are then evaporated, and the soluble salt ammonium nitrate, the result of the reaction, is removed by washing, the pellicle is re-dissolved, and is then ready for coating glass surfaces. The emulsion is not suitable for printing right out, but is amenable to the influence of a developer. Alkaline pyrogallol is usually employed, but the ferrous-citro-oxalate developer recommended by Abney yields a perfectly black and vigorous transparent image, which can be toned by any of the recognised methods.

Following an analogous treatment here, and displacing collodion in this case as we have already done in connection with the chloride process of Simpson, we emulsify our silver bromide in gelatine instead of collodion by adding silver nitrate and soluble bromide thereto, and as a result get at least an equal speed. If by copious washing we remove the nitrate salt resulting from the reaction of silver nitrate upon a soluble bromide, some increase in the rapidity has taken place; but if we omit the washing, and alter the physical condition of the supporting colloid by setting up a decomposing influence in the gelatine—such as a high temperature, or the action of an alkali produces—a marked change at once sets in, but ceases upon the removal of the nitrate salt. The molecules of silver bromide as at first formed are pretty evenly distributed, and of equal size throughout the mixture, and if a little of the newly-formed emulsion were spread on glass, and examined by transmitted daylight, the film would be almost certain to appear red, especially if the precaution of slightly acidifying the gelatine has been adopted at starting.

It is impossible to preserve an emulsion in this state very long, neither is it desirable to do so. Decomposition sets in with liberation of free ammonia, and after the lapse of a few days, such an emulsion compounded without an antiseptic would have become perfectly putrid. In the meantime the silver bromide would also undergo a change in size and colour. An agglomeration of the molecules takes place, and the now coarse silver bromide, if examined by transmitted light, appears of a bluish grey.

Besides this slow method of altering the character of the silver haloid in the cold state, there is a plan by which the same effect can be brought about, namely, by the addition of free ammonia, either with or without the application of external heat, excepting that the emulsion under treatment must not be in a solidified state when the addition of ammonia is made.

There is also the most reliable plan of any for general practice, namely, heating or boiling the mixture until the desired change has taken place; but in either case it is beneficial to use only a minimum quantity of water, and the lowest proportion of gelatine capable of suspending the silver, the remainder being added when making up bulk before washing. In the process as given to the world by Bennett, the whole quantity of gelatine was subjected to a temperature not exceeding 90° F. for several hours to obtain a rather slow plate, and for days to acquire greater rapidity; but now the same result may be obtained in half-an-hour, provided the bulk of the gelatine which gives body to the film is added after sensitiveness has been gained.

When a thin film examined as referred to appears reddish, sensitiveness is seldom very great; but directly this has become changed, the maturing process need not further be prolonged. The point at which the ripening or gaining of rapidity is generally considered to have reached its climax for practical purposes is when a thin film of the emulsion spread on glass, and examined in the wet state by the plan already mentioned, appears of a bluish grey. Beyond this point there is considerable danger in continuing the action, as fog may intervene, and it is often really difficult to distinguish between exalted sensitiveness, and foggy images, in a delicately balanced dry plate. For this reason, perhaps, more than any other, the English makers of dry plates have a tendency to keep the speed of their ordinary plates down to fifteen or eighteen degrees by standard sensitometer test, rather than issue an emulsion of higher sensitiveness. Now I presume most of us know that plates called *extra sensitive* are quoted by manufacturers at an increased price, but why this higher rate should be charged does not seem very apparent. Perhaps the truth is, that some rapid plates require more skill and judgment in order to attain a brilliant negative therefrom, whereas a slow plate possesses so much latitude that the liability of error is minimised to a large extent, and therefore the moderately slow plate is found to be the most successful upon the whole to popularise. It has over and over again been demonstrated that the actual cost involved in the preparation of rapid dry plates is but a fraction of the excess charged, and surely if it were a question of requiring two grains more or less of silver, 2s. 6d. per ounce to make it slow or quick acting, the difference now charged I maintain is excessive.

It is not necessary for me to quote particulars of plate making to-night, for it is a subject which would occupy your attention for a whole evening; and as the mere illustration of compounding a bromide emulsion now would not adequately demonstrate the process as it ought to be done before this Society, I will not attempt it; but any question which may arise concerning it in discussion I will do my best to answer.

In closing, I will just remark that the staining of silver

bromide films, or the incorporation of certain dyes in an emulsion to render the character of the sensitiveness more in harmony with some colours, is a subject which is of the greatest importance to photographers; but as we are told that to prepare such emulsions in England at present is not permitted by the proprietors of patent rights except under special arrangement, I am afraid we shall not get a demonstration of making orthochromatic plates just yet.

Reviews.

Processes of Pure Photography. Price 2 dollars. By *Messrs. W. K. Burton and Andrew Pringle.* (Royal octavo, 200 pages, New York. The Scovill and Adams Company, 423, Broome Street. Review copy sent by the English agents, The Eastman Dry Plate and Film Company, 115, Oxford Street, London.)

In the introductory chapter the authors lay emphasis on the potency and importance of photography as a means of recording and depicting facts, although they point out that it is also a simple means by which the artistically inclined may *to a certain extent* find expressions for their fancy.

Next we have—and as a part of the introductory chapter—a brief summary of the rise of photography from the earlier observations on the darkening of silver chloride under the action of light up to the latest advances of our day, and following is a suggestion that those wishful to learn more as to the matter should read the "History of Photography," written by Mr. W. J. Harrison.

After between three or four pages of "Theories," we come to the practical part of the work, which forms its main bulk. In it are comprehensive details as to the essential points of serviceable apparatus, and directions for arranging the dark room to advantage; after which come processes, instruction concerning exposure, also hints for out-door work.

Whoever wants a carefully-written hand-book as an every-day reference book and guide will do well to obtain the work before us.

INSTANTANEOUS STUDIES.

The Inconceivably Stupid Custom House Officer on Board the Steamer.

Stupid Officer (*suspiciously*). You have a box there?

Photographer. Certainly. It contains dry plates.

Stupid Officer. Plate? Gold plate or silver plate?

Photographer. Neither. I said plates, not plate.

Stupid Officer. You'll have to open it. Can't imposes upon me with a story like that. Why, only doll's plates would go into a box of that size.

Photographer. Can't you understand they're photographic plates?

Stupid Officer. What, glasses for taking likenesses on?

Photographer (*much relieved at being at last understood*). Yes, that's it. And now that you're satisfied, perhaps you'll let me pass.

Stupid Officer (*gruffly*). Not till I've seen inside.

Photographer (*indignantly*). Why, man alive, it would spoil every one of them if the smallest ray of light even were to get in.

Stupid Officer (*composedly*). Just as you like. If you don't open the box I shall have to detain it, that's all.

Photographer. Can't you understand that this box can only be opened in a properly darkened room? I don't at all mind opening it if you have a dark room.

Stupid Officer. You needn't think to gammon me, mister. I know something about photography. It's only bits of bare glass you've got there. I've seen 'em cleaned lots of times. They won't hurt by opening the box (*grins*).

Photographer. I know what you're thinking of; the old collodion process. But these are dry plates, a very different thing.

Stupid Officer. Oh, I shan't hurt 'em. They'll be just as dry after I've looked at 'em as they were before.

Photographer (*exasperated*). Can't you believe what I tell you—that they're dry photographic plates which will spoil if the box is opened?

Stupid Officer (*to himself*). Don't believe him. It's just the size of a cigar box. Why should he make such a fuss if the articles wasn't exciseable?

(*More discussion. Photographer begins to lose his temper*).

Stupid Officer (*seized with a bright idea*). How do I know if they *are* photographic plates—they haven't got something on 'em as is protected?

(*Further discussion. Photographer getting frantic.*)

Stupid Officer (*with another bright idea*). What about the Merchandise Marks Act? Aint they foreign manufactured goods?

Photographer. No, they're not. They were made in England. I bought them in London, and I'm taking them back again.

Stupid Officer. Well, I can't pass 'em without seeing 'em, so it's no use talking any more.

(*Photographer thinks so too, and rushes off to write to Superior Officer. After a ream of correspondence he gets his box of plates back—spoilt.*)

Notes.

Euston Road as a resort for the cheap and cutting photographer has lost its old features; the sixpenny portrait delivered while you wait being the notable characteristic between twenty-five and thirty years ago, and later on we had a doorman at every third or fourth house in certain parts of the road, exhorting passers-by to have one carte-de-visite for a shilling or two for one-and-six.

Things are changed now. Comparatively few photographers are in business there, and these do not depend altogether on the doorman for bringing in business—indeed, several establishments do not keep a doorman; and a recent development is for Euston Road to deliver cards house by house through the more wealthy district of Bedford Square, Russell Square, and Brunswick Square. One of the cards sent out of the Euston Road to bring in a new class of customers, and offering the advantage of low rates, we have before us. One cabinet and three cartes "beautifully finished and Berlin enamelled" are offered for four-and-six; while three cartes-de-visite, "highly enamelled," are offered for two-and-six. Although from an inspection of the show-case of the enterprising photographers we cannot endorse his "not to be equalled by any house in London," we may say we have seen worse photographs turned out of Bond Street or Baker Street.

Mr. J. Cook, of Dunedin, New Zealand, writes:—"I would suggest that all weights, up to say 1 lb., be stamped with their values in grains, in addition to their ordinary denominations. This would make troy, avoirdupois, and apothecary's weights interchangeable and less confusing." It is quite easy to stamp the numbers on the weights by having a set of steel number punches, such as can be obtained at the tool shops; but although this is a very desirable thing to do, it must be remembered that several

additional weights will be required to make up the avoirdupois ounce of 437½ grains to the troy ounce of 480 grains, unless one makes a supplementary weight of 42½ grains.

We now reproduce, in block form, three consecutive phases of Mr. Anschutz's series of twenty-four, photo-







graphed during the period of one jump. These do not differ very much from the jumping horse as depicted by our best artists.

In one of the stories contained in the latest published volume by Mr. William Black, one of the characters, a lord, whose son has been just distinguishing himself in the Soudan, naively enquires at a dinner party what a proud father has to do to secure the appearance of his hero son's portrait in the picture papers. "Must one send a photograph to the Editor?" he asks; and on hearing that this is the most simple way of securing the desiderated end, suggests that he would hardly like to adopt a course which is suggestive of self-advertisement, or at any rate of an advertisement for self and family. The odds are, however—though as to this Mr. Black is silent—that his lordship's first act on getting home that night was to enclose a copy of his soldier son's most recent photograph to each of the illustrated journal's offices, accompanied by a cutting from the current newspaper detailing his boy's prowess. If he did *not* do this, all we can say is that his lordship acted in a most exceptional manner, for, as the editors of illustrated papers know to their sorrow, they are simply overwhelmed beneath an avalanche of the cartes and cabinets of Dick, Tom, and Harry, sent not infrequently by Dick, Tom, and Harry themselves; but if not by them, by their admiring parents or friends. Of course, in the comparatively rare cases when D., T., or H. has really done something worthy of record, or has in some way or other got himself talked about by the general public, his likeness is welcome enough; but, unfortunately, doting mothers, and proud fathers, and affectionate aunts are not the best judges as to their sons' or nephews' claim on public attention. They may possibly be heroes at Little Pedlington, or may have the eyes of Slushton-in-the-Slooze fixed upon them, but this scarcely entitles them to wider and more cosmopolitan fame. The collection of unused photographic portraits accumulated by an editor of an illustrated paper forms, indeed, a most suggestive commentary on the universal desire for publicity, which is a sign of the times, as well as a pictorial sermon on the ephemeral and localised nature of fame; and it would be well if the Dicks, Toms, and Harrys aforesaid, and their mothers, and their sisters, and aunts could study those pigeon-holed likenesses at their leisure. They would then, possibly, not send off photos post haste to London editors upon such very light provocation.

The Paris papers often contain news items which are much funnier in their unconscious way than the laboured efforts at waggery of our professedly comic journals. It is generally in English, reproducing English names and titles, that they are most funny with their "Sir Gladstone" and "Lord Chamberlain," and the like, but sometimes it is in their too literal translation of English idioms they come to such comical grief. Thus, a writer in a well-known Boulevard journal having probably read in some London papers that General Boulanger, since his arrival in our city, had been repeatedly "waited on" by photographers and journalists anxious to obtain an interview, evolved the circumstantial statement that "such is the anxiety to obtain news of 'Le brav' Général,' that, as a rule, every time he gives a dinner party the place of the professional waiters is taken by high-class London photographers, who in some instances have been caught in the act of attempting to photograph the 'coming president' with detective cameras made in the shape of champagne bottles, and by newspaper writers of note who jot down on their paper cuffs all that falls from the general's lips for publication in their papers."

Burnham Beeches are the happy hunting grounds of the artist as well as of the photographer. How many times the camera has been set up in this picturesque region and the trees taken, one would not like to say. The Beeches have been represented by calotype, by wet collodion, and by numberless dry processes, and modern gelatine finds them as popular as ever. So frequent are the visits of photographers that it is surprising a plan put in operation by artists has not been imitated. Here and there among the Beeches, far away from main walks and bridle paths, are now to be seen little huts about three times the size of a sentry box. They are studios in miniature for use when the weather renders sitting on a camp stool in the open impossible. For these huts there is a license to pay, and a ground rent of sixpence a week. The huts are movable, and when a painter in the course of his wanderings through the forest sees a

bit he would like to work upon, all he has to do is to transfer his hut bodily to the spot.

We can see no reason why photographic clubs and socicties should not do likewise. A permanent and portable dark room would at times be of great serviee, especially if an automatie maehine were set up in the interior for the delivery of dry plates. If a photographer ran short (say) of quarter-plates, all he need do would be to go to the dark-room, shut himself up, drop a penny in the slot, and take out the plate he wanted. We live in hopes some day of seeing dotted about in Burnham Beeches dark-rooms bearing the names of the Camera Club, the Photographie Club, the London and Provineial Photographie Assoeiation, and many others.

An artiele on photography written in the eookery book style, is very refreshing. As most cookery books are the work of ladies, it is not surprising to find that the article in question, whieh appears in *Science* (New York) has a feminine signature. The lady advises amateur photographers to go in for imitating the old masters. "Take," she writes in the spirit of Mrs. Glasse, "some fine head painted by an old master, study the light and shade upon it, the eharacter of the faee, the quality of the baekground, then"—one almost expeets her to say, "Break six eggs in a basin"—"choose from among your friends one whose type is somewhat like that in the pieture, and arrange with great care the light and shade." Further on, as the writer gets more enthusiastie, she gets more like Mrs. Glasse. In giving a "reeipe"—we are bound to call it by that name—for produeing a pieture of a Madonna and Child of Andrea del Sarto, the lady says, "Have the woman dressed like the one in your picture; the lights, baekgrounds, and all accessories carefully arranged except the little ehild, who should be introdueed at the last moment, and posed as nearly as possible like the ehild in the pieture. Then focus quickly "(how it reminds one of 'Serve hot,' or some sueh ordinary direetion!)" and take your picture. You should do this thing "very well, or not at all." We are bound in fairness to admit that, despite its eookery book flavour, the artiele has much in its that is praiseworthy.

Lord Monboddo is avenged, and photography has avenged him. His lordship always liked to believe it was possible for men to have tails, and got pretty well laughed at for his pains; but had he lived in these days he would have turned the laugh against his ridieulers. A boy belonging to the Moi tribe, who are to be found in Africa, has been photographed, and a drawing of an extremely literal eharaeter appeared in last week's *English Mechanic*. There is no doubt about the tail, whieh, says our eontemporary, is ten inches long; and we presume there is no doubt about the photograph, though we should mueh prefer to have seen a reproduetion rather than a wood-cut.

ORTHOCHROMATIC PHOTOGRAPHY.

BY C. H. BOTHAMLEY, F.I.C., F.C.S.*

Eosin Dyes.

THIS group of eolouring matters is not only of great interest to the ehemist and teehnologist from the number and great beauty of the dyes which it contains, but from a photographer's point of view it may fairly be said to be the most important group of all, sinee it ineludes the most aetive seleetive sensitisers,† and those whieh have proved to be of the greatest practical value in orthoehromatie photography. It is commonly known as the eosin group, and its members are spoken of eollectively as the eosin dyes, beeause eosin itself was one of the first members to be diseovered. As a matter of faet, however, the true parent of the group is *fluoreseein*, from whieh eosin and all the other members are derived, directly or indirectly, by the proeesses whieh are known as ehemical substitution. Fluoreseein belongs to the large and very interesting group of eompounds known as the *phthaleins*, the first of which were prepared by Adolph Baeyer in 1871. For a short time after the diseovery of eosin in 1874, and the preparation of other members of the group with high tinetorial powers in the following years, great hopes were entertained of these dyes. Their eolours are very fine, the tinetorial power of many of them is remarkably high, and they certainly do yield upon fabries, and notably upon silk, a very beautiful series of delieate shades of eolour. Unfortunately, however, they are a eomparatively unstable elass of compounds, and in most cases the eolours fade somewhat rapidly on exposure to a bright light. In consequenee of this drawbaek the use of eosin dyes for tinetorial purposes has to a large extent been discontinued, and their plaee has been taken by the so-called azo-dyes, whieh eombine beauty of eolour and a high tinetorial power with a very mueh greater degree of stability.

Almost all our knowledge of the phthaleins, including fluoreseein and its derivatives, is due to the researches of Baeyer and his assistants and pupils. Their earlier papers are to be found in the *Berichte der Deutschen Chemischen Gesellschaft* for 1871 and following years, and longer papers giving a eomplete aeeount of their work have been published in Liebig's *Annalen der Chemie*, 183, p. 1; 202, p. 36; 209, p. 249; 212, p. 340. A clear and eomprehensive, but at the same time eoneise aeeount of the group is given by G. Schultz in his treatise on eoal tar and the products derived from it. (*Die Chemie des Steinkohltheers*, by G. Schultz, published by Vieweg and Sohn, Braunsehweig, new edition, 1889.) So far as I am aware, nothing at all approaehing a eomplete aeeount of these eompounds is to be found in any English treatise.

The parent substanee from whieh all phthaleins are derived, and from whieh they are prepared, is *phthalic acid*, $C_8H_6O_4$. This eompound is made on a large seale from *naphthalene*, $C_{10}H_8$, a beautiful white crystalline hydrocarbon, obtained in large quantities from coal tar, and familiar to all users of the albo-carbon gas lamps. The naphthalene is converted into naphthalene tetraehloride by the aetion of hydrochlorie aeid and potassium ehlorate, and when this is treated with strong nitric acid it yields phthalie aeid, which erystallises in white prisms or leaflets soluble in water and in aleohol. Phthalie acid is a dibasic acid belonging to the benzene series, and its constitution may be represented by the formula—

$$C_6H_4 \begin{cases} COOH \\ COOH \end{cases}$$

It may, in faet, be regarded as benzene, C_6H_6, in which two out of the six atoms of hydrogen have been replaeed by two groups of carboxyl, COOH. When phthalic aeid is heated to a somewhat high temperature it readily gives

* Continued from page 180.

† The term "selective sensitiser," which I proposed last year, and which I shall use in these artioles, is synonymous with the older term "optical sensitiser."

off water and is converted into *phthalic anhydride*, $C_8H_4O_3$, the change being represented by the equation—

$$C_6H_4 \begin{cases} COOH \\ COOH \end{cases} = H_2O + C_6H_4 \begin{cases} CO \\ CO \end{cases} O$$

Each molecule or ultimate particle of the phthalic acid splits up into a molecule of water and a molecule of phthalic anhydride.

Phthalic anhydride is a solid substance which crystallises readily in beautiful long silky white needles. It melts when heated to 128°C. and sublimes easily even at a temperature considerably below its melting point. This fact can be utilised in order to purify it. Phthalic anhydride, and not phthalic acid, is the compound actually used by the chemist in the manufacture of the phthaleins.

The other substances which react with phthalic anhydride to form the phthaleins are the *phenols*, a class of compounds derived from benzene, and the hydrocarbons related to it, by the substitution of one or more groups of *hydroxyl*, OH, for an equal number of atoms of hydrogen. They are called monohydric, dihydric, or trihydric phenols according as one, two, or three hydroxyl groups have been substituted for one, two, or three of the atoms of hydrogen originally present in the particular hydrocarbon. Ordinary phenol or carbolic acid, resorcinol or resorcin, quinol or hydroquinone, and pyrogallol, all belong to the class of phenols, and their relation to the parent hydrocarbon benzene is indicated by the following formulæ—

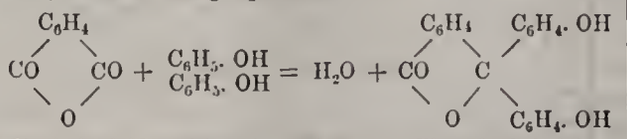
$$C_6H_6 \qquad C_6H_5.OH \qquad C_6H_4 \begin{cases} OH \\ OH \end{cases} \qquad C_6H_4 \begin{cases} OH \\ OH \end{cases} \qquad C_6H_3 \begin{cases} OH \\ OH \\ OH \end{cases}$$

Benzene. Phenol. Resorcinol. Quinol. Pyrogallol.

It will be observed that ordinary phenol is a monohydric phenol, only one of the atoms of hydrogen in the benzene having been replaced by hydroxyl, whilst resorcinol and quinol are dihydric phenols, and pyrogallol is a tri-hydric phenol. It should also be noticed that the names of all these phenols have the distinctive termination *ol*.

The hydrogen which is present in the form of hydroxyl can be replaced by an equivalent quantity of a metal, and the compounds thus formed stand in the same relation to the phenols as ordinary salts do to the acids. We have phenol, C_6H_5OH, and sodium phenolate, $C_6H_5.ONa$, analogous to nitric acid, $NO_2.OH$, and sodium nitrate, $NO_2.ONa$; resorcinol, $C_6H_4(OH)_2$, and potassium resorcinate, $C_6H_4(OK)_2$, analogous to sulphuric acid, $SO_2(OH)_2$, and potassium sulphate, $SO_2(OK)_2$.

When one of these phenols is heated to a moderately high temperature with phthalic anhydride, either with or without the simultaneous presence of a dehydrating agent, as the case may require, what is termed a process of condensation takes place. Some of the hydrogen in the phenol unites with some of the oxygen in the phthalic anhydride, and forms water, which is eliminated, whilst the remainder of the phenol and the phthalic anhydride unite together and produce a new substance of complex constitution, the *phthalein*. The simplest case is presented by ordinary phenol, and the nature of the change is represented by the following equation :—



Phthalic Anhydride. Phenol. Water. Phenol-phthalein.

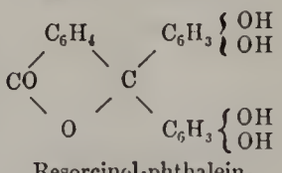
According to Eder's experiments,* phenol-phthalein and its derivatives have very little value as sensitising agents, but of late years it has acquired considerable importance as an indicator in acidimetry and alkalimetry. Its solutions are colourless in presence of any free acid, but acquire a beautiful intense purple-red colour in presence of the smallest quantity of an alkali.

Many other phenols, both monohydric and polyhydric, yield analogous compounds, but only fluorescein and its derivatives are at present of importance in orthochromatic photography, and only these need be considered in detail.

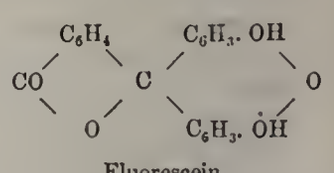
The phenol from which fluorescein is derived is the dihydric phenol *resorcinol* or resorcin, $C_6H_6O_2$ or $C_6H(OH)_2$. From the formulæ already given it will be seen that resorcinol has the same composition as quinol. They are both dihydric phenols derived from benzene, and are said to be isomeric with one another. They differ in their behaviour with alkalies and other reagents. Resorcinol and quinol, as the formulæ show, are also related to pyrogallol, and it is singular that such close relationship should exist between the compounds which furnish us with our best organic developers and the compound from which we derive our most useful orthochromatising agents.

Resorcinol is obtained on a large scale from benzene, which is converted into benzene disulphonic acid by the action of sulphuric acid, and this product is fused with caustic potash. Resorcinol crystallizes in white rhombic prisms, which turn brown when exposed to the air. It dissolves easily in water, alcohol, and ether, and the solutions have considerable reducing power. It has, in fact, been used as a developer, but seems to have no special merits in this capacity. With ferric chloride (perchloride of iron) its solutions give a dark violet colouration.

In order to obtain fluorescein, resorcinol is heated with phthalic anhydride to a temperature of about 200° C. Sometimes a dehydrating agent, such as zinc chloride, is added to the mixture, but this is not essential. The reaction which takes place is strictly analogous to that observed in the case of phthalic anhydride and ordinary phenol. Water is eliminated, and resorcinol-phthalein is formed. The latter, however, very readily loses a further molecule of water, and changes into fluorescein, which is therefore an anhydride of resorcinol phthalein. The difference between the two compounds is indicated by the following formulæ :—



Resorcinol-phthalein.



Fluorescein.

The crude product from the fusion is treated with a dilute solution of caustic soda, which dissolves out the phthalein, and the solution is then mixed with excess of hydrochloric acid, which throws down resorcinol-phthalein in the form of a yellow flocculent precipitate, insoluble in water, but soluble in alcohol and ether. This precipitate, however, gradually becomes darker in colour and changes into fluorescein, a molecule of water being eliminated. Fluorescein is less soluble than resorcinol-phthalein in alcohol and ether, but dissolves easily in hot acetic acid.

Since fluorescein still contains two of the hydroxyl groups which were present in the original resorcinol, it exhibits certain of the properties characteristic of the phenols, and notably a feebly acidic property, by virtue of which it forms a series of metallic derivatives. Ordinary phenol itself forms a series of such derivatives, and hence its more familiar name of carbolic acid. The metallic derivatives thus formed by the phenols and by the phthaleins are frequently spoken of as salts, but they are very much less stable than the salts formed by true acids, and are readily decomposed even by the weakest acids.

When fluorescein is treated with a dilute solution of caustic soda, two atoms of the metal sodium take the place of the two atoms of hydrogen which, as shown in the structural formula already given, exist in the fluorescein in the form of hydroxyl. The compound thus formed may be represented most simply by the formula $C_{20}H_{10}O_5Na_2$, the simplest formula for fluorescein being $C_{20}H_{10}O_5H_2$. It is the sodium salt or sodium derivative of fluorescein, and is met with in commerce under the name of *uranin*,

* Handbuch der Photographie, 3, 138.

this name being given to it because in optical properties its solutions somewhat closely resemble a variety of glass which contains the oxide of the metal uranium. It is used to some extent as a dye for wool and silk, to which it imparts a bright yellow colour with a beautiful fluorescence. Uranin, unlike fluorescein, dissolves readily in water, and it is also soluble in alcohol. Concentrated solutions have a dark orange brown colour, but dilute solutions are yellow by transmitted light, and show a magnificent yellowish green fluorescence by reflected light. This fluorescence, to which the compound owes its name fluorescein, is seen to best advantage in somewhat dilute solutions, and is still intense even in a solution which contains only one part of uranin in a million parts of water.

Fluorescein and uranin, when applied to gelatino-bromide plates, exert a certain amount of sensitising effect, the maximum sensitiveness being for the green rays of the spectrum. The effect, however, is only small, and is very greatly inferior to that obtained with many of the derivatives which can be prepared from fluorescein.

In 1874 a colouring matter, prepared from fluorescein by Dr. H. Caro, was introduced into commerce under the name of *cosin*, which is derived from the Greek *eos*, the dawn, and has reference to the beautiful colour of dilute solutions of the dye, which resembles the pale crimson red sometimes seen in the sky at day-break. The mode of preparation and properties of eosin will be described in detail later on. It differs from fluorescein in containing four atoms of bromine in place of four atoms of hydrogen, and is therefore a bromine substitution derivative, but the differences between it and fluorescein are more striking than the differences usually observed between substitution derivatives, and the compounds from which they are derived. It is the typical representative of a long series of substitution derivatives, amongst which are included the compounds most valuable from our present point of view. Many of these, like eosin, are dyes of great beauty and high tinctorial power; others more closely resemble the parent substance fluorescein, and are of little importance to a dyer or photographer. As stated at the outset, eosin gives its name to the whole series, such of the derivatives of fluorescein as possess tinctorial power being commonly spoken of as the eosin dyes. The term, in fact, as so frequently happens in chemistry, is both particular and generic. We use the word *cosin* to denote one particular compound, and the word *cosins* to denote a whole series of compounds which are closely related to it, just as we gave the name *alcohol* to the ordinary alcohol obtained by the fermentation of sugar, whilst applying the same name generically to a large number of compounds of similar constitution and properties.

(*To be continued.*)

Patent Intelligence.

Applications for Letters Patent.

8378. William Sanders, 6, Lord Street, Liverpool, for "Improvements in or appertaiuing to Photographic Cameras." —May 20th, 1889.

8474. William Blanshard Bolton, Woodside Road, South Norwood, Surrey, for "Improvements in Holders or Carriers for Flexible Sensitive Photographic Films."—May 22nd, 1889.

8475. Henry Herbert, 119, Hartfield Road, Wimbledon, for "A New or Improved Shutter for Photographic Lenses." —May 22nd, 1889.

8504 Richard Tissington, 10, Well Street, Oxford Street, London, for "Printing Photographically and otherwise, Labels, Show-bills, Posters, &c., from Thin Movable Metal Types." —May 22nd, 1889.

8603. Johannes Adalbert Fischer, 433, Strand, London, for "An Improvement in the Production of Phototypes."—May 23rd, 1889.

8632. Arthur Dodwell Chapman, Littlebridge Place, Bridge, Canterbury, for "A Collapsible Pneumatic, Focussing Chamber (a Substituto for Photographic Focussing Cloth)." May 24th, 1889.

Specifications Published.

4103. Frank Bishop, of the firm of Marion and Co., of 22 and 23, Soho Square, London, W., and David Allen, of 157, Whitfield Street, Fitzroy Square, London, for "Improved Apparatus for Washing Photographic Negatives and Prints." —Dated 8th March, 1889.

Plate rack fitted within a trough, so that rack and plates can be lifted out, and fixed above the level of the fluid.

6583. Harry Williamson Teed, of 188, Camberwell Grove, Camberwell, Surrey, Civil Engineer, for "Improvements in and relating to Photographic Shutters."—Dated May 3rd, 1888.

A shutter in which two-half circles which cover the opening are separated, and then brought together by spring-actuated clock work.

7432. Samuel Dunseith McKellen, of No. 3, Chapman Street, Hulme, Manchester, formerly of Marriotts Court, Spring Gardens, Manchester, for "Improvements in Photographic Cameras."—Dated 18th February, 1889.

The claims are :—

1st. In a photographic reflecting camera, the use of non-actinic coloured glass for a focussing screen.

2nd. In a photographic reflecting camera, the method of lowering and raising the reflecting mirror by attaching it to tapes, bands, or cords, or to a curtain, such bands, cords, tapes, or curtains, working between rollers substantially as described.

3rd. In a photographic reflecting camera, using the movement of the mirror to actuate a shutter of any convenient form substantially as described.

4th. In a photographic reflecting camera the use of the revolving rollers to communicate motion to a shutter by suitable connections.

5th. In a photographic reflecting camera the use of the tapes, bands, cords, or curtain to actuate a shutter of any convenient form.

6th. In a photographic reflecting camera the use of a curtain working between rollers to admit and exclude light from the lens substantially as described.

7th. In a photographic reflecting camera the use of a flexible diaphragm to exclude all light except what passes through the lens substantially as described.

8th. In a photographic reflecting camera the use of a hinged front to give access to the lens.

9th. In a photographic reflecting camera, connecting or disconnecting the top cover with the front cover, so that they may open and close together or separately as required.

10th. The arrangement for stopping the movement of the mirror at the proper position for giving a prolonged exposure, substantially as described.

9711. William Tylar, of 57, High Street, Aston, Birmingham, for "Improvements in Apparatus for Producing and Discharging Currents for Washing Photographic Plates and Prints or other Analogous Purposes, capable of being Attached for Use upon or to any Ordinary Vessel."—Dated July 4th, 1888.

Relates to his syphon, already described in the Photographic News.

17,328. Henry Joseph Redding, of 48, Myddelton Square, London, in the County of Middlesex, Optician, for "Improvements in Photographic Roll-Holder Cameras, and in Photographic Shutters and View Finders."—Dated 28th November, 1888.

The claims are :—

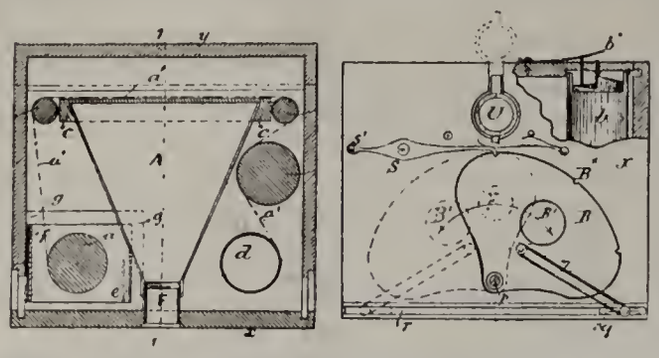
1. A shutter for photographic cameras or lenses, such as B, fig. 2, mounted on a central axis *p*, so that in its path of travel an aperture therein comes opposite an opening, such as F, to give the required exposure, substantially in the manner and for the purposes hereinbefore described and illustrated in the drawings annexed.

2. The improved arrangement and construction of shutters for photographic cameras or lenses, substantially as and for the purposes set forth in the full specification.

3. In photographic roll-holder cameras the detachable spool-holder, consisting of a spring-bottom piece *e* connected to an upright *f*, fig. 4, to which is hinged a top part *h*, arranged and

mounted in the camera frame, substantially in the manner and for the purposes hereinbefore described and as represented in the drawings annexed.

4. The improved arrangement of the several parts of a photographic camera by which the spool or prepared paper-holder, such as *a*, and the receiving roller, such as *d*, are respectively



placed in the front part of the camera, close to the lens or lens aperture, substantially in the manner and for the purposes hereinbefore described and illustrated in the drawings annexed.

5. In photographic roll-holder cameras I claim the arranging and mounting of the spool for holding the prepared paper, and the reel for receiving same in the front of the camera, close to the lens or the lens aperture, instead of at the back of the camera, the as heretofore done, substantially as and for the purpose set forth.

6. The improved photographic roll-holder camera, arranged and constructed substantially as and for the purposes set forth.

7. The improved arrangement, construction, and combination of photographic apparatus, substantially in the manner and for the purposes hereinbefore described and illustrated in the drawings hereunto annexed.

Correspondence.

DR. EMERSON'S "NATURALISTIC PHOTOGRAPHY."

DEAR SIR,—In the last issue of the *Amateur Photographer* there is a letter from one who may be taken at his own valuation—*i. e.*, a "nobody." It is, perhaps, hardly surprising to see such a letter in that paper, though we cannot help thinking any reputable editor would have consigned such a communication to the waste paper basket. Now, since that letter mainly consists in attacks upon yourself and upon me, it is seemly, perhaps, that I should contradict a few of the lies (there is no other word to characterise the statements made) in that letter. Having watched the policy of the *Amateur Photographer* ever since it passed out of the hands of Mr. J. Harris Stone, M.A., an educated and highly-cultured gentleman, whose only fault was outspokenness, I may, perhaps, be allowed to record here some of the tactics of a paper which sets itself the responsible task of elevating (save the mark!) photography, and instructing young photographers. Probably all right-minded gentlemen will accept that paper at its true value after reading this letter, and will also accept at their true values the writers "Nemo" and "Anon," its supporters.

The first curious fact I noticed in connection with the *Amateur Photographer* was a communication to one of its correspondents, in which it was frankly announced that it was run to pay, or words to that effect. That day I mentally determined to cease subscribing; but the weekly art criticism (?) in the answers to correspondents so amused me that I continued to read it, though not to subscribe. Any disinterested person may take up these numbers, and he will find the refrain, "They are not sharp," "They are not sharp."

My book "Naturalistic Photography" appeared, and the erudite (!) and polished (!) editor gave it to Mr. H. P. Robinson to review—at least, so I am informed on good authority, though one would not like to believe it for Mr. Robinson's sake, for one fondly hopes that there still lingers amongst us that nice sense of honour which prevents a *gentleman* from *anonymously* reviewing the work of an opponent. But "chivalry is an ingredient sadly lacking in our land!" This review appeared. It showed ignorance unbelievable, and was wilfully and stupidly malicious. Extracts were quoted from passages in which I condemn certain popular artists, and my reasons for condemning them were suppressed. A "little clique" of painters is sneered at and libelled as having "been long struggling to gain recognition, but the results they show have not been inviting, and their self-assertion has been almost as hard to bear as their ugly pictures." There is a critic for you. The works of Sargent, Forbes, Bramley, T. F. Goodall, Gilbert, Sterling Lee, Havard Thomas, J. G. Shannon, Adrian Stobus, Onslow Ford, Peppercorn, Clausen, Lavery, Harrison, Swan, Kennington, Llewellyn, Ammonier Lathanque, and hosts of others too numerous to mention, are included in this libel, and yet these names include some of the latest A.R.A.'s, and several of the Chantrey fund pictures have been bought from the works of these painters, and all the best work of this year's exhibitions is by one or other of these men. This delightfully ignorant critic then goes on to give my system in two or three paragraphs. This truthful gentleman proceeds to say that the naturalists "wilfully ignore the fact that the eye changes its focus so automatically and instantaneously to adapt itself to vision that we are not conscious of it." Indeed! And when did the critic become an authority in physiology? But the fact remains that I do not wilfully ignore the fact; *vide* "Naturalistic Photography," pages 119, 120, which proves either that the reviewer did not read the book, in which case he was dishonest in his capacity of reviewer; or that he read and wilfully suppressed my remarks, in which case he was doubly dishonest as a critic and as a man. From this false premise, a creation of the reviewer's own brain, follow several specious deductions, which are, of course, of no account.

So imperfectly educated does this reviewer appear to be, that he sees no difference between principles and rules. I do not guarantee to supply my readers with brains, but only with food for good brains. Part of my remarks on composition are speciously suppressed, and a paragraph quoted which, apart from the context, becomes ridiculous. This is an archaic reviewer's game. We are then told Mrs. Cameron got her portraits with a bad lens, and was delighted when she got a good lens. Still in her works I see no difference in focussing, and I based my remarks upon good authority, which I prefer to that of special pleaders. The world is informed that Mr. Adam Salomon would not have admired the kind of work I admire. Indeed! I should prefer to hear Mr. Adam Salomon himself, were he alive. But the ludicrous part of the review is to come. With no more proof of what he calls the falsity of my doctrine than this sort of thing, he, with crocodile's tears, writes that it is his solemn duty to "protect the young photographer from false doctrine that may be prejudical to him in the exercise of his art." My doctrines are called all sorts of names, but no proof is given to support the review, and the *Amateur Photographer* sets up as a disinfectant. The *Amateur Photographer* must not forget that disinfectants misapplied are poisonous, and so I regard that paper. The superior tone of this reviewer is a huge joke when you consider the ignorance he displays of all the aims and workings of modern art. A painter whose name is in the list above, on reading the review said, with a roar of laughter, "Why the fellow is an ignorant fool," and he will say it in public if necessary some day. So much for the review, and for the veracity of the reviewer.

On April 12th, Mr. H. P. Robinson wrote a letter on Adam Salomon, in which he naively says, "The sudden revival of the name of Adam Salomon has been due to

the dedication to his memory of a book by Dr. Emerson, *reviewed by you a week or two ago*" (italics are mine). If, as I am informed, Mr. Robinson is responsible for the review in question, every gentleman will have his own not very favourable opinion of the italicized words. Mr. Robinson goes on to say, what sins—such as retouching, &c.—Mr. Salomon committed. All I can say if true, Adam Saloman would say of Mr. Robinson, "Save me from my friends;" and it only goes to prove that he was not a first-rate artist, a fact of which I was already fully aware. But I prefer to take Mr. Adam Salomon's own words on these points, and those I have quoted in "Naturalistic Photography." Mr. Robinson ought to know that a friend's interpretation of a man's views in art is always valueless, and especially so would Mr. Robinson's be, for he seems incapable of understanding anything out of the beaten track.

In this same issue of the *Amateur Photographer*, "F. R. C. S." (another cur without a name) dares to condemn Mrs. Cameron's portraits, than which none better have ever been produced by photography; and in the same breath, "F. R. C. S." gives a testimonial to Mr. Robinson's little book, which it needs from some one; but we should prefer such a testimonial, if to be of any value, to come from another quarter than the College of Surgeons, hardly an authority on aesthetics. Mr. Robinson proceeds in these "epoch marking" articles—as the *Amateur Photographer* calls his superficial, loose, slip-slod articles—to misrepresent my teachings; but these and others of his writings I shall treat of elsewhere, and in the proper place. Later on, May 3rd, a certain unknown Mr. Geldart gives another testimonial to Mr. Robinson's books, which he calls artistic and literary (*sic*). In the number for March 17th the editor of this paper talks of photography imitating Claude Mouet. Either he has not read my book, or not understood it, or else wilfully stated a misleading fact, for I have never advocated that photography should resemble the so-called "Impressiouist's" work, and I clearly stated this on page 22 of my book. In the same number there is a scurrilous letter by a lying coward who is unknown, and signs himself "Anon." This letter is headed, "In Search of the Naturalistics." The first part is a deliberate, coarse, brutal, and impertinent insult—such an insult as no gentleman would have admitted into his paper. But the letter has its ludicrous side, and says, "A Mr. T. F. Goodall is the only one who comes under the censure of the author's unmitigated praise." What the meaning of this illiterate sentence is, I must leave to your readers to guess. If it is intended as a joke, I suppose Mr. Robinson and the editor have done the laughing required; if seriously meant, it is a deliberate falsehood. Anyone interested in the matter can find a good dozen modern men mentioned in "Naturalistic Photography" with "unmitigated praise." This wonderful letter further says, "Michael Angelo and Raphael are not *in it* with Goodall, according to Dr. Emerson." Does this stupid fool think Galileo is *in it* with last year's senior wrangler? Yet Galileo is the greater. This ignoramus says there are no naturalistic works at the Grosvenor! He then, out of pure malice, says he found three of Mr. Goodall's paintings, "one of them skied, the others *tolerably well placed*" (italics are mine). This is deliberate misrepresentation, as anyone can prove by going to the Academy, for the two "tolerably well-placed" pictures could not be better placed. They are *on* the line, not *near* the line, as this unscrupulous nameless one says. The anonymous one could detect no art in these pictures—all educated observers can quite understand that—but as it *is* a matter of education, we will not wrangle, only refer the reader to a notice in the *Saturday Review* of June 1st. Then, still nameless, he goes to the new English Art Club, and finds nothing; still, that is not surprising. We strongly suspect the nameless one is of an advanced age, and it is a hopeless task to try to educate sexagenarians. Still, even Sargent, Shannon, Degas, Whistler, Bates, and many others *are* considered artists by some people, and I am one of them. The only true part of the letter comes at the end—he "came away quite convinced that he had made a mistake in wanting to be a genius." Certainly, poor old fellow; he had no chance. I am told that a certain person has been going about, naturally behind my back, but this time with a name, expressing almost in identical language these sentiments, at the Camera Club (a fine clubable gentleman for the Camera Club!), and it has been suggested he either wrote the letter, or got it written for him. Whoever and whatever he be, I now brand him as a liar and a coward, deserving the contempt of every upright man and gentleman, and with him I class "Nemo," whose brave letter I am coming to. On May 24th *The Amateur Photographer* contains another testimonial to Mr. H. P. Robinson. We cannot help wondering what he has been doing to deserve all those testimonials—testimonials, as a rule, mean dismissal or retirement.

Last week appeared "Nemo's" letter. This choice nobody begins by what is proved to be a false assumption, and invites a discussion on my work in *The Amateur Photographer*, an "independent field," which I hope none of my friends will enter, and so help the sale of that disinfectant paper. They are amusingly eager for a controversy—"all for the truth," we presume. "Nemo" goes on with this envenomed and malicious lie: "I can only surmise that they think it has been already sufficiently knocked on the head, for it seems to have no friends; except, perhaps, the editor of *The Photographic News*, a force that does not count."

These mendacious statements make us laugh most heartily. The PHOTOGRAPHIC NEWS, a force that does not count! and a book, the second edition of which is in the press, "being sufficiently knocked on the head!" They say laughter is the best of medicines; if so, we owe many thanks to "Nemo," of the *Amateur Photographer*. The statement that "Naturalistic Photography" has no friends is only another sweeping lie, which sounds suspiciously like the hiss of the green-eyed monster. As a matter of fact, amongst reviewers it has met with only three enemies—the *Amateur Photographer*, and what that is worth people can judge by "Nemo" and Company's letters; the *British Journal of Photography*, a trade journal, the property, I am told, of Messrs. Ross and Co., opticians; and the *Camera*, whose kindly editor, though not approving, behaves like the gentleman he is, but he might have saved himself the *faux pas* of mixing up modern impressionist work and naturalistic work, and he might have remembered my words on page 22: "Although we think the work of the so-called modern Impressionists but a passing craze." I cannot attach much importance to his judgment, however, since in the same number of the *Camera* he publishes a picture from one of Mr. Mostyn Clark's negatives, and from the context we gather that this is a reproduction from a photograph by Mr. Clark. It is, however, gentle reader, a reproduction of the *photograph of a water colour drawing* by E. H. Fahey. And this gentleman, who reviewed "Naturalistic Photography," knew so much of nature that he *did not know this difference*. But I forgive him, he had an ill-feeling. Now to enumerate the friends that "Nemo" denies me: the *Photographic News*, *Photographic Journal*, *Photography*, *Camera Club Journal*, *Journal de l'Industrie Photographique*, *Deutsche Photographische Zeitung*, *Scientific American*, *Photographic Art Journal*, *American Journal of Photography*, *Anthony's Bulletin*, *Photographischer Correspondenz*, and *Photographisches Mittheilungen*. Many of these reviews could not have been better had my best friends written them, and amongst the writers are many of the greatest living photographic authorities in art and science. Besides this, I have numbers of letters from leading photographers and artists which you, Mr. Editor, or any one else rationally interested, can see at any time with their permission.

The book has met with a reception that I never dreamed of, and I thank all my reviewers and friends from the

depth of my heart. As to your "laughable support," I need, sir, express no opinion.

But there is another lie to answer. Remarking on Mr. Chamberlain's letter, "Nemo" observes that it "consists almost entirely of excuses for the author's arroganee and petulanee, and suggestions for the improvement of the book," quite forgetting—for Nemos always have bad or no memories—that Mr. Chamberlain said, *inter alia*, he thought the book "an honour to England." Mr. Chamberlain I thank, and his criticism I shall answer in the proper plaee. Then "Nemo" alludes to his kindred spirit "Anon," *arcades ambo*! and ends his vivacious letter by calling you "dull!" By heaven, such letters make one blush for human nature; but the editor of the *Amateur Photographer* seems to revel in them.

I must apologise for the length of my letter, but it is as well to put on record the tacties of a certain section of the photographie press. I am still watching that "disinfecting" paper the *Amateur Photographer*, and invite all high-minded gentlemen to join in this vigil with me.—Yours faithfully, P. H. EMERSON, B.A., M.B. (Cantab.), &c.

SIR,—I have read Dr. Emerson's book with pleasure and profit, and I entirely agree with all you have written commendatory of it.—Yours obediently,

WILLIAM ADCOCK.

THE FLASH LIGHT.

SIR,—In a note in your issue of the 24th ult., Mr. W. H. Harrison is eredited as the inventor of the magnesium flash light. As there are several distinet methods of produeing the magnesium flash, it may be questioned whether any one person ean be properly ealled "the" inventor, but so far as eoncerns the first use of magnesium powder in the form of a flash, I have been under the belief that my deeeased friend Richard Larkin is entitled to that distinetion. At all events, it is reeorded in the *Pharmaceutical Journal* of June, 1866, that he exploded a mixture of ehlorate of potash and magnesium at a eonversazine held at the Society's rooms some little time previously, and that I took a photograph of the assembled guests by the light emitted. Mr. Harrison may have published the method at an earlier date without my being aware of it. Will you kindly supply the date of the publication on whieh you found the elaim made in his behalf? The matter may not be one of great importanee, but from a historical point of view it is desirable to settle it definitely.—I am, yours obediently,

June 4th, 1889. W. E. DEBENHAM.

Proceedings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on the 30th ult., Mr. T. KERR in the chair.

The HON. SECRETARY showed some prints on Liesegang's paper; time of printing-out, half an hour in the sun. By holding the prints over vapour previous to putting them in the acid bath, the colour was made more intense.

Mr. A. COWAN exhibited these plates. Two had been developed with hydroquinone and bromide of potassium and ammonium respectively, and one with hydroquinone without any bromide. The developer containing bromide of ammonium caused a yellow stain on the film. The other two plates were quite clear.

The HON. SECRETARY passed round some prints on plain salted paper. They had been lying about for some years, no particular care having been taken of them. They showed no signs of any deterioration. The washing had not been prolonged.

Mr. W. E. DEBENHAM said prints were not improved by a long washing, as a decomposition of the paper was liable to be set up in consequence.

A Member asked what precautions were necessary to keep the lines of a picture perfectly vertical when it was taken from a great height.

Mr. W. E. DEBENHAM said all that was necessary was to keep the plate perfectly vertical.

BATH PHOTOGRAPHIC SOCIETY.

A MEETING took place on the 29th ult., at the Royal Literary and Scientific Institution, Mr. PHILIP BRAHAM, F.C.S., in the chair.

Mr. F. W. Simpson was elected a member of the Society.

The pictures taken at the out-door meetings of April 25th and May 23rd were then shown. The first outing was at Farleigh Castle, a pleasant ride of nine miles from Bath. The old Chapel, ruined Gateway, and various other spots were photographed from different points of vantage. The second outing was to St. Catherine's Court, a beautiful house and grounds, part of an old monastery in the picturesque valley of St. Catherines, which lent itself well to the photographic treatment, and those results which were shown proved highly satisfactory. That the Society is making rapid strides may be judged from the fact that about two dozen members attended the out-door meeting, and the Bath Society paper *Bladud*, in noticing, remarked on the great success of the undertaking in Bath.

The SECRETARY then showed a series of negatives taken at Farleigh Castle, treated with different developers—hydroquinon, pyro and ammonia, potash, soda. The general feeling of the meeting seemed to be in favour of the potash.

Mr. ASHMAN also showed on behalf of Capt. Molesworth a series of negatives 10 by 8, depicting scenery and life in Madras and other places in India. These were inspected with much interest.

A framed photograph on opal, of Mr. C. H. Talbot (son of Fox Talbot), a founder of the Society, was then presented to the members by Mr. Friese Greene, the original negatives being taken by the electric light without the sitter's knowledge. The picture was admired for its delicacy, and upon the motion of the Chairman a vote of thanks was passed to the donor.

Mr. FRIESE GREENE exhibited sample pictures of his new process of rapidly producing proofs on an impermeable surface, and in reply to questions stated that the novelty consisted in rendering an ordinary mount impervious to chemical agents previous to coating the same with emulsion, and that all other operations were the same as for bromide paper. He recommended in the case of printing without retouching, that a piece of talc should be interposed between the negative and paper.

Mr. W. MIDDLETON ASHMAN (hon. sec.) then read his paper entitled, "The Emulsion Processes of Photography" (see p. 373). The delivery was accompanied by a series of experiments showing the method of compounding emulsions. Mr. Ashman also showed various specimens of emulsion on opal and paper, describing the various qualities to be sought after. He also drew attention to the perfect manner in which opal printing-out by contact can be done, together with the advantage of being able to inspect the progress as often as desired, in a frame devised by Mr. Offord, and previously exhibited by the lecturer at a meeting of the Photographic Society.

The CHAIRMAN thought the delicate balance between the sensitive compounds and the materials in which they were emulsified was a subject of interest to any Society. He was sure they would be benefited by the paper read that evening, and hoped that Mr. Ashman would give them a demonstration on dry plate making later on.

Mr. W. HARBUTT inquired whether daylight would interfere with the preparation of a printing-out emulsion.

Mr. E. PITMAN asked the comparative sensitiveness to bromide emulsion on glass or paper.

Mr. FRIESE GREENE wished to know the change in appearance of silver bromide after the blue stage had been reached.

Mr. W. PITT desired to know the best method of coating paper surfaces with emulsions.

Mr. ASHMAN, in reply, stated that an apartment shielded by yellow blinds would be a suitable illumination to work in. The speed of printing-out surfaces could not well be compared with development processes; they would be several hundred times slower. An emulsion which had matured beyond the blue stage, and become grey, might be extremely sensitive, or produce foggy images. The mixture of a grey emulsion with a slow one was often productive of good results; this, however, could only be ascertained by trial. Three methods were available for coating

small quantities of paper with emulsion. Wetting the paper and pouring over a measured quantity, setting on a levelled surface, and then suspending to dry. Floating paper on the surface of liquefied emulsion, and setting on a flat surface. Drawing the free end of a roll of paper over a vessel of liquid emulsion.

The CHAIRMAN, in conveying the thanks of the meeting to Mr. Ashman, impressed upon experimenters the importance of noting all results at the time, and not by any chance to trust to memory alone, for years after making an experiment something might crop up by which the notes would be of the greatest interest.

CAMERA CLUB.—PHOTOGRAPHIC SECTION SOCIETY OF NATURAL HISTORY.

THE first meeting of the month was held at the rooms of the Club, Cincinnati, on May 6th, Mr. BULLOCK in the chair. One new member was elected.

A motion prevailed as a sense of the Club that its interests would be best subserved by a declination of prizes of money value to members for work done on the annual excursion. A suggestion was adopted that the excursion committee offer diplomas for two or more grades of work done on the annual excursion, and that prints of the same be framed and hung in the club rooms with proper mention.

Mr. BULLOCK, after addressing the committee on the work expected of them, read a paper on composition generally, and the duties of the exhibition committee specifically, especially with reference to lantern slides.

The subject started a lively discussion, and more may be expected from it.

The reports of Treasurer and Librarian showed the Club to be in general good condition, forty-five new members being received during the year, making a total to date of 114.

The second meeting of the month was held on May 30th, when two members were elected.

Mr. KELLEY read a paper following the papers of Messrs. Johnson and Bullock at previous meetings. Mr. Bullock had maintained that general interest in the picture should determine whether it should be publicly exhibited. Mr. Kelley, not ignoring the interesting, thought that selections should be governed by the technical and general excellence of the photograph as well.

Dr. Le BOUTILLIER followed, advancing the merit of pictures with life in them, because they were apt to meet with applause.

Mr. FISHER advanced novelty as a very desirable feature.

Mr. PECK heretically advanced the view that as all cannot be great artists, if the photograph is good, and the maker and his friends are satisfied with it, it ought to be accepted.

Mr. JOHNSON thought that the exhibitions each year should show study and improvement as to general excellence.

The CHAIRMAN of the Exhibition, in moving the thanks of the Club to Mr. Kelley and the members taking part in the discussion, gave assurance that each and all the ideas advanced would be considered in their selections.

The Chicago slides were shown at the close of the discussion, following which Mr. Prince gave practical demonstrations with positive films. Mr. Bullock also showed samples of his work with same.

DERBY PHOTOGRAPHIC SOCIETY.

THE members held their fortnightly outdoor meeting on Saturday last, when by the kind permission of Mrs. Herrick they visited Beau Manor. At Loughboro' they were joined by the Loughboro' and Leicester Societies. The day was, with the exception of a little too much wind, all that could be desired, and about 125 plates were exposed on the Manor, Old Coach, and other objects of interest in the neighbourhood.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE usual monthly meeting was held on Thursday, May 30th, at Crescent Chambers North, the PRESIDENT (Mr. A. W. Beer) in the chair.

The minutes of last meeting were read and confirmed, and Messrs. H. W. Guthrie and H. S. Nicklin were duly elected members of the Association.

The HON. SECRETARY read a letter from the hon. secretary of the Photographic Club (Mr. Edward Dunmore) recommending the adoption of the metric system. He also exhibited Talbot and Eames's dark slide, which is made at a very moderate price and distributed samples of Scholzig's sensitised paper, sent by Mr. Scholzig for the purpose, speaking of it very favourably. He stated that he had been asked to try and report upon a sample of Beernaert's plates, which he had found all that could be desired, both in speed and facility of working. He also acknowledged a gift to the library of six volumes from Mr. Beer, the President.

The PRESIDENT read a letter from the Secretary of the Royal Infirmary, acknowledging in grateful terms the gift by the Association of a large number of spare prints. He then referred to the resignation of the present hon. sec., Mr. W. A. Watts, owing to business engagements, at which he expressed great regret.

Mr. HUGHES reported on the excursion to Rossett, which was fortunate both in numbers and in weather, and at which fifteen were present, there being about fifty-six exposures.

Mr. EARP reported on the one to New Brighton, at which there were seven, making sixty exposures; and

Mr. BEER reported on Bakewell and Haddon Hall, as to which he remarked "that it was moist when we started, the noontide was moist, and it was moist at night." However, there were eighteen present, making one hundred and fifty exposures.

Mr. WILKINSON exhibited some prints of Blanchard's process, and Mr. ARCHER showed and explained the new American detective camera, the most important feature about which is its extremely moderate price.

Dr. KENYON then gave his paper and demonstration on "Film Photography," in the course of which he remarked that there were three types of films—Eastman, Vergara, Celluloid. As regards the Eastman, the result left nothing to be desired, but the necessary work was somewhat laborious. The source of most failures in stripping he attributed to want of perfectly clear glass. He advised the use of Chance's patent plate, simply giving a thorough rinsing under the tap, and leaving to dry spontaneously; he also advocated the use of French chalk and the Eastman rubber solution. He exhibited stripping films in various stages, and successfully stripped one which had been attached to the glass for two years. The ferrous oxalate developed films strip more easily than those developed with pyro, which tends to render the gelatine insoluble. The Vergara film he described as rather slow, and requiring a special slide, otherwise no difficulty in working it. The Carbutt Celluloid film was simply perfect, and worked in all respects like a glass plate; the Fry celluloid he thought slower, but there was no more difficulty with it than with Kingston plates.

The meeting closed with a vote of thanks to Dr. Kenyon.

All communications for the Hon. Secretary should in future be addressed to Mr. W. Hughes, 7, Crescent Chambers North 3, Lord Street, Liverpool.

SHAFTESBURY PHOTOGRAPHIC SOCIAL.

THE above Club held their usual monthly social on Friday evening last, at 8.30.

Next Friday evening, at 8, Mr. Baker will give a paper on "Lantern Slide Making." Visitors are invited.

Talk in the Studio.

TESTING GLASS BY COLOUR REACTIONS. By F. MYLIUS.—(*Ber.*, 22, 310—314).—An aqueous solution of iodine kept in sealed tubes for a few weeks is completely decolourized, owing to the action of the alkalies contained in the glass: on adding dilute sulphuric acid, the solution again becomes coloured. When a trace of a very dilute solution of silver acetate or nitrate is added to an aqueous solution of starch and pure iodine, the latter becomes yellowish or colourless, owing to the combination of the free hydriodic acid; if, now, a little powdered glass is added, the solution is at once coloured blue owing to the formation of an alkaline iodide. (Compare Abstr., 1887, 568.) Experiments showed that the depth of colour produced in such solutions in a quarter of an hour by lead crystal glass, Thüringer glass, thermometer glass from Zena, and Bohemian glass, was greatest in the case of the lead glass, and gradually decreased in the order given. The following method can be employed for testing the quality of glass:—The surface to be tested is first carefully washed with

water, alcohol, and ether consecutively, and then covered with or in the case of tubes filled with, a solution of iodoeosine (0·1 gram) in ether (100 c.c.) which has been previously saturated with water at the ordinary temperature; after keeping for twenty-four hours, the glass is washed with ether. The surface will then be covered with a red layer, purple in transmitted light, the intensity of the colour varying with the degree to which the surface has been attacked. The coloured layer is generally homogeneous and transparent, but in very bad samples it is dull and crystalline; bad glass, moreover, cannot be freed from alkali by washing with water, so that the red colour is formed immediately, whilst with samples of good glass the colour is only produced after several hours. The principle of the method is that the free alkali produced by the action of the water in the ether, and the slight additional action of the "eosine acid," combines with the iodoeosine, forming a salt which, being insoluble in ether, is deposited on the glass. Experiments show that this method leads to the same conclusions as Weber's hydrochloric acid method (*Dingl. polyt. J.*, 171, 129). Glass containing lead is strongly attacked, and the mixture of lead and alkaline salts deposited on the surface can be separated by washing with water, the former remaining undissolved. Very slight variations in the surface can be detected; the difference in the intensity of the coloured layers produced with samples of the same glass, one of which has been kept in contact with cold water or dilute acids for twenty-four hours or heated with water for five minutes, is distinctly noticeable. If a glass tube, which has been submitted to electrolysis by Warburg's method, is tested, it is seen that the surface which was in connection with the anode does not become coated, as it is free from alkali; the other surface, however, becomes covered with a deep-red layer, showing that the proportion of alkali has been increased by electrolysis. The worst glass can be made capable of permanently resisting the action of water by first leaving it in contact with cold water for several days, and then heating to 300-400°. After this treatment no colouration is produced with the iodoeosine solution, even after several months' time, whereas the original material and some which had been heated only to 100° give a deep-red colouration in a few hours. When the better kinds of glass are treated with water, the difference caused by the subsequent heating is not so marked. In testing glass tubes, a colourless zone is frequently observed a little above the sealed end. This phenomenon is due to the primary formation of a layer of moist silica, which, on heating at 300-400°, becomes impervious to water; at the end of the tube this layer merges into the melted glass, which again becomes hygroscopic on solidifying. The inverse phenomenon occurs when tubes are sealed without having been previously cleaned. The alkaline compounds fuse on the surface of the glass, and even after washing with water, alcohol, and ether, the iodoeosine test shows a region rich in alkali; at the end of the tube, however, the alkalis have dissolved in the melted glass. Freshly broken surfaces, even of the best glass, immediately become covered with a thin red layer when thus tested.—*Journal of the Chemical Society.*

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The last ordinary meeting for the session will be held on Tuesday next, June 11th, at 8 p.m., at the Gallery, 5A, Pall Mall East, when matters of interest will be brought forward.

PHOTOGRAPHIC CLUB.—The subject for discussion at the next meeting of this Club, June 12th, will be "Rapid and Slow Gelatine Plates." Bank Holiday outing at Aylesford, Kent. Train from Cannon Street, nearest to 10 o'clock. It is suggested that members should enquire on Saturday as to Bank Holiday arrangements.

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," (but not letters intended for insertion under the heading "Correspondence") should now be sent to Mr. Spiller, who is alone responsible for all which appears under the heading "Answers to Correspondents." Such communications, if now sent to the Editor, are forwarded by him to Mr. Spiller. Failure to attend to the above instructions may lead to disappointment.

Answers to Correspondents.

This column is now under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, is placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

A BEGINNER.—1. There would be no objection to using the whole-plate rapid rectilinear lens for a five by four or any smaller size as a temporary expedient, having already such a lens; but the angle of view would be narrowed, and the exposure the same as for a larger picture. 2. In the diagram sent, the angle of view is not 45 degrees, but exactly the half of that, viz., 22½ degrees, as you will see by applying a quadrant scale. 3. The same lens would be suitable also for lantern slides and enlargements.

DOMINO.—All the portraits are well toned and printed, and the exposure seems about right in all cases, including the lady in dark velvet jacket, No. 2, and the little girl in white frock, No. 8; the retouching in the latter being much more successful than in the former, where much of the distinctive likeness is lost, particularly in the lower part of the face. The child, No. 10, is perfect as regards technical detail, but lacks animation. You seem to want the cuckoo clock or a child's toy to awaken the expression, and some of the adults would have been better for a passing joke—they are too serious. No 2 is a speaking likeness, but the attitude, as with some of the others, is rather stiff and formal. Too many of the pictures are direct front face; this was necessary with No. 5, but not with No. 9, nor with the right-hand figure of No. 1, who should have been looking inwards. The grouping of No. 4 shows a too rigid symmetry; good as regards the more prominent figure, but the girl behind has her arms awkwardly placed, and the right and left sisters are posed exactly counterpart. You seem to be troubled with grey eyes in the North, and for these, orthochromatic plates might sometimes be used with advantage.

J. S. T.—The fogging of your extra rapid plates may be due to over-exposure, if you are sure that your camera and slides are light-tight, and the quality of your dark-room illumination satisfactory. For moving objects, try Wratten and Wainwright's instantaneous plates with a quick-acting shutter.

CAMERA.—We cannot pretend to give you instruction in this place as to how to make a camera. It will prove a difficult task unless you are a good cabinet maker, and then the best way would be to copy an approved pattern after making close inspection of joints and parts.

T. E. (Aberdare).—Mr. E. J. Padmore's address is not known to us at present, but we will endeavour to procure it for you.

READER.—The freaks of photography in the *Pall Mall Budget* of 23rd ult. are all well-known camera expedients of easy execution, the skeleton accessory being of very questionable propriety.

LODER.—Your letter does not make it clear whether or not you have a photograph of your deceased friend. If so, does not the mount bear an address from whence other copies could be obtained? In the event of your portrait being faded or unsatisfactory, send it to Mr. Charles Heath, of 12, Pall Mall East, with full particulars, and he could possibly make a fairly satisfactory memorial portrait from it. If this answer is not sufficiently explanatory, be so good as to write again and let us have more specific details.

R. O.—Your failure in the preparation of potassio-chloro-platinite seems to have been due to the retention of some nitric acid or aqua-regia in the solution at the time of passing the sulphurous acid gas, so that on evaporation the platinous chloride becomes converted back again into the platinic salt, and so is precipitated by the chloride of potassium. Take more care to drive off the free nitric acid in the first stage of the operation, even by adding hydrochloric acid and evaporating down again, and then all should go well.

ACTINIC.—A velvet-covered inside shutter is a good contrivance for opening and closing the lens without indicating to the sitter the exact moment of exposure; and if this be worked with a pneumatic arrangement, so much the better.

RESIDUES.—The black powder left on dissolving your silver from residues, in nitric acid, is probably metallic gold in a fine state of subdivision. It should be filtered off, burnt, and reserved.

"DRY POINT."—We are informed that this is a description applied by Mr. Flather to his method of finishing enlargements, which gives the effect of a very delicate line engraving. It is not a patented method, nor, indeed, is any novelty claimed for it, so that anyone may practise it; but its cost is prohibitive of its general adoption, if Mr. Flather's charge—ninepence per square inch for finishing small sizes—affords means of judgment.

J. HAWKE.—Answered by post, and the letter from Cannes returned.

A. B. and E. F. also answered by post.

Other correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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THE AIMS, THE DEVELOPMENT, AND THE DECADENCE OF ART.

TIME was when the work of the artist and the handicraftsman was comparatively free and unfettered; when the man made the thing which he as an individual desired to make or form. This was the golden age of art, the period when the best, and probably also the worst, efforts of the human mind and hands were made towards the production of the desirably beautiful.

In a time of absolute freedom in art, every man will work according to his own inclinations, and he who has any sort of desire towards constructing the beautiful—whether by pleasantly forming or decorating something made for use, or by making a thing which is only to be agreeably beautiful—will put that desire in force absolutely without reference to what others have done; and the only thing common to such manifestations of the esthetic sense will be any bias or tendency running all through the human soul, if, indeed, there be any esthetic instincts universal throughout humanity, a matter concerning which we can only conjecture.

We may have on the one hand the wild screech of the school-boy uttered in the delight which he feels at the new unrestraint of the playground, and on the other hand a wondrous meditation of such an artist as J. Sebastian Bach when fingering his organ, and quite forgetful of the presence of any hearers, the subject in his mind becoming involved into the most wondrously constructed fugue. Each of these efforts may be a perfectly spontaneous work of fine art as distinguished from useful or industrial art; an effort towards the production of something which is *in itself* desirably agreeable. The primary aim of fine art, and the spring of all the truest efforts, is then the desire of the artist to construct something having an element of beauty which he himself can enjoy.

We now come to the influence of an outside taste, which, if free and untrammelled by convention, may do much, and has done much, to preserve the best and to destroy the worst. The first by-passer may kick over the laboriously-constructed mud-pie of the child, while a rough clay study by Flaxman—constructed, may-be, with less labour and expense of time than the mud-pie—may be carefully preserved from generation to generation. Hence it is that every period, enlightenment has resulted rather from the esthetic spirit being developed throughout the people, than from the special training and bringing into existence of a sort of artistic priesthood; indeed, the existence of a priesthood—whether social, religious, or artistic—tends to the making of conventions, in which conventions the primary springs of free human action seem to become step by step engulphed, obliterated, and, may-be, altogether annihilated.

A powerful convention may, and often does, spring from a very trifling circumstance; a loud-spoken individual—or, may-be, a corrupted press organ—speaks in high praise of certain sorts of things; and many who have no real opinion, taste, or view of their own, but who are ashamed that others should know this of them, take up the view and the arguments for it, and so bring fresh persons into the convention until it permeates society, and those who really have opinions of their own do hesitate to express them lest they seem to differ so much from other men as to bring despite upon themselves. Andersen's tale of the king's new garments gives us a picture of the very inmost heart of a convention. While the king rides naked through the streets, the whole people applaud the magnificence of his robes; each, like the king himself, fearing to be considered unfit for his office, as it had been laid down by the charlatan tailors that the clothes they would make would only be visible to such as were worthy. The convention here falls like a card-house when a child expresses surprise that the king has nothing on, and in this we have a picture of the way in which conventions break up.

The artist of our day is bound down so closely by conventions as to have but little spontaneity in his work. He is bound, in the first place, to live as if he were prosperous and doing well, because the holders of considerable money are, as a rule, unable to trust their own judgment, and they form their opinion of the works of an artist by the extent to which his works are sought after and purchased. Secondly, because he must study mainly to make productions that will sell; that is to say, that come within the commercialist convention. Again, he must constantly busy himself with constructing portraits for hire, a thing quite inconsistent with the exercise of art instinct. The priesthood among the artists are the very men whose financial success is the outcome of the conventions, and naturally they do that which tends to strengthen the conventions.

The time, therefore, is gone by—at least, in civilised countries—when the general work of the artist or craftsman is the outcome of his real self-humanity or of his imagination. The modern workman labours in obedience to his master, and he constructs according to the patterns furnished to him; indeed, more often than not he only performs one small operation in the process of making to pattern, in order that his master may sell at a profit.

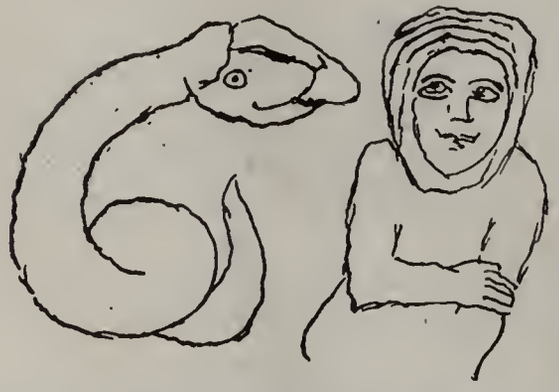
No longer is the word "maker" synonymous, or nearly synonymous, with "artist," the change being due to our nineteenth century mode of production.

The mere wholesale copyist, then, is a constructor in the barest sense of the word, one whose position is quite distinct from that of the artist or true maker; and there are those who trace the first degradation of art from the time when the first portrait or copy was constructed; and in connection with this we may refer to the remark of Mr. Oscar Wilde, quoted on page 680 of our volume for

1885. "Ugliness," said the apostle of Estheticism, "made its initial inroad upon art when the first bust or portrait was constructed." To clearly understand the meaniug of the quotation the reader should refer back and perusc the remarks which follow it. The point we wish to insist upon now is that mere imitation is not art. The plastic artist is one who puts into tangible form the imaginations of his mind, while the mind of the spiritual artist may manifest itself in music or in story.

Let us not be misunderstood when we say merc imitation is not art: we would say imitation as imitation. A man may bc so delighted with some natural object—thc expression of a face, a tuft of grass, or a landscape—that he desires to make a pictorial record of such object. In doing this, he may be a true artist workiug for the delight of what he does; indeed, his work consists rather in making a record than an imitation. Indeed, he does not make an imitation in any such sense as is the case with the man who makes "high art lamps" for a commercialist master, in accord with a pattern or detailed drawings furnished to him—he rather seeks to record one phase of the thing which he looks on or perceives—just that phase which delights him; and here, perhaps, we have the key to the so-called "impressionism" in art.

In illustration of the true effort rather towards getting at the spirit of a uatural object, than towards becoming a mere copyist or imitator as far as paper and pencil will allow, Mr. Ruskin makes reference to the Temptation of Eve as depicted by an early Italian artist, and now at Milan. "In that sketch," says Mr. Ruskin, "rude and



ludicrous as it is, you have the elements of life in their first form. . . . This fellow does not want scales nor coils—he can do without them; he wants the serpent's heart—malice and iusinnation; and he has actually got them to some extent. So also a common workman, even in this barbarous stage of art, might have carved Eve's arms and body a good deal better; but this man does not care about arms and body if he can only get at Eve's mind—show that she is pleased at being flattered, and yet in a state of uncomfortable hesitation; and some look of listening, of complacency, and of embarrassment he has verily got. Note the eyes slightly askance, the lips compressed, and the right haud nervously grasping the left arm. Nothing can be declared impossible to the people who could begin thus; the world is open to them and all that is in it; while, on the contrary, nothing is possible to the man who did the symmetrical angel. The world is keyless to him; he has built a cell for himself in which he must abide, barred up for ever."

Subjoined is a sketch of the "symmetrical angel" referred to iu the passage we quote from Mr. Ruskin's "The Two Paths."

Mr. Ruskin refers to this figure of the "Symmetrical Angel," taken from an eighth century psalter, to show the utter hollowness of the teaching of those who set out instructions in picture-making based upon such rules as "Leading lines and masses should be balanced and compensated;" "Several lines running in one direction would give a sense of falling if they were not balanced by other lines running iu another direction opposing them." The angel has all the *merits* of accord with the directions of the school of construction according to rule, yet we venture



to think it by no means a worthy example of fine art. Speaking of the school of constructors according to rule, Mr. Ruskin says ("Two Paths," edition 1859, p. 27): "Now you see the characteristics of the utterly dead school are, first the wilful closing of the eyes to natural facts; for, however ignorant a person may be, he need only look at a human being to see that it has a mouth as well as eyes." . . . . "You will also admire, doubtless, the exquisite result of the applications of our great modern architectural principle of beauty—symmetry, or equal balance of part by part; you see even the eyes are made symmetrical—round instead of irregularly oval; and the iris is set properly in the middle, instead of—as nature has absurdly put it—rather under the upper lid. You will also observe the principle of the pyramid in the general arrangement of the figure, and the value of 'series' in the placing of the dots."

(*To be continued.*)

A BIOGRAPHICAL NOTICE OF THE LATE PROFESSOR DONKIN.

In the Proceedings of the Chemical Society we find a short notice of the life and work of the late W. F. Donkin, which notice many of our readers will be interested in reading.

"W. F. Donkin was the eldest son of the late Savilian Professor of Astronomy at Oxford. Born in 1845, he went at an early age to Eton, where he was educated, and where he obtained distinction in natural science. On leaving, he read for a Demyship in that subject at Magdalen College, Oxford, and was elected in 1865. Taking his degree with honours in 1868, he prosecuted his favourite study of chemistry, and became Assistant Demonstrator in the University Laboratory, besides undertaking other duties, such as those of Public Analyst to the County. He also became Science Tutor of Keble College. He married in 1876, but lost his wife the following year. This grief led him before long to think of leaving Oxford, and when, in the course of a year or two, the Professorship of Chemistry in St. George's Hospital became vacant, and was offered to him, he accepted the post, and came to live near London. To the study of chemistry he now began to add that of electricity, in which he speedily became proficient—especially in the direction of electric lighting; here, his beautiful dexterity of manipulation stood him in good stead, and he acted for some time as scientific experimenter to a well-known electrical firm, by whom his opinion was much valued. Indeed, in the opinion of one well qualified to judge, he was rapidly making his mark as a leader in experimental investigations requiring high chemical and electrical knowledge.

"His marked liking for scientific pursuits was early shown; thus, when about ten years old, and when, on account of his father's health, a winter had to be passed in

Madeira, he made a collection of the beetles of that island, and again a year or two later he collected, ground, and polished a number of geological specimens of the rocks at Clifton. About this time, also, he began photography, his apparatus consisting of a little wooden box made by the village carpenter, which served as camera, and a common magnifying glass in a pill-box for lens. With this humble outfit he produced some very respectable photographs, and it was not long before his perseverance attracted the attention of a friend, who made him a present of a camera and lens, with which he made further and rapid progress. What his ultimate attainments in photography were, especially in Alpine photography, it is scarcely necessary to say. The exhibition of his Alpine and Caucasian photographs, which was lately open at the Gainsborough Gallery, was probably unique, for few men, if any, joined as he did great powers as a mountaineer to great skill in photography.

"Besides making a name for himself as scientist and climber, Mr. Donkin was also an excellent musician, having inherited the talent from his father. Many may still recollect the family quartetts in which he played the viola. His steadiness and experience were such as to make him a useful addition to a performance, even when professional artistes of the highest rank were playing, and of late years he took on several occasions the viola part in quartetts and quintetts led by Joachim. He also did much towards furthering the cause of music in the people's concerts in the East End, and was always ready, at whatever inconvenience to himself, to help where his aid was asked.

"In 1884 Mr. Donkin became honorary secretary of the Photographic Society, and in 1885 of the Alpine Club. In 1886 he went to the Caucasus with Mr. C. T. Dent, now the president of the Alpine Club, and last year he made a second expedition there, taking as a companion Mr. H. Fox, and Mr. Dent again accompanying him. Mr. Dent was compelled to return through illness, and Mr. Donkin and Mr. Fox, with their two Swiss guides, continued their mountaineering. On the morning of the 29th or 30th of August the party started to cross a glacier pass at the eastern base of the great peak marked on the Russian map as Dychtau, with the intention of bivouacking beyond the pass, and attempting the peak next day by its south-eastern surface. They were never seen again, and it is probable that some disaster must have overtaken the travellers and their guides in the attempt on Dychtau. Few men have been more widely mourned than Mr. Donkin; his modesty, unselfishness, and fine character endeared him to all with whom he came in contact, and his death has caused a blank in many quarters which it will not be easy to fill."

SPECTROSCOPIC AND PHOTOGRAPHIC OBSERVATIONS AT GREENWICH OBSERVATORY.

The following is from the Report (dated June 1, 1889) of the Astronomer-Royal :—

For determination of motions of approach or recession of stars, 236 measures have been made of the displacement of the F line in the spectra of 38 stars, and 18 of the *b* line in the spectra of 8 stars, besides 5 of the *b* line in the spectrum of Saturn's ring, and comparisons with the spectra of the Moon, Venus, the Sun, or the sky, as a check on the general accuracy of the results. Observations of Algol on three nights during the past year confirm the previous results indicating orbital motion, but further evidence is required to establish the fact. The spectra of γ Cassiopeiæ, o Ceti, β Lyræ, P Cygni, R Cygni, and β Pegasi, have been examined on several occasions, and Comet *e* 1888 has been spectroscopically observed on one night, the spectrum being chiefly continuous. The spectroscopic observations of all kinds are completely reduced.

In the year ending 1889 May 10, photographs of the Sun have been taken at Greenwich on 182 days, and of these 358 have been selected for preservation, besides 12 photographs with double images of the Sun for determination of zero of position.

For the year 1888, Greenwich photographs have been used on 177 days, and photographs from India and Mauritius filling up the gaps in the series on 182 days, making a total of 359 days out of 366, on which photographs have been measured in this year.

The Sun has been free from spots 155 days in the year 1888, the longest spotless periods being February 4 to 17, May 24 to June 8, and October 4 to 25. The mean spotted area in 1888 was half that of the preceding year, and correspouded closely to that for 1877, so that the minimum may be expected to occur during the present year. The mean distance of spots from the equator has also diminished to 7°·38 in 1888, being very little larger than it was in 1878, just before the last minimum, and this is a further indication that the Sun-spot minimum is close at hand. The faculæ in 1888 show a diminution in correspondence with that of Sun-spots, their area for 1888 being intermediate between those for 1876 and 1877.

The photographic reductions for 1888 are completed, and the copy for press is prepared.

The photographs from India and Mauritius have been received from the Solar Physics Committee as far as 1888, Dec. 31 and Dec. 9 respectively.

THE EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The Exhibition will be inaugurated by a *conversazione*, on Saturday evening, the 28th of September, and will remain open daily (Sundays excepted) from Monday, the 30th September, until Wednesday, the 13th of November.

Medals will be placed at the disposal of the judges for artistic, scientific, and technical excellence, and for lantern transparencies and apparatus.

Judges :—Messrs. W. Bedford, V. Blanchard, G. Davison, W. England, J. Gale, H. P. Robinson, and J. Traill Taylor.

Each exhibitor in the picture department must fill up a printed entry form supplied by the Society. This must be enclosed and addressed to the Hon. Secretary, Photographic Society of Great Britain, 5A, Pall Mall East, London, S.W. At the back of each frame must be written the name and address of the exhibitor, with the title or description of the picture and the number (if there be more than one) to which it refers in the entry form. Each frame or picture may have the exhibitor's name and the subject of the picture neatly inscribed, but no address or anything in the shape of an advertisement will be permitted. Pictures in Oxford frames, and pictures previously exhibited in London, will not be admitted. It is suggested that when any work shown is taken by a special process prepared and made by the exhibitor, information as to particulars should be communicated.

Each exhibitor in the apparatus section must fill up the entry form supplied by the Society, and write a concise description of each piece of apparatus, and on the exhibit itself a removable card must be attached, containing the name of the exhibitor and the number to which it refers in the entry form.

No charge will be made to members of the Society for exhibiting their pictures; but to non-members a charge of one shilling per square foot will be made for wall space, the minimum charge being five shillings. No charge for wall space will be made to foreign exhibitors.

The apparatus being now under the personal supervision and explanation of a competent attendant during the whole time the Exhibition is open, a fixed charge is made of five shillings to members and ten shillings to non-members, which, in all cases, must be enclosed with the entry form, or such apparatus will not be received.

A list containing the price of pictures and apparatus to be disposed of will be laid on the table. It is desirable that professional exhibitors should state the price of their pictures on the entry form, as frequent inquiries are made to the Assistant Secretary (who is in charge of the exhibition every day) respecting the price of framed and unframed copies. Ten per cent. commission will be deducted on sales.

THE CENTENARY EXHIBITION AT PARIS.

BY OUR SPECIAL COMMISSIONER.

THE BRITISH PHOTOGRAPHS—(*continued*).

MR. W. J. BYRNE sends a large display of panel portraits, half of which are silver prints on albumen paper, whilst the remaining half are platinum prints. There are many of these pictures worth study; the lighting is frequently unconventional, a circumstance arising from the fact that the photographs in these cases have been taken at the residences of the sitters, and not under the ordinary glass roof. A portrait of the Hon. Mabel Hood seated at an organ brings back some memories of a painting of St. Cecilia. Amongst the larger exhibits there is a group which, however good as a photograph, and satisfactory as portraiture to the friends of the sitters, is not altogether pleasing as a picture. A lady with two little girls and a spinning wheel is accompanied by a boy in a silk fancy dress. Some half dozen other large photographs, two of which are life-size, complete Mr. Byrne's display, which is a creditable one, and a study of which will repay the photographer who, having fallen into a certain routine in the matter of pose and lighting, is desirous of importing some freshness of style in order to give variety to his work.

Mr. J. Blaine Scott exhibits some large photographs printed in platinotype and carbon. Perhaps the most striking of these is the portrait of a lady standing almost in profile. The photography is good, but there is a plant, the leaves of which come close beside the head, and the powerful light and shade on this accessory somewhat detract from the general effect. There is also some retouching on the print, which is of a different colour from the photographic image, and is thus made unpleasantly evident.

The largest display in the British photographic department is that made by Count Ostrorog Walery, whose entry in the catalogue reads—"Photographic portraits and views, silver prints, carbon and platinotype prints, photogravures, enamels," and who is largely represented in several of these items. Two portraits of the Prince and Princess of Wales are so much retouched, as to prevent a strict judgment from being formed on the photographs themselves. Several negatives are represented in duplicate, one print being in platinum, and another on albumen paper.

As the tendency of Walery's work is to be bright and powerful, rather trenching on hardness, it is not surprising that the platinum prints show to greater advantage than the silver ones. This is very evident in a panel picture of a female figure bearing a pitcher on the shoulder. Here the negative is decidedly too intense for obtaining the best result with silver printing, and the greater softness of the platinum print is decidedly advantageous. It is to be regretted, however, that the fringe of hair on the forehead in the platinotype is so manifestly touched-in on the print.

Another style exhibited shown by this exhibitor—a style which is well suited by the great vigour of the negatives—is that of printing, in what is commonly called the carbon process, in pigment of a reddish or terra-cotta colour. Several examples in this style have a very pleasing effect. Of five large portraits, about 22 inches by 15, the least satisfactory is that of a lady whose elbow rests upon some fur trimming, and from whose hand a fan drops perpendicularly. The most interesting and satisfactory portion of Count Walery's display is a case of burnt-in enamels. Some of these are excellent, and several of them are coloured, and well coloured. One is of large size for work of this character, measuring about 11 by 9 inches. Two stands, each contain twenty-four portrait prints in platinum, and under these are twenty-four subjects, reproduced from originals in the South Kensington collection. Amongst the portraits are some with plain backgrounds, and these will be found more to the taste of many than the showy backgrounds which predominate in this collection. Specially to be noted are fine portraits of Sir F. Leighton and Sir Morell Mackenzie, also of Mr. Irving, one of the latter being a head of larger size than the majority of the exhibits.

Facing the collection of photographs are the stalls allotted to exhibitors of apparatus—Messrs. Watson and Son, Shew and Co., and Sands and Hunter. Behind these is a large stand bearing the name of Van der Weyde, but there were no photographs as yet on view, a fact to be regretted, as interfering with the completeness generally characterising the British Section at a time when the displays of other nations were so behind-hand. The works of another exhibitor (according to the catalogue), Werner, of Dublin, we failed to discover, and some fine large portraits by Fergus, of Largs, including a bold life-size head, apparently taken direct, of Mr. Gladstone, were standing on the floor ready for hanging.

THE FORM AND APPLICATION OF SINGLE LANDSCAPE LENSES.

BY T. R. DALLMEYER, F.R.A.S.*

IT is not my intention to trace historically the development of modern forms of single landscape lenses, but to indicate how far they can fulfil the various purposes for which they are designed.

The following considerations are involved:—1. Rapidity—2. Corrections, centrically and excentrically, consistent with definition—3. The amount of angle included—4. Distortion—5. Curvature of field—6. Brilliancy and freedom from flare spot.

I shall refer to four forms that I construct myself, but the general treatment of these will, I hope, cover the ground sufficiently to aid those who wish to carefully investigate the properties of the instruments in their possession, and the purposes to which they are best applied.

It is the number of considerations to be borne in mind in the construction of a single landscape lens, some of which are at variance to others, that renders its construction of the same rapidity as a double combination an impossibility; but the brilliancy of image given by single combination lenses has made them perhaps the most popular form with photographers generally, where they can be employed. If the central pencil only had to be considered, a single lens can be made, of course, of a very high intensity, f, and even quicker; but only a degree or two from the axis all definition is gone.

The compromise then begins; how large an aperture can be employed consistent with good marginal definition, &c. Fig. 1 represents the simplest form of single combination, known as the "Wilsonian." It consists of a plano-concave flint, cemented to a double convex crown, and is successfully constructed for lenses up to 8 inches focus, working at an intensity f_{16}, entirely free from spherical aberration. For reasons subseqnently to be explained this form is not to be recommended for larger lenses. Fig. 2 represents the triple meniscus, introduced in 1867, and known as the wide angle landscape lens. Fig. 3 is the rapid landscape, specially constructed to work at longer foci than the former on given sizes of plates, and about double the rapidity without spherical aberration. Fig. 4, the new rectilinear landscape lens, I introduced last year, intermediate between the two former in point of rapidity, possessing certain distinct advantages over the others, and the theoretical disadvantage from the open air space between the corrector and the single posterior lens that forms the image. This I shall refer to later. I have

* A Communication to the Photographic Society of Great Britain.

prepared a table having reference to the figures in the points of investigation referred to at first.

I will now treat of the six heads in the table; but before doing so will describe a simple means for examining the lenses to be critically tested in these respects. Concentric with the axis of the lens, and about ten to fifteen times its focal distance, place a naked lamp-flame of small size, and near to it the bulb of a thermometer filled with mercury, so that the small bulb is visible closely adjacent to but a little behind and to the right and left of the flame. The image reflected by the bulb of the lamp-flame acts very well as an artificial star or point of light. When the lens is screwed into the camera, and then focussed upon the lamp, you can tell if all is properly centred by removing the focussing screen and viewing the reflected image or images visible, and if all are seen in a straight line and in one plane, then you are sure of having all true to view the central pencil. It is also an advantage to have a small scale behind the lamp-flame, with various graduations and figures, as an additional guide to the defining power. An illuminated bright cross is also a valuable test object for judging the correction for astigmatism. I assume in the table the lens to be actinic—viz., that the chemical and visual foci are coincident; and as this test has often be explained, I shall not enter upon it now, although it is of course of first importance that lenses are perfectly corrected in this respect.

1. *Rapidity or Intensity free from Spherical Aberration.*—The test for freedom from spherical aberration is in plain language that the lens gives a *sharp image*. On focussing the lamp-flame and artificial star sharply, and slightly wheeling the screen in and out of focus, the structure of the image should vanish equally on both sides of the focus. If a sharp image cannot be obtained, but an image with a woolly halo round it, there is aberration present; on wheeling the screen inside the best focus the image will at once disappear, but on wheeling it outside the structure of the image will linger more or less according to the amount of positive spherical aberration present. To judge fairly of the true power of a lens in this respect (even for the central pencil), smaller and smaller stops should be introduced until the definition is such that spherical aberration is not present—the ratio of this diameter to the equivalent focus of the lens is then the true measure of its intensity for the central pencil and the gauge of its rapidity. It is distinctly misleading to claim for a lens an intensity other than that at which spherical aberration is eliminated. The advantages that accrue from the introduction of spherical aberration, when measurable and reproducible to obtain soft images, are generally acknowledged, and it is then advisable to allow single combination lenses to have a *larger* aperture than eliminates all positive spherical aberration for certain purposes, so long as the structure of the image is not destroyed; but I maintain that the basis on which to register the true intensity of a lens is that at which no aberration is present. I have clearly demonstrated, in a discussion that occurred in the PHOTOGRAPHIC NEWS, how positive spherical aberration assists in producing softer definition, and how the

Style of Lens.	Intensity (free from uncorrected aberration). (1)	Quality of correction of excentrical pencil. (2)	Angle included, for parallel rays.	Distortion.	Curvature of field. (3)	Brilliancy and flare spot. (4)
Fig. 1. Single Stereo Lens ... Focus, 6 inches.	$\frac{F}{10}$	Appreciable astigmatism at extreme edges of plate; more pronounced than in Figs. 2 and 3.	Extreme angle = 71°. Angle included on base line of 5 × 4 plate = 45°.	Measurable at margins of full covering power.	Very flat; can hardly be measured.	No trace of flare spot. Equal illumination over 35° (full aperture).
Fig. 2. Wide Angle Landscape Lens. Focus, 10 inches. Plate, 10 × 8 ,,	$\frac{F}{15}$	Slight astigmatism combined with coma out at extreme edges.	Extreme angle = 77°. Angle on base line of 10 × 8 plate = 53°.	Measurable and visible to eye at extreme edge of plate.	Not measurable, or hardly so.	No flare spot. Equal illumination over 50° (full aperture).
Fig. 3. Rapid Long-Focus Landscape Lens. Focus, 15 inches. Plate, 10 × 8 ,,	$\frac{F}{11}$	Slight astigmatism and trifle more coma out than above (Fig. 2).	Extreme angle = 65°. Angle on base line of 10 × 8 plate = 36°.	Can be measured with straight edge, but hardly appreciated by eye on 10 × 8 plate.	Measurable, about $\frac{1}{16}$ inch at edge of plate.	No flare spot. Equal illumination over 22° (full aperture).
Fig. 4. New Rectilinear Landscape Lens. Focus, 13½ inches. Plate, 10 × 8 ,,	$\frac{F}{13}$	Almost free from coma at extreme edges of plate and no astigmatism.	Extreme angle = 68°. Angle on base line of 10 × 8 plate = 40°.	None	Measurable, and slightly more than above.	No flare spot. Equal illumination over 25° (full aperture).

(1) Can be used with larger apertures, introducing positive spherical aberration, giving softness to image.
(2) and (3) The use of smaller stops benefits both.
(4) By employing smaller stops, perfectly equal illumination can be given to the whole plate.

definition of planes more distant than that focussed for gives "depth of focus." Single rapid landscape lenses are now considerably in vogue among amateurs for portraiture, and an extra large aperture, having a certain amount of positive spherical aberration outstanding, produces the soft pictures so much admired by many. I wish to lay particular stress in this paper on what I term the rendering in the image of *true structure*, and the bearing of the introduction of positive spherical aberration consistent throughout the whole image, where soft pictures or *impressions* are wanted (I refer to the excentrical as well as the central pencils), is distinctly and undeniably advantageous for planes in the object beyond those focussed for.

2. *Correction of Central and Excentrical Pencils.*—It is impossible, in the short time allotted, to fully treat of this head. After a careful examination of the central pencil, move the camera by slow stages on its axis, so that the image of lamp-flame and star become nearer and nearer to the edges of the plate, and note, stage by stage, the quality of the image and the falling off of definition with a magnifier. By gradually examining the *structure* of the image of the object at different distances from the centre, and, when indifferent, inserting diaphragms until a sufficient definition is obtained, you will easily record the power of your lens by noting, for example: Image on screen required in full detail is 6 inches square on a 10 inch by 8 inch plate; stop No. so-and-so, or $\frac{f}{a}$, must be used (I leave out now the question of depth of focus; that has been treated of before). Again, if the entire plate has to be filled, observe test objects at extreme edge of plate, and note stop for this, and so on. The chief errors met with are astigmatism and coma; the former is destructive of all definition; the latter, if very *aggravated*, destroys the structure too, but if nearly entirely eliminated the structure is not destroyed, and a brilliant image is the result. In constructing large lenses of the form fig. 1, the astigmatism and violent coma produced render them of little use. Proper corrections for the lens in this respect must be consistent with a sufficiently flat field that it shall be a useful instrument. A perfect lens should show the lamp and star the same throughout the entire field as for the centre. My own

experience lately has shown that great improvements in this respect are gained by employing some of the Jena glasses; but unfortunately those that should show very material advances are marked with the danger signal for lasting properties.

3. *Angle of Circle of Illumination.*—This is well to know, as you are certain of what plate can be fully illuminated, and with a given lens how much the sliding front of a camera may be used, not to run the risk of leaving unexposed corners. It is best found by screwing the lens on a larger camera than that it is usually employed on, finding the measure of the circle of illumination given, and with a known focus determining the angle included. Lenses are constructed, including various angles, according to the requirements of the situation, and on referring to the diagram the largest angle is seen to be included by the wide angle landscape, and the least by the long focus. There is no doubt that for pictorial effect the lens including a small angle gives a more pleasing picture. This has been fully entered into from the art side of photography that has been ably handled by well-known authorities. The eye of itself, without movement of the head, only includes about 40° or less, and any picture including very wide angles produces an unpleasant effect in that the foreground appears exaggerated and the distances dwarfed. For purposes of record, and where a good deal of subject is desired to be included upon the plate, the use of wide angle lenses is, of course, essential; but it must be borne in mind that because a lens is called wide angle it need not necessarily be strained to its full extent; and any number of lenses, no matter what their form, of a given focus, and working on a given size of plate, would all include the same angle. However, the question of including a large angle is at variance (when free from spherical aberration) to working with a large aperture, and hence the reason of producing a more rapid lens, such as the long focus rapid landscape, where considerably less angle on a given plate is included, compared to a shorter focus used on the same plate, as in the case of the wide angle landscape.

4. *Distortion.*—The great drawback to single cemented combinations with the diaphragm placed in front, due to the position of the diaphragm, is a measurable marginal curvature of straight lines. In the wide angle landscape this is distinctly measurable. The diaphragm is in much closer proximity to the lens than in the narrow angle landscape lens, and, although it possesses certain commendable features in its equality of illumination throughout the plate, it has the disadvantage of a pronounced marginal distortion which renders its use prohibitive for architectural purposes. Curvature of field is remedied by placing the diaphragm further away from the lens, but the angle included, and the equality of illumination, are interfered with. Where a small angle only need be included, as in the rapid landscape lens, the diaphragm is placed therefore at a greater distance, and the curves and glasses employed are so arranged that it is free from spherical aberration with a much larger aperture, and hence it works more rapidly. As the angle included is small, and the focus long, compared to the size of plate used, it is admirably adapted for making features of distant objects where little subject only is desired to be portrayed, and can be used for instantaneous effects, such as distant views, yachts in motion, instantaneous street views, &c. Distortion, although it *can* be measured, is hardly appreciable. The rectilinear landscape lens that I introduced last year is constructed with the special object of entirely curing the defects of single cemented combinations, and at the same time maintaining their advantages. This lens includes an angle intermediate between the others, and there is no trace of marginal distortion, and hence it can be applied to architectural subjects as well as ordinary landscape work. The quality of its marginal definition is so fine that it has proved a most useful lens for copying purposes, interiors, &c.

5. *Curvature of Field.*—This is a very important point to be investigated. The test objects should be carefully focussed for in the centre of the plate, and then the camera turned on its axis, and the image viewed at its edges, when it will be found necessary, according to the correction of the lens, to screw it in more or less. If the curvature of field is very great it easily accounts for the fact that the lens will not give on a plain surface clear definition throughout. This subject has always been a very difficult matter to cope with, for in obtaining a lens with very flat field, astigmatism, as a rule, comes in to such an extent that definition is destroyed, hence it is for the optician with the material at his disposal to produce the best mean between the allowable amount of curvature consistent with the best correction of the excentrical pencil itself. The curvature of field becomes less and less noticeable the more the lens is stopped down, and a careful examination in this respect of the powers of the instrument should also be gauged and taken note of for reference.

6. *Brilliancy.*—The charm of single combination lenses is chiefly due to the brilliancy of the image they usually give. The larger the angle included, still admitting the full pencil of rays through the diaphragm, the more equal will be the illumination or uniform brilliancy of the picture produced. To measure this, focus upon the lamp-flame, and then screw the camera screen in some little way. When central, an illuminated disc of light, perfectly spherical, appears upon the screen. As this is moved towards the edges of the plate it will still remain perfectly spherical so long as the full pencil of light traverses the glass of the lens. A point will be found on either side of the axis at which that disc begins to alter its shape by being cut off on one side, showing where a portion of the full pencil has begun to be cut off. This continues until the remainder of the disc entirely vanishes as it is removed to the limit of the angle included. The more even the illumination, the more brilliant will be the image produced, if this is consistent with the correction of the excentrical pencils, as before explained. Another point influencing brilliancy to be observed is the number and position of reflected images. I proposed this evening to treat of this subject, but it is such an extensive one that I have not yet been able (through lack of time) to present it to your notice fully investigated. I am of opinion that the brilliancy and position of the reflected images must be more or less detrimental to brilliancy of the whole image; but according to the forms of the lenses employed, and their positions relatively to one another, will depend the influence which such reflected images will bear to the brilliancy of the whole image. I pointed out, in a letter in reply to Mr. W. K. Burton, in the PHOTOGRAPHIC NEWS, how I explained that the air space in the rectilinear landscape did not cause it to suffer in its brilliancy so much as would be the case in the doublet with a diaphragm placed between them, and this point I would refer you to for investigating the effects produced. Mr. Burton wrote a reply in the form of an article in the PHOTOGRAPHIC NEWS, and I hope to have the pleasure of contributing a full paper upon this subject later on. Another important consideration in brilliancy is that known as flare spot. No properly constructed lens should possess this. Its cause and cure were explained many years ago by my late father; but it may be of interest to know the method of practical cure, in addition to the usual hint thrown out, is to move the stop a little bit in one direction or the other. If the camera be turned towards strong daylight, and focussed for parallel rays, then the screen removed, and the eye placed at some little distance behind the screen, should flare spot be present, the appearance of the lens is that of having a bright ghost-like circle partially covering the disc of the lens. By moving the stop, either to or from the lens, the size of this disc will alter, and if it be so placed that this ghost-like disc covers the whole, or as large a portion of the lens surface visible, the flare spot will be cured.

FRENCH CORRESPONDENCE.

ORTHOCHROMATIC PHOTOGRAPHY—DIRECT CONTRETYPES—INTERNATIONAL CONGRESS OF PHOTOGRAPHY—MEASUREMENT OF THE INTENSITY OF LIGHT—THE UNIVERSAL EXHIBITION—COLLODION WITH ACETATE OF AMYL.

Orthochromatic Photography.—Messrs. Frederick and Ed. Boissonnas, of Geneva, have for some years been pursuing researches of the highest interest in orthochromatic photography. Their efforts are not in the direction of any new principle, nor do they follow any distinctly personal views; but they have made a detailed study of the employment of yellow screens of various intensities of colour, the tincture used being that of aurantia, indicated by Dr. Vogel. The formulæ for the different screens have been published, and the result arrived at is the knowledge gained by practice of the cases in which it is desirable to have recourse to a screen of greater or less depth of colour. Any orthochromatic plates are used, but it is demonstrated that with the aid of a translucent yellow screen, the results which would be

obtained upon a normal orthochromatic plate are considerably improved. The album of remarkable specimens that we have been charged to present to the French Photographic Society contains a crowd of admirably conclusive results; in each case a print from an ordinary plate accompanying one from an orthochromatic plate. The latter results vary considerably, according as the screen used is of a tone more or less rich in colouring matter. We are led to enquire, in the presence of such a success, how it is that the use of orthochromatic plates is not more general, since it is so thoroughly demonstrated that, thanks to them, we arrive at much greater accuracy of result. The gamut of colour is, in fact, almost completely put right, and we have photographs giving the effect of the luminosity of colours, such as they appear to the eye. The beautiful works of Messrs. Boissonnas were very well received by our colleagues, and we are sure that they will institute a point of departure in France for a much more extensive and general use of orthochromatic processes.

Direct Contretypes.—Monsieur Balagny has just repeated the experiments of Capt. Biny upon the production of direct contretypes upon gelatino-bromide of silver plates, treated with bichromate of potash. Nothing new is brought out by M. Balagny, but he supplies details of the practical method of working better than has been done hitherto. The contretypes that he shows in support of his demonstrations display the highest qualities, but we feel certain, nevertheless, that in spite of affirmations, however well justified, the process will remain a delicate one, and will require a certain amount of practice in order to produce such excellent results as those shown by M. Balagny. We will shortly sum up the principal points of the labours of M. Balagny. A solution of bichromate of potash at 3 per cent. is made and filtered into a dish, and the work is done in a diffused light from any source. The gelatino-bromide of silver plate is immersed in the solution for about five minutes, the excess of liquid is removed from the plate, the back is well cleaned, and it is allowed to dry in absolute darkness. To make a contretype, the plate is exposed behind the negative in a dark slide or printing frame, for an average period with a negative of normal intensity, and in a good light, of from ten to fifteen minutes. After exposure the plate is washed until the bichromate is completely removed, and it is then plunged into an old hydrokinone developing bath. The development is carried on by daylight in the same way as with an ordinary negative. The whites are very well preserved, and the contretype is reversed in direction, which makes it at once serviceable for collographic impressions. After development the plate is washed, and is fixed in a 3 per cent. solution of cyanide of potassium freshly mixed. It is then washed afresh and allowed to dry. We find nothing new in this exposition except the special study of the use of flexible films for the production of contretypes by the aid of gelatino-bromide of silver.

International Congress of Photography.—The work of preparation for the International Congress of Photography is about finished: the several committees have studied the projects which will be proposed for solution to the members of the Congress. Amongst these solutions there are some which appear to us to be susceptible of adoption by divers representatives of the nations participating, but there are others upon which it will perhaps be difficult to obtain accord. One of the questions which has appeared to us to be viewed with a sort of indifference on the part of our colleagues, is that relative to the necessity for measuring the intensity of light at the moment of photographic operations. This must arise from the fact that the greater part of these gentlemen are men of learning who make use of photography only in a casual way for scientific studies, where the precise duration of the exposure is a matter of little moment. However this may be, it appears that since light is the principal photograghic motor, we ought to occupy ourselves with the obtaining of a practical means of judging its intensity. Several kinds of photometers exist, more or less precise, the use of which is a surer guide than the mere unaided judgment. There are a host of cases in which it is impossible for the most experienced operator to satisfy himself precisely as to the proper duration for an exposure to secure the best image, hence so many failures, that are due to the absence of a guide. It may be objected to our observations that all this does not prevent very good negatives from being taken. In spite of the indifference referred to, we perserve the conviction, that this is one of the most interesting questions, and one to which the attention of the Congress should be most strongly drawn. However, the various questions that are to be discussed will be shortly published; the International Congress alone will be empowered to adopt definite resolutions.

The Universal Exhibition, as we had reason to suppose it would be, has been inaugurated without being ready, but it is now nearly complete, and the readers of the Photographic News have been informed by the special commissioner sent by the management, of the actual condition both of the foreign, particularly the English, and of the French photographic exhibits. The jury has just been appointed; it is composed of four titular members—Messrs. Darlot, Davanne, Levy, and Leon Vidal; and of three supplementary members—Messrs. Audrea, Braun, and Cheri-Rousseau. We do not know the date at which the jury will commence its labours; doubtless it will wait till a time closely approaching that of the International Congress, so as to profit by the presence of the foreign members of jurics, to have them also at the Congress.

Collodion with Acetate of Amyl.—We have continued our experiments with collodion made with acetate of amyl, the interesting product made known to us by Col. Waterhouse. We have succeeded in making an excellent varnish by dissolving three grammes of pyroxyline in a hundred grammes of acetate of amyl. The time of drying is very long, but the film is superb; very hard, very white, and constituting a protective varnish of the first quality. Unfortunately it cannot be employed except upon very flat surfaces. If it were not for the high price of acetate of amyl, good use might be made of this compound, which for certain purposes is much better than ordinary collodion.

Leon Vidal.

Notes.

The question of technical education was touched on by Sir Sydney Waterlow at a School-Board meeting recently. He pointed out the need of educating the rank and file of the workmen, and suggested that with this aim, every Board school should be provided with some sort of workshop—a rough physical laboratory, in fact. This would develop tastes, and doubtless sow much seed for future development.

The work of technical education ought to be carried out by the seventy-four City or Guild Companies of London, who actually spend no less than a hundred thousand pounds yearly of the funds entrusted to them for public purposes in "Banqueting," while another hundred thousand a year goes to useless beadles or officers, and to give "fees to members."

This sum of two hundred thousand pounds, if reasonably used, would serve to keep up two hundred establishments, each with a nightly free and open lecture and technical demonstration—establishments at any one of which workmen might be sure of a place to sit in, and a chance of listening to something both interesting and instructive.

In any district where there is special need of such a centre of technical instruction, a suitable room could be had for £100 a year. Another hundred would pay for a man who would act as caretaker and general helper; while £350 would pay the salary and laboratory expenses of a competent physicist who would lecture each night. The remaining £450 might go to provide a craftsman each evening, who would demonstrate some special point in connection with his occupation; the demonstration serving as a text on which the lecturer would lay an exposition of the underlying chemical and physical principles.

But it may be said that the Guilds are now doing something in the cause of technical education! True, in a certain sense; there is a great cold, shiver-provoking and sparsely studented building at South Kensington right beyond the needs of the case, and with a uniformed beadle at the door, all inside things being kept with such a veneration for varnish, for smoothness, and for everlasting absence of "mess," that nothing very useful can be done there. There is also the Finsbury Institute, which is good as far as it goes, and is doing useful work, but a mere nothing compared with what ought to be done by the Guilds.

What we have suggested is a scheme something like that carried out by the Abbé Moiguo in Paris about twenty years ago, but with modifications to suit the present time.

The June number of the *Journal of the Chemical Society* comes to hand before the May number, a pink slip in the former explaining that "the May number of the *Journal* will be sent in a few days. The delay has arisen from the difficulty in obtaining the autotype plates of spectra illustrating the President's Address."

"A cur without a name" is the very appropriate term applied by Dr. Emerson to the writer over a *nom-de-plume* of detractory remarks which he has not the courage to make openly; but Dr. Emerson does not seem to be quite aware that such letters are very often regarded as mere editorial concoctions, which the editor hardly likes to put forward on his own responsibility, and so covers with a thin veil.

Still it is a fact—as we can testify—that "curs without names" do occasionally and actually send communications with a request for insertion anonymously; but it is some years now since any unsigned letter has been admitted into the PHOTOGRAPHIC NEWS, and we most emphatically promise our readers that, while the present editor holds office, nothing of the sort will be inserted.

Mr. Debenham's letter in the PHOTOGRAPHIC NEWS of last week makes it appear that Mr. W. H. Harrison was not quite the first to use the magnesium flash-light, although he was early in the field, a circumstance which in no way detracts from the reputation or merits of Mr. Harrison, a gentleman who has won fame not only in photographic matters, but also in several fields outside. In all his work, however, his interest in photography is apparent, even in his verses. His "Lay of the Photographer, a Scientific Ballad," commences thus—

"Young Pyroxyline has come out of the West,
Where he lived with dark niggers, not very much dressed;
All regardless of safety he plunged in the brine
To keep ward and watch o'er the fair Iodine.

Bright, bright, was his armour, and gleaming his face,
As he seized his fair prize with a loving embrace.
Oh Roxy! Ha dun now! You've broken my fan!
I'll tell papa Tyndall, you naughty young man."

A side note intimates that the above verses have reference to the "American origin of Pyroxyline;" but we are under the impression it was first discovered by a German in Germany, and that Egyptian cotton is ordinarily used. Still a poet has latitude, and Mr. Harrison freely avails himself of this, especially in his epic on "The July Bug," where his subject is represented as a monster a good many feet long and several feet broad! This latter poem forms one of the "Wobblejaw Ballads" (p. 144), Mr. Harrison's most noteworthy collection of verses.

In the routine work of experimental research into the phenomena of the so-called "spiritualism," Mr. Harrison has also laboured, and with so much result that in one of his numerous works on the subject he takes the courage of his opinions, and says (Psychic Facts, p. 14): "The table was lifted in the usual way by the spirits."

We are not sure whether Mr. Harrison, either in his well-known series of books on spiritualism, or the "*Spiritualist*" which he edited, records any investigation as to production of the so-called spirit photographs; but if his experimental efforts were directed in the direction, we might perhaps hope for some certain and definite results.

We must, however, say for ourselves that every so-called spirit photograph which we have hitherto seen—and we have seen a good many—was so obvious an imposture as to make us almost blush for the rationality of those who could accept such things as evidence of supernatural manifestations, and our only regret was that the law did not step in to punish the unscrupulous concoctors, and those who make a trade—either direct or indirect—out of them.

A proposal for "doubling the utility of the printing press" also comes from the versatile mind of Mr. Harrison—a proposal in the practical carrying out of which photography may take part. No space is to be wasted over broad letters like "m" or "w," but all letters are to be made tall and narrow, like "f," projections at side serving to distinguish the various symbols.

Torquay Illustrated is an attractive sheet of information and advertisements sold at twopence, and kept level with the times by fresh editions as often as may be required.

The above sheet—published by Mr. Winget, of Torquay

—may serve as a suggestion to photographers at recreative resorts. A series of illustrations and some descriptive matter might form the basis of such a sheet, for issue in any holiday town ; all that is needed is that the photographer should ally himself with some enterprising printer.

The adventurous persons who wander about the western states of America in the neighbourhood of the "Rockies" in search of gold-bearing lands find photography useful. Their policy is to pick up a piece of land cheap, discover, or pretend to discover, gold upon it, and afterwards sell it at a swinging profit to a confiding English company. When the "prospector" is on the look-out for the land it is desirable to keep his purpose a profound secret, or the owner would immediately run up the price, and the difficulty is to find a legitimate reason for wandering about. Nothing answers the purpose better than a photographic outfit. It is quite natural that a man in search of picturesque views should wander into the most desolate spots, and hence he is able to make his observations unsuspected. The modern prospector is a totally different person from the old rugged individual immortalised by Bret Harte. The former, judging from his appearance, might be a clerk or a shopkeeper ; the latter cannot he mistaken for anything else but a gold digger. It was, therefore, rather a clever move on the part of a photographic prospector to take the portrait of an old miner whom he met on his travels, and exhibit it as a picture of an old expert engaged in "panning" gold on the property. That the miner in question had never been near the property the prospector wanted to sell, and was never likely to go near it, was of no consequence—to the prospector. Of course he took care not to mention this little fact to the persons to whom he sold the property.

The *Daily News* is quite right in stating, as it does, in an article describing Mr. Gladstone's journey to the West of England, that the taking of a photograph has now become an inevitable part of every public function. The photographer with his camera may be an unauthorized, but he is certainly a most important personage in every official programme. And a curious proof of his persevering persistence is just now to be seen in the shop windows of London. The "Fire Engine Parade" on the Queen's Birthday was, as is well known, a complete *fiasco*. The Prince and Princess were well nigh swept out of their carriage ; the Master of the Buckhounds was literally rushed off his legs ; the Duke of Cambridge, as we have since learned, was in personal collision with excited journalists ; Colonel Howard lost his head, the police lost their temper, and confusion, utter and profound, ruled the agitated scene. And yet, as is now proved to us by the appearance of a photograph, evidently taken with much care and success, of the Horse Guards Parade when the crowd which occupied it was at its noisiest and worst, there was one man at all events who did not cease to be calm and collected on that most trying day. As the poet puts it—

"When all around wild frenzy reigned,
One mortal there was self-contained,
One man in sooth stood firm."

And as the other lines of the original stanza do not come in quite so pat, we may be, perhaps, allowed to add a second part of our own—

"Calmly he focussed the Parade,
Calmly the due exposure made,
Though much the crowd did squirm."

["Firm" being a difficult word to rhyme, let us parenthetically apologize for the weakness of our last line.] Seriously, though, the community owes much to the photographer, and will, as time goes on, owe him still more and more ; for, as we have before stated, we look forward to the time when the "Special Photographer" will plant his tripod in the thick of every battle, and bring away negatives of the fray at the risk of his life. Meanwhile he can rehearse in the thick of such crowds as that which will make the "Fire Engine Parade" on the Queen's Birthday ever memorable.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

Twenty-fourth Article.

BY W. M. ASHMAN.

The methods of printing photographs in organified silver chloride without the use of albumen will occupy the available space in the present chapter. Originally, the use of collodion as a vehicle in which to suspend silver chloride for printing-out under a negative was introduced by G. W. Simpson, a former editor of this journal, who named the process Simpsontype. Upon the publication of Mr. Simpson's formulæ, various experimenters of that time set to work to modify them and to improve upon the results first obtained ; among whom may be mentioned W. T. Bovey, J. W. Swan, and J. G. Tunney. The collodio-chloride process became its familiar cognomen, and it was very much used for printing photographs on opal and other white surfaces, flexible as well as rigid. The economical side of the question seemed to debar its general adoption, and for a time the process fell almost into disuse. Now, under the trade name of Aristotype, paper coated with sensitive collodion emulsion is a marketable article, and its manipulation is almost identical with that of ready-prepared and sensitised albumen paper. We will just outline the method of preparing such a surface. A plain or normal collodion has first to be prepared or purchased. Some samples of so-called "enamel collodion" are not quite good enough for the purpose. To make the article, dissolve 60 grains of soluble cotton, pyroxyline, in a mixture of strong alcohol 3 ounces, methylated ether 5 ounces ; pulverise 120 grains of silver nitrate, and dissolve by gentle heat in 2 ounces of strong alcohol ; pour this solution into the collodion, and shake. If the emulsion is not likely to be used shortly after making, it has been found more convenient to keep the above-named ingredients in one solution, and those which are to follow in another, mixing them together as required. Strontium chloride 32 grains, citric acid 24 grains, dissolved in four ounces of alcohol ; then add ether 4 ounces, and pyroxyline 60 grains. Equal proportions of these two solutions to be mixed together with a thorough shaking, in a dark room, just before using. It is then ready for coating suitable surfaces upon which to print a positive image. Opal glass well cleansed from dirt requires a substratum of albumen or gelatine to ensure the perfect adhesion of the emulsion. White of egg diluted with an equal quantity of water—or twice that amount may be used—together with one drop of strong liquid ammonia to each ounce of solution. This is poured over the glass while wet, in the same manner as

collodion or varnish, drained for a few seconds, and dried by heat, which coagulates the albumen.

A five-grain solution of gelatine may be used instead, but it must not be heated above 60 deg. F., and dried whilst level. The mixed collodion is applied to plates thus prepared in the same way as described in Chapter XIX. on varnishing. The coated plate is then dried spontaneously in the dark, and the collodionised surface is brought into contact with the varnished side of the negative to be printed.

One method of procedure is to secure negative and opal plate together at one end by means of a strip of gummed paper, slightly overlapping each so as to form a hinge. The plates thus attached are placed in a printing frame and pushed well up into one angle of the rabbet, the negative, of course, being underneath; then, after adjusting the back and closing the springs, the frame can be exposed to diffused daylight for about two-thirds the time required to print from the same negative on ordinary sensitized paper. The progress of printing can then be examined by removing back and separating the two plates, the paper hinge ensuring their return to the original position. They should be carefully replaced in the same corner of the frame before the back is again closed for further exposure. This class of picture is more attractive when full vigour is obtained, and to ensure this the printing must not be cut short, except in the case of lantern slides, but carried on to a considerable depth. There is always some risk about getting the opal back in the precise position it occupied at first, and to obviate this difficulty it is a good plan to construct a special frame for the purpose. If the back of printing frame be hinged at one end and not in the centre, the opal can be secured to it temporarily by any cement, such as "Prout's Glue," or a mixture of resin, bees-wax, and red ochre, with the aid of a little heat, and the negative also secured in the frame at two corners by the same means. A convenient plan of altering a printing frame in order to make it suitable for opal printing is described and illustrated on pages 189 and 190 of the current YEAR-BOOK OF PHOTOGRAPHY, or other methods may doubtless suggest themselves.

When paper is coated with such an emulsion, of course no special frame is required. The chief point to attend to is the selection of a suitable paper, free from deleterious chemicals, even in texture, not very permeable, tenacious, white or slightly tinted, and, above all, strong enough to withstand the washing processes incidental to toning, fixing, and finishing. Such paper is used by Collotypers, and is readily obtained on the Continent. A very good and useful surface may be produced by treating a strong white paper with an emulsion of barium sulphate in nearly insoluble gelatine. Paper so coated and dried, and then well rolled, offers a good basis upon which to flow a moderately thin film of the sensitive collodion. An easier and very effective method is to prepare some starch, as for mounting, with the best arrowroot, and to apply it to the paper with a sponge or broad brush very carefully to avoid lines. It is well to cover the paper in one direction, from end to end first, and then to repeat the process at right angles to the former direction. The coating is best accomplished by pinning the sheet to a flat board in such a way that the edges can be turned up all round about a quarter of an inch to form a dish. The collodion is then poured on in a pool near the centre, and the whole surface covered by moving the board about, the superfluous emulsion being poured off at one corner, in the same manner as before described. The greatest precaution must be used to avoid injury from dust. When quite dry, the paper is ready for use, and is treated in very much the same way as sensitized albumen, only the surface, being more delicate and tender, extra care must be taken to prevent injury thereto. This emulsion is really an acid silver chloride in collodion, and there is very little silver citrate in it. Pure silver nitrate and citric acid in pure water will not produce silver citrate, but Captain Abney suggested a method of introducing an alkaline base which is required to attract the nitric acid, and leave the silver for the production of citrate. It simply consists of the employment of a test tube accurately fitted with a bent glass tube, which shall dip into the alcoholic solution of pyroxyline, silver, and citric acid. Some strong ammonia is placed in the test tube, and the latter is plunged into hot water to drive off the ammonia which bubbles up through the mixed solutions, and the result is the production of an emulsion of silver citrate. The ammonia nitrate does not hinder the printing, but quite the reverse, only the evolution of gas must be stopped in time to leave distinct traces of acid unneutralized. The prints, which should appear of a reddish hue upon removal from the printing frame, are washed in two or three changes of clean cold water to extract the salts before the process of toning, which we now know determines the ultimate colour of the silver image. Toning should be continued until the purple stage is reached, and it is necessary to look through them by transmitted light to properly judge of the depth. The thiocyanate toning bath is usually recommended, and formulæ are generally supplied with the commercial article, but it is quite possible to obtain good results by means of the ordinary borax bath freshly made; or the old-fashioned double bath, toning and fixing in one, where gold solution is added to an ordinary fixing bath, will produce a well-toned print, especially if a trace of sodium bicarbonate is added just before using. Except in the case of the latter double bath, fixing must follow as usual, and plenty of washing. The prints may then be dried spontaneously or squeegeed on to talced glass, as before described, and stripped when quite dry. This process is also useful for obtaining direct positives on clear glass, either suitable for the optical lantern or for window decoration, but it must be borne in mind that in the latter case the pictures require printing very deeply indeed to get the full value of the particular negative employed.

Gelatine offers an excellent vehicle in which to suspend the above-named silver compounds, and the process of manufacturing the emulsion, and applying it to glass or paper, offers the great advantages of economy and simplicity. A reference to the remarks in a previous chapter upon the production of silver bromide emulsion will give an idea of the process required, only there is no necessity to prolong the heating, a proceeding generally known as "cooking" the emulsion. In this case it is sufficient to make a solution of gelatine, some twenty-five to thirty grains to the ounce of water, and to add to it a soluble citrate and chloride, and then the due proportion of silver nitrate, with plenty of vigorous stirring. This, after setting, is broken up small by squeezing it through a piece of mosquito netting, rapidly washed in two or three changes of water, and after well draining, and a final rinsing in methylated alcohol, is simply heated a little to melt it, and pased through a fine muslin filter, when it is ready to coat either glass or paper. The former, if opal, should receive a very thin coating; the latter is best managed by rolling up a length of paper with the smooth side outwards, laying the roll in the emulsion contained in one angle of a deep dish, and kept warm by hot water in another dish beneath it, then gently pulling the end of the paper upwards, when it will be found covered with the emulsion. The mixture should be rather more watery for the paper than for glass.

When dry, the printing and all subsequent manipulations are similar to those referred to above, with the exception of the useful application of a bath of common alum and water after the toning is finished, and before fixing. A simple formula would be as follows. Dissolve completely, with gentle heat, 160 grains of hard gelatine in 4 ounces of distilled water. Dissolve 40 grains of ammonium chloride and 40 grains of sodium citrate in one ounce of water, and add to the above. Dissolve 150 grains of silver nitrate in one ounce of water, then in a room lit by

yellow light mix this gradually with the preceding solution, stirring vigorously all the time. Five grains of citric acid in powder may now be stirred in, and when well mixed up, the whole can be left to cool. The subsequent proceedings have already been indicated.

Full details of preparing opals and paper with citrochloride of silver and other organic sensitive compounds have appeared in vols. xxx. and xxxi. of the PHOTOGRAPHIC NEWS, from the pens of R. Offord and the present writer, which articles contain so much useful information regarding the process, that the student is advised to read them up if he desires to practise printing out by means of a gelatine emulsion. The leading advantages claimed are, a sensitive surface capable of yielding the most brilliant results obtainable by any known process, great simplicity in manipulation, rapidity of action, economy, special suitability to the average run of gelatine negatives possessing great variety of detail without much density, freedom from black and bronzed shadows, and considerable facility for the production of what are known as enamelled pictures. It may be noted that although the results of many hundreds of experiments with the organic salts of silver have been placed at the service of experimenters, very little interest has been so far shown. Two or three have succeeded in gratifying themselves and their friends by producing pretty pictures by means of the process, and since the publication of those articles one or two samples of paper and plates have been commercially placed on the market. The most important instance is that of Obernetter's chloride of silver paper, which is a decided step in the right direction. But no formulæ have been published pointing to practical and experimental interest in so important a subject as that of the silver printing process of the future, nor have any improvements been suggested with which to supplement the various formulæ and methods of procedure indicated in the articles referred to. One simple substitute for the emulsion last described may, perhaps, prove more attractive to the beginner, and as it is possible to produce by its means the most charming silver prints ever made by the agency of light, it is deserving of a place here. For full particulars we must again refer to the series of joint articles previously mentioned, the process having been first suggested by the gentleman named in connection therewith. A commercial article known as double transfer paper, sold for the purposes of carbon printing, is the foundation of the process. It is a paper coated smoothly with gelatine, and only requires to be sensitised to become a vigorous rival to emulsion paper. The process is very simple. A solution composed of water with 5 per cent. of sodium or ammonium chloride, and the same amount of potassium or sodium citrate dissolved therein, is placed in a dish rather larger than the pieces of paper to be treated. The paper is kept in a damp place long enough to become limp, and is floated, gelatine side downwards, on the surface of this bath for five minutes. It is then drawn over a glass rod and suspended in a current of air. When dry enough, and yet not too much so to lie flat, carefully floated upon a 10 per cent. solution of silver nitrate made acid with a trace of citric acid. Again the surface is passed over a glass rod to remove excess, and hung up in a dark room, lit by weak artificial or yellow light, to dry. The following process of printing, toning, fixing, washing, and subsequent drying, are all as before. The double bath does well for this:—

Water	5 ounces
Sodium thiosulphate (hypo)	1 ounce
Gold terchloride (in solution)	2 grains
Bicarbonate or phosphate of soda ...	5 „

Tone very deep; the prints are then ready for final washing.

If separate baths are preferred, the toning can be done first in a fresh borax bath:—

Borax	50 grains
Water	8 ounces
Gold terchloride...	1 grain

Then, after a slight washing, the fixing follows.

The other toning bath recommended is the thiocyanate:—

Water	5 ounces
Ammonium thiocyanate	35 grains
Hypo	1 grain
Sodium carbonate	3 grains

When dissolved, add 2 grains gold terchloride in one ounce of water.

One characteristic of the thiocyanates must be noted. These salts have been recommended for use with silver as a means of intensifying gelatine negatives, and strong solutions are required. But gelatine is soluble in such solutions, so that the film is injured before the process is complete. The same holds good with the toning bath, and with some samples of paper the surface becomes so soft and tender that it is impossible to avoid injury to it. With other samples, where the gelatine has been more nearly coagulated, this effect is not seen.

Another advantage of this system of printing is that the colour may be deepened if found to be of too warm a tone after fixing, either at once, or subsequently, by a second process of toning in the double solution of gold and hypo, as above, where it should remain until the blue or an intermediate stage of reduction of gold upon the image has taken place. Washing must then again be resorted to.

TRANSLATION OF ENGLISH FORMULÆ INTO THE METRIC SYSTEM.

BY ALEXANDER COWAN.*

As requested by the Chairman at the last meeting, I have put on paper the remarks I then made respecting the translation of our old formulæ into the metric system, now definitely adopted by the Club. I am sure to many they will be quite superfluous, but to some few may be acceptable, and as the Photographic Club has now formally decided to use in future only metric systems of weights and measures, I venture again to suggest what I consider one of the simplest methods of translating, with the least possible trouble, any of our existing formulæ.

I take it for granted that every one using any formula has always liked to know what proportion the various constituents in it bear to one another, so that if occasion requires he can vary any of them according to circumstances. In our old system this has generally been expressed by the number of grains or minims contained in each ounce of liquid used—in my own practice, for many years, I have exclusively used the grain as the only unit for both liquids and solids—and I propose to show by an example how formulæ thus expressed are immediately translated into the metric measures, without the figures losing their old familiar look and sound, which they certainly will do if they are literally translated.

For instance, take one of the simplest formula for pyro development, viz.:—

One ounce of liquid containing—

Pyro	2 grains
Sulphite	8 „
Ammonia	4 „
Bromide	1 grain.

Ten ounces of this of course contains—

Pyro	20 grains
Sulphite	80 „
Ammonia	40 „
Bromide	10 „

If we now literally translate this it will read—

Pyro	1·296 grammes
Sulphite	5·184 „
Ammonia	2·592 c.c.
Bromide	·648 gramme

Made up with water to a bulk of 283·5 c.c. nearly.

In this form it certainly does not convey to our minds the proportion that each ingredient bears to the others in so definite and simple a manner as does the original formula.

Now what I mentioned last week—and I am almost ashamed

* Communicated to the Photographic Club.

to do again—is leave the formula alone, and let it translate itself by at once calling all the quantities grammes, when it will read—

Pyro	...	...	...	2 grammes
Sulphite	...	...	...	8 ,,
Ammonia	...	...	...	4 ,, or c.c.
Bromide	...	...	...	1 gramme

and the bulk of solution 437·5 c.c.

This bulk of solution will be about fifteen times greater than our old-fashioned ounce, but the figures remain almost without fractions, and can be easily multiplied or subdivided if larger or smaller quantities are required.

I have little doubt but that if any one habitually using the metric system had originated such a formula as that used for example, the bulk would have been made up to 500 c.c., or perhaps the amounts of all the ingredients doubled, and made up to 1,000 c.c., as I notice in foreign formulæ an almost total absence of the awkward fractions that occur when translating from one system to another.

In connection with this subject, perhaps I may be allowed to suggest the advisability of always making up the total of any new formula to a definite measure, such as 100, 500, or 1,000 c.c., instead of, as is often the case, adding the quantities of the various ingredients to a given bulk of liquid.

Correspondence.

DR. EMERSON'S "NATURALISTIC PHOTOGRAPHY."

SIR,—In your last issue is a long letter from Dr. Emerson in which my name is frequently mentioned throughout its four columns of coarse vituperation and wild assertion, an advance even on the strong language which disfigures his otherwise interesting book.

I don't know what are Dr. Emerson's views on the customs of journalism, but I distinctly refuse to lend myself to the calling over and counting out process by affirming or denying the authorship of any review which has appeared of his book. He ought to know quite well that it is not the practice on the English press to sign leading articles or reviews, and that all but the most egotistical and sensitive have given up crying out against the anonymous when the praise has not been laid on thick enough. Nor would it be consistent with self-respect to reply to any communication which so artfully and ingeniously attempts to connect my name with letters the writers of which an almost hysterical sensitiveness to criticism drives Dr. Emerson to designate as "lying cowards," and speak of one of them as an "ignoramus," "stupid fool," "poor old fellow," "liar and coward," and this by one who is fond of calling others "no gentleman."

In his letter Dr. Emerson follows the stale device he pursues in his book, of calling everybody he does not agree with, or who does not agree with him, "imperfectly educated," "ignorant fool," and other such amenities; and he does not scruple to accuse them of "deliberate, coarse, brutal, and impertinent insult," and "envenomed and malicious lies." It would require an amount of Billingsgate I do not possess, and a different nature to my own, to reply in the same spirit, and my many friends in the photographic world will understand my reticence. I am afraid it would be ineffective to try to soothe him as the Irish scholar silenced the fish-wife, by calling him a quadratic equation, or an isosceles triangle.

When Dr. Johnson called an opponent a naufrangeous villain, he was asked the meaning of the adjective. He replied that he didn't know, but thought it a good word to throw at a man's head. It is in this light that I look on Dr. Emerson's gentlemanly epithets. At present I think him amusing, and should not like that feeling to degenerate into anything more serious. Dr. Emerson is young and impetuous, but a little wanting in ballast. Much may be forgiven under the circumstances. He will learn as he grows older that neither sound, fury, nor bluster is force, and that he will never bring the world to his feet by calling names. The hysterical scream has ceased to be successful.

H. P. ROBINSON.

Tunbridge Wells, June 10th, 1889.

SIR,—In the interest of art advancement in photography, I beg of you to allow me, as a perfectly unbiased individual, not knowing personally either Mr. H. P. Robinson or Dr. Emerson, to comment on that dreadful letter appearing in your last issue under the above heading.

Dr. Emerson refers in his letter to the heartiness of his mirth. Surely it must be of a very demoniacal character, attended with *un pas du diable* and handfuls of hair recklessly dispersed about from very spleen; and I am not sure but a "peppery" temper would plead the best exoneration for the shower of hotly spiced terms which overspread his letter so thickly, such as, "another cur without a name," "a scurrilous letter by a lying coward," "this choice nobody," "a brutal and impertinent insult," "this stupid fool," "the hiss of the green-eyed monster," "envenomed and malicious lie," "this ignoramus," and so on. Phaugh! Shades of ye frequenters of Billingsgate, are ye not green with envy?

There was a long discussion some time ago, in a well-known periodical, on the flat earth theory, which perhaps you, sir, read. Mr. Emerson's letter reminds me of nothing so forcibly as some of the communications from the leader of the exponents of this absurd idea, who, finding himself so wofully beaten in the discussion, went off in a similar tirade of strong terms, suggesting an accompanying display of red fire, and a suspicion of sulphurous fumes in the atmosphere. Can it be that the weakness of Dr. Emerson's cause renders a similar treatment necessary?

Looking at it from the broadest point of view, there are a certain number of men who find the artistic, the literary, and the legitimate scientific paths of life so well trodden by greater born geniuses than they can ever hope to be; they have keenness of perception (*i.e.*, common sense) enough to more or less recognise this want of theirs; they have, moreover, a sufficiency of mathematical tuition or intuition to promulgate sets of rules and principles, and so, spurred on by their aspirations after popularity, they proceed to make scientific tricks and "fireworks" take the place of intuitive genius. They have sense enough to know, as business men, that this is their last chance, and that amidst the millions who people the world, there is always a following to be got from amongst the weak-minded and the undiscerning people whose principal craving and hope of leaving the "common ruck" is in being eccentric.

This, to my mind, is undoubtedly the fundamental base on which is reared the Wagnerian school of music, some of the eccentricities in literature, some of the abstruse theories in science, the "realistic" school of painting, and it appears to me to be also the motor power in this allied "naturalistic" photography, which is being attempted to be brought prominent.

I have not read Dr. Emerson's book, and from the present expressions of its author I do not find much encouragement to do so now; I have no doubt that there is much that is good in it, for I cannot imagine any work reasonably intelligibly written on such a subject not containing some beneficial teachings, if the student could pick them out, which, however, as a student, he most probably could not do; there is the danger in letting such statements as I know Dr. Emerson *has* made in his letters go unchallenged, and it is from this standpoint I write. I do not read the *Amateur Photographer*, and it was only by accident that I noticed one of its correspondents objecting to Mr. Emerson's strictures on Mr. H. P. Robinson. This so much astonished me that I took the trouble to purchase the previous half-dozen numbers to ascertain the cause. I am sorry to have opposed the generous promptings of Dr. Emerson's

nature by thus enriching to the extent of one shilling the coffers of a journal which Dr. Emerson had decided not to support, because its owners were audacious enough to acknowledge that *they tried to make money by it!*

From these papers I got some idea of this "Naturalism," and I am vastly afraid that Dr. Emerson has chosen a wrong theory on which to build himself a name. "Naturalism" may have some requirement in painting, where the manuerisms of many ages may have led its votaries too far away from nature, and where the *entire work* is the creation of the hand; but with photographing it is vastly different; too much bare and gaunt naturalism is what it most suffers from in an artistic sense, and what it is slowly emergiug, and will continue to emerge from as its followers get more art knowledge, spite of Dr. Emersou's or any one else's coutrary advocacy. Dr. Emerson states:—"I first showed that composition was really 'selection,' the old meauing of it was really 'a building up,' *and in no way suited to naturalism*" (my italics).

I don't know what credit abides with Mr. Emerson for this discovery, excepting that a new name should be quickly found for "a building up," which I very emphatically assert is far and away the direction where most artistic results are possible in photography. Mere "selection" is a very weak decoction of art, and one that I am glad to state that photographiers are beginning to see beyond. The sole (perhaps accidental) selection of happy sceues should not, in my opiuion, entitle a professional photographer to show or compete at an exhibition unless, may be, in an infcrior class; they should first display some of this despised "building up" to prove the individual art capacity of the photographer.

I read in the same letter of Dr. Emerson's this extraordinary statement: "Finally, I have yet to learn that any one statement or photograph of Mr. H. P. Robinson's has ever had the slightest influence upon me, except as a warning what not to do." Here, again, if Dr. Emerson's book is consisteut with the above statement, I would warn students against the uselessness and pernicity of its character. Who does not know Mr. Robinson's works—soli l successful efforts that have been taught in his writings and consistently embodied in his photographic productions? Mr. Robinson is the man who, of all others amongst us, has perceived and most completely thrashed out the art grains from the chaff of photographic limitations—separated most finely the possible from the impossible. He unquestionably has most fully realized and overcome the difficulties of long exposures consequent to near figures and distant planes, of procuring proportionate details in all parts, of toning down undue prominences, of the best uses of light and haze, of stretching all of these and kindred points to the widest bounds of our narrow sphere of art, and making out of them pictorial embodiments, no one of them without its palpable art story attempted and achieved with the least apparent effort.

Dr. Emerson asks why these testimonials to Mr. Robinson, as he inanely calls them? I may state that it is our common duty to mark our appreciation of what is right when its position is assailed; this, if only to protect our younger workers from being lured from the true paths, and not necessarily that Mr. Robinson and his works require any upholding; if they did, the photographic world, and not a few of its members only, would stand his sponsor.

It is possible, if not to "roar with laughter" (*vide* Dr. E.), at least to feel amused that shortly after asking why these testimonials to Mr. Robinson, Dr. Emerson goes on to state, "and now to enumerate the friends whom 'Nemo' denies me." Then of course follows *his* list of testimonials. But that merely by the way. Dr. Emerson's letter is composed so much of the same warped feelings and inconsistencies, that on any less important subject I should not have troubled to notice it, and as I before suggested, his best excuse for them is that they are the inconsiderate promptings of a hasty temper.

On one point I am heartily at issue with him, though perhaps from more disinterested motives, and that is in resenting the Photographic News being alluded to as "a force that does not count."

I apologise for the length of my letter, and beg to remain, dear sir, yours very sincerely, Lyd. Sawyer.

Singleton House, Newcastle-on-Tyne, June 10, 1889.

Dear Sir,—In the letter which you publish from Dr. Emerson, I come under his condemnation. He says of me: "I cannot attach much importance to his judgment, however, since in the same number of the *Camera* he publishes a picture from one of Mr. Mostyn Clarke's negatives, and from the context we gather that this is a reproduction of a photograph by Mr. Clarke. It is, however, gentle reader, a reproduction of a *photograph of a water-colour drawing* by E. H. Fahey. And this gentleman, who reviewed Naturalistic Photography, knew so much of nature that *he did not know the difference.*"

A few words of explanation will put the matter in a different light. When the particular number of the *Camera* to which Dr. Emerson refers was ready for press, I was called away from London, leaving directions that a certain plate was to appear in it. Unfortunately, the process block which I provided for did not come to hand at the appointed time, and in my absence Mr. Clark's block was substituted for it. A short description of it was hurriedly supplied by the publishers, who omitted to state that the plate was from a water-colour drawing. I myself had no idea that the substitution had been made until some days after publication. Had our positions been reversed, I should have felt it my duty to Dr. Emerson to ascertain the facts before I held him up to ridicule by assuming that he did not know the difference between a water-colour drawing and a photograph. Your insertion of this note will greatly oblige me.—Yours faithfully,

T. C. Hepworth.

THE CENTENARY EXHIBITION AT PARIS.

Sir,—May I draw your attention to a little inaccuracy in your notice of my exhibit at Paris.

The "Soothsayer" picture is not a group, but a single figure study; the group is called "The End of the Tale." In the picture entitled "That's you," the girl does not hold a slate. My idea was that the picture should represent a child who, tired of play, should throw down her doll, and, in the pursuit of mischief, chalk the caricature on the wall.

I may add that I had not previously seen the picture your critic mentions, as, with the exception of last year's exhibition in London, I have not seen one since, I think, 1882 James Burnside.

5, *Pollet Street, Guernsey, July* 10, 1889.

Proceedings of Societies.

Photographic Society of Great Britain.

At the ordinary monthly meeting of this Society held at the Rooms, Pall Mall East, on Tuesday last, the 11th inst., the chair was occupied by Mr. James Glaisher, F.R.S., President.

The names of the judges for the exhibition of the Society to be held in the autumn were announced, and were as follows:—Messrs. W. Bedford, Valentine Blanchard, George Davison, W. England, J. Gale, H. P. Robinson, and J. Traill Taylor. It was also announced that the same gentlemen would act as the hanging committee.

Mr. T. R. Dallmeyer read a paper "On the bearing of the possible introduction of spherical aberration in photographic lenses," in the course of which he stated that he had fully

demonstrated on theoretical grounds the advantage of the introduction of an amount of spherical aberration that could be regulated at will in a photographic lens. The claim he made had not been disputed for planes beyond those focussed upon, which were those of importance, as a good deal of the picture included distances beyond the chief object which was focussed, and any bit of foreground coming in would be rendered softer and more artistic by some loss of definition. There would be a drawback if there were an equal amount of foregound in the front of the focussed plane, and of distance behind it, but this did not occur. The broad statements by Dr. Emerson as to the advantage of the softening due to imperfect definition had taken a large portion of the photographic world by storm. He would not traverse the bearings of the relations between art and photography, though he had been forcibly struck by the different schools that existed in photography. Major Nott had insisted that a butterfly ought to be defined with every detail, whilst some artists would represent children chasing a butterfly, the insect being sufficiently defined to show that a butterfly was intended, and that was all. His late father had introduced a portrait lens in which, by the introduction of positive spherical aberration at will, a gain of definition in the plane beyond the focussed one was obtained, and he was proud of it.

Mr. W. E. DEBENHAM said that when in 1858, or thereabouts, Petzval proposed to introduce by the separation of the back lenses of a combination a certain amount of spherical aberration, he had put it fairly, that by sacrificing definition at the focal plane there was not a real gain of definition elsewhere, but that by not having a sharp plane to contrast with, the want of definition in the out-of-focus planes was less striking. When the late Mr. Dallmeyer afterwards claimed that by sacrificing definition at the focal plane the other planes were improved in definition, he (Mr. Debenham) contested that statement, and he contested it now. Mr. T. R. Dallmeyer now, however, made an important change in the claim, as he admitted that the definition was worse on one side of the focus, but claimed that it was improved upon the other side. It had been demonstrated, he thought, theoretically that spherical aberration did not improve definition in the out-of-focus planes, but he had since the late controversy on the subject tried it practically with one of Mr. Dallmeyer's lenses. He had used a focimeter on the principle described by Mr. Claudet, but with slight variations to render it an instrument of greater precision. He had eighteen arms attached to the bar which pointed to the centre of the lens. These arms were in planes, each an inch behind the next one, and were covered with type of several degrees of fineness, so as to make comparison as closely as possible. With this appliance he had tried the lens separated two gradations, four gradations, and finally unscrewed as far as it would go; but in no case could he find any improvement in general definition by the sacrifice of definition at the focal plane itself. Anyone could repeat this experiment, but, to be conclusive, several plates should be exposed, as a slight want of flatness in a plate would cause a little change in the focal plane.

Mr. CHAPMAN JONES thought that if the photographic facts were duly studied, everyone would agree. The fact that such a lens was considered a desideratum must not be ignored. Mr. Grubb's demonstration, with which he agreed, showed that for images of objects within the focal distance the definition was improved, whilst for objects beyond it was impaired. With spherical aberration there was a nucleus surrounded by a halo, and upon whether it was the halo, or was the concentrated pencil of rays that was measured, depended the decision as to the advantage of spherical aberration in obtaining definition.

Mr. DALLMEYER said, in reply, that the focimeter test described by Mr. Debenham was not a fair one; that the only way to try it was to use a lamp flame. If, now, the flame were focussed by a lens having great spherical aberration, and the lamp was then withdrawn to some distance farther, there would still be an image of it on the screen, whilst with a perfectly corrected lens, the image at the same distance would be quite unrecognizable. He would bring such a lens to a technical meeting of the Society, and demonstrate this. Mr. Chapman Jones, he said, distinctly contradicted him (Mr. Dallmeyer) by saying that the foreground planes were those which benefitted by the introduction of spherical aberration; it was the distant planes which benefitted, not the foreground ones.

Mr. DEBENHAM still considered the focimeter test—photographing simultaneously planes at different distances—to be fairer than the lamp-flame test, as being more like the actual work of the photographer. As to the lamp-flame test, he enquired whether Mr. Dallmeyer had tried a black spot on a white surrounding, as well as the bright lamp against a dark background, and whether, in this case, the image retained its visibility when the object was moved farther from the lens than its focal position.

Mr. DALLMEYER replied that he had not tried the dark object instead of the lamp flame, but he anticipated that the result would be the same; indeed, to suggest that there would be any difference in effect between a light object and a dark one was to dispute the law of conjugate foci.

A vote of thanks to Mr. Dallmeyer having been passed,

Mr. LEON WARNERKE produced some paper which had been given to him by a Russian gentleman—Mr. Sukatchoff. This paper had been exposed that day, for a time somewhat less than that required for silver printing, by Mr. Warnerke under negatives, and showed a faint brown image. Upon laying the print, back downwards, upon a dish of water, the image was developed of a colour varying from brown to purplish black. Water must not touch the surface of the print until this development was complete, or a light spot would be formed. When developed, the print was completed by simple washing in water. He had not been informed of the constituents of the sensitive surface, but was informed that there was no silver, and had verified this statement by test. Hyposulphite of soda could be used in a small quantity, and had the property of intensifying the image.

Mr. DEBENHAM said that the appearance of the print and the details so far given, suggested that the sensitive salt was an iron one, and that the process was on the lines of Pizzighelli's platinum process, but that the platinum was substituted in whole or in part by another noble metal, iridium or palladium, or more probably gold.

Mr. W. H. HARRISON suggested that the faint image visible before development was due to the action of light upon bichromate of potash.

Mr. JOHN SPILLER enquired whether Mr. Warnerke had had the paper long enough to say whether it preserved its colour. As to the probable composition of the paper, he could only adopt the suggestion thrown out by Mr. Debenham.

Mr. WARNERKE believed the paper would keep, but as yet he had not had it long enough. It would, he believed, be shortly supplied commercially, and was intended to be used for making copies of tracings and drawings, in the same way as the blue-process paper is now used. He suspected that iron was the sensitive salt.

Mr. FRIESE GREENE said that he believed that the feature to be observed in new processes was that of reducing things to simplicity. As fulfilling this requirement, he showed a carte portrait upon one of what he called opal cards.

Mr. WARNERKE thought that photographic work ought to be more represented at the Society's meetings than was the case. He showed a photograph of the council meeting of the Society, taken the preceding month by a magnesium flash, and enquired why there should not be a photograph taken of the members at every one of the eight ordinary meetings of the year. Such photographs would form a valuable and useful record.

It was announced that the next technical meeting of the Society would take place on the 25th inst., and that the conversazione at the opening of the Society's Exhibition would be held on the 28th of September next.

SHEFFIELD CAMERA CLUB.

AN ordinary meeting was held at Whiteley's Institute on June 7th, Dr. MORTON presiding.

Mr. Claude Barker was elected a member.

Several interesting objects were shown, including Carbutt films, stereo views by Mr. Maleham, instantaneous studies by Mr. J. O. Arnold; also a number of views taken with drop shutter by the Chairman, on Edwards's isochromatic plates. The density and detail in the negatives proved the efficiency of this class of plate.

Mr. J. O. ARNOLD, F.C.S., then gave a lecture on Microphotography. He described the apparatus necessary, and mentioned the difficulties which beset the process in its various stages. He said it was essential to have a powerful and steady light, and for moderately dense objects he used a good microscopical lamp with plano-convex condenser, but found lime-light and magnesium ribbon more effectual. Transparent sections of wood and tissues generally were best stained brown or red, that is in their structural details. Blue stains and pale tints gave very poor results. Opaque bodies, including many rock sections,

had to be taken by reflected light, and Dr. Sorby's hyperbolic condeuser was iuvaluable, as it threw no shadow. In regard to the microscope, the lecturer worked with both objective and eyepiece. The power selected depended on the subject: 2-inch up to ¼-inch embraced a large number of suitable objects, but a higher magnifier was occasionally needed.

Mr. ARNOLD proceeded to photograph a specimen of mica containing oxide of manganese, a semi-transparent seetion. After focussing by means of a lamp, which was afterwards removed, about nine inches of magnesium ribbou was burnt bchind the scction. The camera slidc closed, removed, and plate developed in the dark room with hydrochinone, a very satisfactory negative resulted. Microscopical lantern slides of wood, diat ms, and uarch granulcs by polarised light, were showu to illustrato the lecture.

A discussion followed, in which the chairman, Rcv. Clementson, Mew, Maleham, Winder, and G. T. W. Newsholme took part.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held at Mason's Hall Tavern on the 6th inst.

Mr. H. D. ATKINSON exhibited a number of old prints; they were evidently parts of stereoscopic pictures, and were made about 1857 or 1858.

Mr. H. STARNES showed two albums of priuts lent by Mr. W. Morrish, of the West Surrey Photographic Society; they were published in 1855 and 1857 respectively, and contained examples of most processes in vogue at that time. Attached to each print were full particulars of author, leus, stop, time of day, and also the process by which the picture—both uegative and print—were produced, adding greatly to the value of the album

A discussion on the subject of "Old Prints" followed.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

AT a meeting held ou June 7th, at 76, Peckham Rye, Mr. F. W. WEBB was chairmau.

Mr. F. W. EDWARDS gave a demoustration of "Printing by Platinotype." Having brought with him about thirty undeveloped prints, he proceeded to develop them before the meeting. The subjects—which consisted of photographs of panels, statuary, portraits, and landscapes—were very artistic, the development of which in Mr. Edwards's hands was eutirely successful. The precautions to secure success were fully enumerated, a print being purposely left undeveloped some time, in order to show the effect of atmospheric action on undeveloped prints. The demonstration was much enjoyed by the meeting, which passed a cordial vote of thanks to Mr. Edwards.

The uames of three geutleman were hauded in as proposed members.

It was resolved that an excursion of the members take place on Saturday, June 22nd, to Carshalton and ueighbourhood, the place of assembly to be Cheam Park, at 6.30, for tea.

The next meetiug will be held on Friday, July 5th, at 8 p.m.

COVENTRY AND MIDLANDS PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting was held on June 5th, the President in the chair. It having been suggested that another exhibition should be held in the autumn, the report of the council on the matter was read, recommending the same; and, after some discussion and a few ameudments, was unanimously adopted.

The circular letter sent out by the Photographic Club on the metric decimal system of weights and measures was read and discussed, most members expressing themselves in favour of the same if it could be more generally adopted.

The results of the recent out-door meeting were examined with interest, as also some instantaneous shutters showu by Mr. Sturmey.

Mr. H. W. JONES, F.C.S., presented the members with some samples of "Photopel," a new form of developer he had been working at, and also showed what could be done with it.

NORTH SURREY PHOTOGRAPHIC SOCIETY.

THE ordinary fortnightly meeting was held on the 4th instant, when Mr. W. H. Walker and Mr. Lewis Wolff were elected first president and vice-president respectively. Both gentlemen took a large share in the formation of the Society in January 1887, and have never relaxed their exertions for its welfare.

A discussion on hand cameras followed the election.

The HON. SEC. made a few introductory remarks, classing this form of camera uuder two heads—viz., purely "detective" cameras, and those that may be used in the hand, without attracting attention, or on the tripod in the usual way.

Messrs. Marion's book and parcel detectives were then explained. The kodak, having beeu already shown, was not explained.

Messrs. FALLOWFIELD then described the mcthod of working Miall's new camera, the chief feature of which appears to lie in the means of changing the plate by a turn of a button, the change being registered on a plainly visible disc above the buttou.

Messrs. Thomas's "Wellington" was kindly sent for the members' inspection, and a representative of the firm explained its points. The use of double backs is applied to this camera; and two of similar construction by Messrs. Watsou and Beck were brought by members and placed on the table. Messrs. Rouch's "Eureka" was most ably explained, and samples of work done submitted. This was followed by the "Mackellan," special comment being called on the method of focussing applied.

Mr. A. SENIER submitted an American patteru which he had considerably altered and improved, presenting as perfect an instrument as it is possible to conceive.

The HON. SECRETARY also showed Messrs. Hockiu's "American" for use with films; its principal feature was considered to be its exceptioually low price.

Considerable discussion arose on the various forms of camera, and the time at the disposal of the meeting was hardly sufficient for the full consideration of this wide question, which will probably be revived at some future date.

At the next meeting, on the 18th inst., at the West Norwood Constitutional Club, 8 p.m., Mr. Valentine Blanchard will demonstrate his new black platiuum printing process. Visitors will be welcomed.

LEWES PHOTOGRAPHIC SOCIETY.

AN ordinary meeting was held on June 4th, the PRESIDENT in i n the chair.

Mr. A. H. C. Corder read a paper on the Platinotype Process." His paper dealt briefly with the hot aud cold bath processes, the Pizzighelli direct printing process, and the new process just brought out by Mr. Valentine Blauchard. Mr. Corder afterwards developed some prints by the hot bath process, and passed them round for inspection.

A discussion then took place, iu which the President, Mr. C. A. Wells, Mr. Foxall, the Hon. Secretary, and others, took part.

After a vote of thanks to Mr. Corder, the meeting resolved itself into a *conversazione*. Several members brought negatives obtained at the excursion held on May 20th, also prints from them, and considering the unfavourable weather, the results were regarded as satisfactory. The President exhibited his detective camera, which consisted of a ¼-plate camera in a box; and showed work which had beeu done with it. Several other members also exhibited work.

At the next meeting, to be held on July 2nd, the hou. sec. will read a paper on "The Artistic side of Photography."

Talk in the Studio.

DAMMAR RESIN.—By B. GRAF (*Arch. Pharm.* [3], 27, 97-111).—Five East Indian varieties of dammar resin were examined, and were fouud to be tolerably uniform in composition. In opposition to previous observers, the resin was found to contain only about 1 per ceut. of au acid, which proved to be bibasic and of the formula $C_{18}H_{33}O_3$. The other constituents, of which 40 per ceut. was iusoluble and 60 per cent. soluble in alcohol, appeared to be of no very pronounced chemical character, and in particular had no acid properties. The soluble portion has probably the molecular formula $C_{20}H_{42}O_2$, and melts at 61°. The presence of a pure hydrocarbon in dammar resin is denied. The portion iusoluble in alcohol is not free from oxygen, and melts at 144-145°.—*Journal of the Chemical Society.*

THE COST OF GELATINO-BROMIDE PLATES NOW AND EIGHT YEARS AGO.—Looking back eight years we find Mr. A. L.

Henderson counting up the cost of materials, and expressing astonishment that quarter-plates should be sold at so low a price as 1s. 10½d. per dozen (PHOTOGRAPHIC NEWS, 1881, p. 407), and now that quarter-plates are largely advertised at less price per dozen than the odd tenpence half-penny, it is a matter of some interest to quote Mr. Henderson's estimate of cost. Materials are slightly—but not correspondingly—cheaper now, and we do not think that any coater in the country now gets £5 per week; indeed coating is principally machine work. Mr. Henderson wrote in 1881:—

"Silver, 5 ounces at 3s. 1d. ...	...	15s. 5d.
Bromide, 3½ ounces at 4d. ...	...	1s. 2d.
Gelatine, 4 ounces at 3s. 6d.	...	0s. 10d½d.
Alcohol, 3 quarts at 1s. 3d. ...	...	3s. 9d.
70 dozens glass at 3d. ...	...	17s. 6d.
		£1 18s. 8½d.

This coated 70 dozen quarter-plates. I know that many of your readers will take exception to the quantity, and say I should have coated 100 dozen. Of course there is coating and coating; if a very rapid plate is wanted, thicker coating is necessary, as the bromide is more transparent; to which must be added the cost of various extras, as per example—plant, interest on ditto, rent, taxes, water, ice, labour, breakage, fuel, failures, paper, boxes, gas, carriage, discount to dealers, repairs, depreciation, experiments; and last, if not least, advertising; and in addition there may be many other items unknown to myself. Take the question of labour, for example; one professional plate maker told me he paid his principal coater £5 a week, and that not on piece-work. In conclusion, taking all the extras and risks into account, the wonder is that a good plate should be retailed at 1s. 10½d. per dozen quarter-plates."

PHOTOGRAPHIC CLUB.—The subject for discussion on June 19th will be "Printing Processes." Saturday outing at Rickmansworth.

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," (but not letters intended for insertion under the heading "Correspondence") should now be sent to Mr. Spiller, who is alone responsible for all which appears under the heading "Answers to Correspondents." Such communications, if now sent to the Editor, are forwarded by him to Mr. Spiller. Failure to attend to the above instructions may lead to disappointment.

Answers to Correspondents.

This column is now under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, is placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

BLOCK.—Be so good as to enquire of the author who supplied it. His address is Cross Park, Partick, near Glasgow. An etching process, such as bitumen on zinc, would give such a result.

J. N. (Cheadle).—We are inclined to think that the silvery deposit on the face of your ferrotype is caused by the chemical action at the cut edges. Could you not test this by touching the edges all round with a very thin film of varnish before coating the plate with collodion?

HERMETICUS.—Write to Mr. C. E. Groves, F.R.S., secretary of the Institute of Chemistry, 9, Adelphi Terrace, Strand, W.C., who will give you all particulars, and also an authoritative answer to the question you ask. The fact of your having passed the South Kensington examinations ought to facilitate your admission.

T. EVENS.—Mr. E. J. Padmore is, we believe, an official engaged at the Clausthal Mines. The photo which he sent us is remarkably successful, two flash lamps having apparently been employed at different distances, but both on the same side, and hidden behind recesses, so as to give no direct glare.

A. B.—A sheet of the aluminium leaf, obligingly furnished by the Editor as being similar to that used by him at his recent lecture, measured nearly eleven inches square, and weighed only ·0085 gramme. This corresponds to about ·0008 grm. per square inch, and therefore eighty-four square inches would only weigh a grain. It was prepared by a gold-beater whose whole stock was purchased by Mr. Bolas some years ago, and whose premises have since been pulled down to make way for metropolitan improvements. The interest excited by the aluminium light will no doubt lead to further experiments.

T. A. W.—The French officials are not very favourably inclined to permit the use of the camera in Paris, and the right to photograph the Exhibition and its contents would of course be reserved. We should advise you to confine your operations to working with the detective camera, particularly when facing public buildings. The procuring of a special permit would necessitate your going through a good deal of trouble, and for this you would apply to the Foreign Office here, or British Embassy abroad.

HYPO.—I. Ordinary French polish would obviously meet your first requirements. 2. Lacquer for brass-work is shellac dissolved in methylated spirit, and applied warm. 3. A good receipt for browning gun-barrels is the following:—

Tincture of steel (Tr. ferri chlor.) ...	... 2 ounces
Methylated spirit	... 2 ,,
Bichloride of mercury	... ½ ounce
Sulphate of copper	... ¼ ,,
Nitric acid	... ½ ,,
Water	... 1 quart

The methylated spirit is sometimes wholly or partially replaced by sweet spirits of nitre. Flour emery is used for cleaning the iron, and then the solution is painted on and left to dry. Several coatings are successively applied, the iron rust being occasionally removed by chalk on a rag. It is important to polish the surface well, and not to hurry the process. Lastly, wash well with water, and rub in oil. Iron thus bronzed is not altogether proof against rusting in a damp atmosphere, but is greatly protected.

PLATINUM.—The recovery of platinum from residues and ashes of platinotype paper and prints is not so easy as with the other precious metals, on account of its infusible character. We should be inclined to mix in a certain proportion of red lead and black flux with the ashes and burnt residues, and then melt them together for the purpose of getting a button of platinum and lead alloy, which could then be separated by the action of nitric acid, when the platinum would all be left insoluble as a grey or black sponge, and this collected on a filter, washed, dried, and burnt, could then be redissolved in aqua regia for further use. Or, the button of alloy could be cupelled to remove most of the lead before resorting to the use of nitric acid.

INNER TEMPLE.—The photographs of the interior of Temple Church, both small views and enlargements, can be procured of Mr. R. C. Murray, 113, Pentonville Road, N. They were taken by Mr. John Clerk, Q.C., Treasurer of the Inner Temple.

A. E. D.—An excellent portrait of the late Mr. W. F. Donkin occurs in the picture taken of the Photographic Exhibition some years ago by Mr. W. Cobb. From this negative an enlarged vignette might, we think, be produced, and a likeness very characteristic of our deceased colleague. Write to Mr. Cobb at Shooter's Hill Road, Blackheath, and offer this suggestion, if it meets your approval.

L. E. (Weymouth).—The weather in the metropolitan district during the Whitsuntide holidays has rendered out-door photography impossible. With leaden skies, high wind, and rain, the outlook has contrasted most unfavourably with the brilliant conditions of last week, when the leading article was written. Reports from Paris are no better, so you may consider yourself fortunate in escaping the unpropitious circumstances prevailing over a wide area of Southern Britain and parts of the Continent.

C. K. (Paris).—Write to Mr. J. Berger Spence, 31, Lombard Street, London, E.C.

E. D. S. and other correspondents answered by post.

The Photographic News.

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THE PHOTOGRAPHIC NEWS.

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AN ENCYCLOPÆDIA OF PHOTOGRAPHY.

IT has long been a subject of remark that in photographic literature we have numerous small or elementary treatises, but a noteworthy absence of comprehensive hand-books. It is, therefore, with great pleasure that we find that Messrs. Gauthier-Villars and Sons, the eminent publishers of Paris, have projected such a comprehensive Encyclopædia of Photography as shall do credit to the craft. Indeed, the first part of the work is now in our hands for review.

No person who has not been in the constant habit of handling and collating items of photographic importance could be expected to very successfully produce so comprehensive a work as that now projected by Messrs. Gauthier-Villars; hence it is with much satisfaction we are able to state that the production of the Cyclopædia has been entrusted to Dr. Charles Fabre, who has long been so favourably known as author of the French "Year-Book," the "Aide Memoire de Photographie," and who is so much associated with the work of photographic journalism in France.

The "Encyclopædia of Photography"* is to consist of four volumes each of four hundred pages, super royal octavo size. The work will be issued in twenty parts of eighty pages each, one part to be issued each month till the work is completed, and the subscription price is 40 francs (32/-).

If we may judge by the first part now before us, the work will be one which every person really interested in photography will endeavour to secure. The first number deals with the historical phase of the development of photography; after which there is a short account of the general phenomena of light, and then follows a carefully-written treatise on photographic lenses, which deals with the mode of construction of lenses in general, and the characteristic features of the various forms of photographic objectives. Very copious references are given, and at the end of each section is a bibliography of the subject.

With respect to the general scheme of the work, we may say that the first volume is to deal with apparatus, appliances, and material common to the principal methods. The second volume will deal with the various methods of producing and protecting the negative, while ordinary positive methods will be dealt with in the third volume. The fourth volume will treat of those matters which do not quite come within the scope of the headings just given—such as enlarging methods, scientific applications, chemical matters, and theories of photography.

* Traité Encyclopédique de Photographie, par Charles Fabre, Docteur ès Sciences. Part 1, June 15, 1889. Gauthier-Villars, 55, Quai des Augustins, Paris.

PRETENDED SPIRIT PHOTOGRAPHS.

THERE are two impostures in connection with photography that every now and then crop up, and are brought before the public with more or less assurance. The one is the claim to be able to produce, in a commercial manner, photographs in natural colours; by which it is implied and understood that the colours, like the light and shade of the photograph, are formed by the chemical action of light; and the other is the pretence to photograph the spirits of deceased persons. Both impostures are, doubtless, to be traced to a similar source, the desire to make money at a greater rate than the legitimate photographic work of the producer would accomplish. The "photograph in natural colours" swindle has been rather too conspicuously exposed in recent years, for it to be likely to be attempted again just yet. But the subject of spirit photography has had rather a long rest, and may, perhaps, on that account be nearly due again; indeed, from an article in the *Pall Mall Budget* of last week, in which one of the methods of perpetrating the fraud is dealt with and explained, it may be inferred that there is some present necessity for denunciation and exposure.

The periodical press is such a powerful engine, that it is much to be regretted when any portion of it is employed in the service of deception. True, that for the most part it can be relied upon rather to expose false pretences than to assist them. Yet it has happened, in the cases relating to photographic matters to which we have referred, that interest has been obtained—either by offering to some journalist having influence amongst his brethren to participate in the profits of the scheme, or, in the case of spirit photography, by the necessities of the writers to uphold what pleases their patrons—to procure that journalistic support without which much hold could not be gained with the public. We are not aware, however, that any writer not thus directly interested, having any pretension to scientific knowledge, and, at the same time, practically acquainted with photography, has committed himself to the support of either of the questionable schemes referred to.

The first important pretence to photograph departed spirits in company with living sitters, was made about the year 1868, by one Mumler, in the United States of America, a condensed account of police proceedings in connection with which we extract from an article headed "The Mumler Swindle," in the *Illustrated Photographer*. Mumler being prosecuted for fraud, the Judge expressed himself thus:—"However much I may be morally convinced that there may have been trick and deception practised by the prisoner, yet as I sit as a magistrate to determine from the evidence given by the witnesses according to law, I am compelled to decide that I would not be justified in sending the complaint to the Grand

Jury, as, in my opinion, the prosecution has failed to make out the case."

The *New York Herald* and the American photographic journals abused the judge for allowing the man to escape, but some credit is due to him for having so far overcome his moral conviction of the prisoner's guilt as, in the interest of strict legal justice, to act in opposition to it. The Photographic Section of the American Institute, however, thought itself called upon to take action in the matter, and without a dissentient voice passed the following resolutions :—

1. That the Photographic Section of the American Institute take the earliest opportunity to condemn all such methods of working upon the credulous and uninitiated, and that they receive with wonder and amazement the decision of the justice.

2. That to our worthy member, Mr. P. V. Hickey, of the *World*, who lodged the complaint upon which the proceedings were based, we offer our thanks for his praiseworthy though unsuccessful efforts in the cause of truth and common sense.

Here we may remark, of pretended spirits photographs generally, that whilst those versed in photography have scouted them as evident impostures, and indeed, from the clumsiness which has characterised most of such productions, it is difficult to understand any reasonable and skilful person being deceived by them ; yet they have not wanted defenders, one at least of whom has claims for respect on account of his scientific services, if a knowledge of photography does not happen to be amongst his acquirements. This is notably the case with respect to the productions of Hudson, a photographer in a small way in Holloway, whose "spirit" photographs were mostly such transparent impostures as one would think only capable of deceiving the wilfully credulous. Hudson, we believe, actually confessed to making sham spirit photographs, yet some believers remained, who persisted in proclaiming their belief in the genuineness of some, at the least, of his productions. Mr. A. Russell Wallace, a scientific man who has done good service in the biological department of science, wrote of one of Hudson's photographs : "Here, then, one of two things are (*sic*) absolutely certain : either there was a living intelligent but invisible being present, or Mr. and Mrs. Guppy, the photographer, and some fourth person planned a wicked imposture, and have maintained it ever since." In a foot-note he adds : "It is an important circumstance that the face of the spirit form is well-defined, and as recognisable as the portrait of any living person. Had an imposture been attempted, this would have been carefully avoided, since it would almost certainly lead to the discovery of the person who was dressed up for the occasion. Yet no such person has been found, although during the discussions that subsequently arose, many were eager to find proofs of imposture."

In reply to these arguments it was pointed out in the *British Journal of Photography*, that the face, although it might not be recognised as the likeness of any particular human being, was remarkably like that of an artist's lay figure. The awkward helplessness of the pose of the fingers, and the band across the forehead, were further arguments in favour of the lay figure theory. Thus not only was the non-recognition of the personality of the sitter accounted for, but the "absolute certainty" of collusion by a fourth person, if the alternative of fraud was assumed, did not remain even a probability.

In a third case, that of a Frenchman who set up a sort of private studio in the neighbourhood of Portman Square, and extracted a good many guineas from the pockets of the credulous, the imposture might have remained undemonstrated, but that the French police have a more free hand than that enjoyed by those of London or New York, and on his endeavouring to carry on a large business in spirit photographs in Paris, the authorities made a sudden descent upon him, and seized, amongst other things, the puppets from which he made his "spirit" negatives.

Into the question of spiritualistic phonomena so-called, apart from photography, it is not our province to enter, although we may be permitted to quote from a letter written by Faraday to Schönbein, the inventor of pyroxiline : "What a weak, credulous, unbelieving, superstitious, bold, frightened—what a ridiculous world ours is, as far as concerns the mind of man." Although it is to be regretted that such transparent impostures as the before-mentioned so-called spirit photographs should have received the support of any man of science, it is satisfactory to believe that it is only when there is an absence of knowledge of photography itself that such credulity has been exhibited.

THE AIMS, THE DEVELOPMENT, AND THE DECADENCE OF ART.

LAST week we gave a sketch of the "symmetrical angel," taken from an eighth century Psalter, quoted by Ruskin, and used by him as an example of results to be expected from following the directions of those who formulate rules for the construction of pictures and other works of fine art ; rules which were in substance formulated long ago by Aristotle, and which have since been retailed out with fresh wording, but less clearness, by almost every soulless pretender who desires either to pose as an art critic, or to call the attention of purchasers to any sheets of devices or figures which he may construct. As an example of work done quite without reference to the advice or dictates of the



constructor according to rule, we now reproduce the first page of Mr. Walter Crane's "Sirens Three," which was

* Continued from p. 386.

commenced in the issue of *The English Illustrated Magazine* for April, 1885.

In this remarkable work, in which Mr. Crane appears in three-fold character of poet, draughtsman, and penman, there is scarcely a page in which every recommendation of the constructors according to rule is not most flagrantly violated.

In the example before us, Mr. Crane has in no sense "balanced and compensated his leading lines." He has "made several lines run in one direction, so as to give a sense of falling, because they are not balanced by other lines running in another direction opposiug them." "Symmetry, or equal balance of part by part," is totally absent, while the "Principle of the Pyramid" is nowhere evident. In spite of all this, Mr. Crane's "Sireus Three" has been a source of delight to many besides its author; we say "besides its author," because we regard Mr. Crane far too true and honest an artist to send out anything which does not at any rate give him delight.

The mention of Mr. Crane's "Sirens Three," a work reproduced by photography from the artist's original drawings, would naturally lead us to the relations existing between photography and the fine arts; but before passing to a study of the influence photography has had upon the craft of the printer, the decorator, or the painter, we may quote a passage from one of the essays of Dr. Adam Smith as bearing on the question of imitation alluded to last week, and also we may quote from a paper recently published by Mr. William Morris as regards the general aim of the true artist.

Dr. Adam Smith, especially known to the newspaper reader as the author of "The Wealth of Nations," but most esteemed in other quarters on account of his work on "The Theory of the Moral Sentiments," says, in his essay on the Nature of the Imitative Arts:—

In painting, the imitation frequently pleases, though the original object be indifferent, or even offensive. In statuary and sculpture it is otherwise. The imitation seldom pleases, unless the original object be in a very high degree either great, or beautiful, or interesting. A butcher's stall or a kitchen dresser, with the objects which they commonly present, are not certainly the happiest subjects, even for painting. They have, however, been represented with so much care and success by some Dutch masters, that it is impossible to view the pictures without some degree of pleasure.

In this case Dr. Smith is taking rather the "photographic" view—a view which concerns the making of an exact copy or record—than the ordinary view of the artist painter; when the object is generally not so much to secure an exact record or imitation of a comprehensive whole, as to record some phase which the artist wishes to perpetuate—indeed, we are inclined to think that Dr. Smith takes a somewhat low view of the work even of the "imitative" artist.

Somewhat in contrast with the view of Dr. Smith, and nearer in accord with the view of the "free art" school of to-day, stand the remarks of Mr. William Morris as expressed in his "Aims of Art" (London, 1887). Mr. Morris says:—

I suppose, indeed, that nobody will be inclined to deny that the end proposed by a work of art is always to please the person whose senses are to be made conscious of it. It was done *for* some one who was to be made happier by it; his idle or restful mood was to be amused by it, so that the vacancy which is the besetting evil of that mood might give place to pleasant contemplation, dreaming, or what you will; and by this means he would not so soon be driven into his workful or energetic mood; he would have more enjoyment, and better. The restraining of restlessness, therefore, is clearly one of the essential aims of art, and few things could add to the pleasure of life more than this. There are, to my knowledge, gifted people now alive who have no other vice than this of restlessness, and seemingly no other curse in their lives to make them unhappy: but that is enough; it is "the little rift within the lute." . . . I believe that art cannot be the result of external compulsion; the labour which goes to produce it is voluntary, and partly undertaken for the sake of the labour itself, partly for the sake of the hope of producing something which, when done, shall give pleasure to the user of it. Or again, this extra labour, when it is extra, is undertaken with the aim of satisfying that mood of energy by employing it to produce something worth doing, and which, therefore, will keep before the worker a lively hope while he is working; and also by giving it work to do in which there is absolute immediate pleasure. Perhaps it is difficult to explain to the non-artistic capacity that this definite sensuous pleasure is always present in the handiwork of the deft workman when he is working successfully, and that it increases in proportion to the freedom and individuality of the work. Also you must understand that this production of art, and consequent pleasure in work, is not confined to the production of matters which are works of art only, like pictures, statues, and so forth, but has been and should be a part of all labour in some form or other: so only will the claims of the mood of energy be satisfied. . . . The true secret of happiness *lies in the taking a genuine interest in all the details of daily life*, in elevating them by art instead of handing the performance of them over to unregarded drudges, and ignoring them; and that in cases where it was impossible either so to elevate them and make them interesting, or to lighten them by the use of machinery so as to make the labour of them trifling, that should be taken as a token that the supposed advantages gained by them were not worth the trouble, and had better be given up. Thus and thus only can come about the new birth of Art, and I think it will soon come about. You may say it is a long process, and so it is; but I can conceive of a longer.

The fact that the camera merely records what is in front of it, limits the photographer in his exact office *as a photographer*, in such a way as to prevent him exercising that imaginative faculty which is a mainspring of fine art in whatever way that art may manifest itself. The photographer may, however, and frequently does, secure fine pictorial results by the judicious *selection* among available objects, in others he constructs pleasant looking groups; groups of persons as evidenced by the works of Rejlander, and many other groups of things as exemplified by the assemblages of flowers, fruit, shells, and other objects, which remain as evidences of the pictorial instincts of Mr. Roger Fenton.

Anyone, however, with a real conception for the subject of a true picture, will know the very real difficulty of adequately building up that conception in the solid, ready for photographing, rather than expressing it primarily on the canvas, with however such assistance as may be given by a study of persons or things used as models; a difficulty so great that only those utterly unable to produce anything else than a burlesque of nature by means of pencil or brush are likely to attempt any complex grouping intended to depict or illustrate human passion or feeling.

It is because far too ambitious attempts of this sort have been made by persons completely without the perceptive power of the self-trained observer of nature, or the capacity to draw a simple figure in definite outline, which most persons can acquire by a reasonable amount of practice, that photographic exhibitions of twenty years ago, and even much more recently, were crowded with strange groupings, showing such figures as sham peasant women in sham peasant garments—made for the purpose by the costumier—and carrying such baskets or articles as the constructor of the groups fancied might bring with them some air of reality. But all through it was the humanity of these "models" which was so saddening to anyone delighting in nature, reality, or truth. Broad and coarse grins, probably expressions based on real scorn of the man who was so blind as to suppose that his camera was depicting the repose of conversation, or the quiet peacefulness of ease and contentment. Such productions, false to nature in their essence—meretricious, coarse, vulgar, and garish in the execution—were often made more offensive by fragments of several being pieced together into an incongruity, imagined by the simple-minded to be a "whole," and are fast disappearing from our photographic exhibitions. If admitted, either by oversight or from other cause, they usually excite the risibility of the judges, while an occa-

sionally bronze medal is thrown in to give emphasis to the change of feeling since the time when gold medals were almost invariably given to such productions. The man who can construct such things with the notion that they are in any sense desirable sheets (picture seems hardly the word to apply) is barred up in a cell far more narrow than that enveloping him who constructed the symmetrical angel which we reproduced last week. He is soul-less; the world has no life, no reality for him. To use Mr. Ruskin's reference to the figure of the Serpent Tempting Eve (p. 386), such a man can (by his camera, if in no other way) depict the scales or the coils, but the "element of life in its first form" he is unable to delineate; indeed, he has not the perceptive power to recognise these elements of life when before him; consequently, even with his camera, he can only obtain them fortuitously. Indeed, there is but little chance of his doing this, as his "models" are not what he poses them for.

False interiors, built up in the solid and made up of materials which are not what they seem, but only constructed *to photograph like the real thing*, formed a large part of the stock-in-trade of the now almost extinct class—and the class was never a large one—of those who love to practise juggling tricks and every sort of sham and unreality in connection with the work of the camera. Such a man, if he wanted a rock or a big stone, would make no effort to obtain and use the real thing; he would construct something of cement, plaster, glue, and brown paper—anything which, if photographed, would pass as a stone. In making this imitation he believes himself to be an "artist," and he prates proudly of how he did it. Mr. Wall, in one of the able articles on the art side of photography, writes:—

I once knew a clever photographer who wasted pitifully some days of bright summer weather, in the midst of glorious scenery, with a glue pot, a bundle of laths, some distemper colours, bits of canvas, and muslin, rope, string, wire, &c., making what he called "rustic accessories," which, when made, were ugly still, artificial abominations, utterly unlike the real, truly picturesque things which he might have procured in half-an-hour from some fields not a stones-throw from his glass room. "But then mine are," said he, "so much lighter." This poor man was all the while possessed with the singular idea that he was cultivating his *artistic* faculties, and worked for his childish ends with an amount of self-satisfaction and conscious pride enough to make one envy him even while one laughed at him.

Let us go back twenty years, and see what was written by one of those working and writing towards the substitution of artifice and unreality for art in connection with photography:—

I wish to point out that some of the greatest modern pictures are such as might have been represented by photographic means, providing only the conception had been forthcoming—the inspiration, the greatness or nobleness, or pathos, which Mr. Ruskin says determines its claim to be a work of fine art or not. I refer to that simple and touching picture, the "Old Shepherd's Chief Mourner."

We know that Mr. Ruskin, in discussing it, emphasizes "the close pressure of the dog's breast against the wood; the convulsive clinging of the paws which has dragged the blanket off the trestle; the total powerlessness of the head, laid close and motionless upon its folds; the fixed and tearful fall of the eye in its utter hopelessness; the rigidity of repose which marks that there has been no motion nor change in the trance of agony since the last blow was struck on the coffin lid; the quietness and gloom of the chamber; the spectacles marking the place where the Bible was last closed, indicating how lonely has been the life, how unwatched the departure, of him who is now laid solitary in his sleep; these are all thoughts—thoughts by which the picture is separated at once from hundreds of equal merit, as far as mere painting goes."

It is hardly to be believed, but in all seriousness the proposal was made—by the writer, photographer, and picture constructor according to rule, whom we have just quoted—to realise the soul of such a picture by photographing a stuffed dog. He writes:—

The coffin, the trestle, the pall, might all have been constructed. A clever taxidermist would have stuffed a dog in that position, the only difficult bit in the picture. The bowed head, the lassitude of the limbs, the tear (*of wax*) falling from the heavy eye, might all be imitated.

Rejlander was, perhaps, among all the photographers who made reputation in the last generation, the man who knew best how to use the camera as an instrument towards the production of desirable pictures, and he sufficiently understood his work to be an opportunist of the most pronounced type. Although he may occasionally have dressed up a model to represent something which that model was not in reality—this was not his characteristic line of work—he never made a system of dressing up his acquaintance into sham peasants, and printing them into rural scenes. He was, as we have said, more essentially an opportunist than a constructor according to plan, and we think this must be the case with anyone who will fully develop the artistic possibilities of photography. If in going along the road he saw a person who struck him as useful in the composition of a photograph, he would follow and secure that person if possible, sending his wife to arrange matters if the person was a woman.

If photographers will rightly read the lesson taught by the works of Rejlander, the works of the now almost effete school of photographic picture-makers by rule and combination, and the works of the new naturalistic school led by Dr. Emerson, they will probably recognize that the pictorial strength of photography rests not so much in carrying out a previous conception, as in opportunism; availing oneself of the power of recording a pleasing phase in the ever-changing panorama of life and being.

(*To be continued*).

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

TWENTY-FIFTH ARTICLE.

BY W. M. ASHMAN.

Blue Printing.—Printing positives by means of the iron salts is the simplest of all photographic processes by which a picture upon paper is obtained from a negative.

Both the preparation of the paper and the subsequent operations are extremely easy; the former will be clearly pointed out, and the latter consists of merely rinsing the prints in a few changes of water.

It is nearly half a century since Sir John Herschel discovered that the persalts of iron possess the property of changing into protosalts (ferric salts into ferrous) under the influence of light, especially in the presence of organic matter. By floating bank post paper upon a solution of perchloride of iron (ferric chloride), or by brushing that solution over the paper, and drying it in the dark, a sensitive surface was obtained which would receive an impression when placed in the light under a partially obstructive medium, such as a drawing upon thin paper, or some design. Natural objects were very often employed, such as flowers, or leaves of ferns, as also fabrics, such as lace, &c., and in each case a faint image of the obstructing object was visible after a short exposure. The next step was to strengthen that image, and a suitable substance was at once recognized in the reagent employed to indicate the presence of a ferrous salt, namely, red prussiate of potash (potassium ferricyanide), which gives a blue precipitate when any ferrous salt is brought in contact with it. This was the origin of the now well known blue print. By further experiment it was found that the blue picture thus produced could be rendered purple by chloride of gold, made darker by silver nitrate, yellow by potassium dichromate, and black by tannin. It will thus be seen that there is a wide range of possibilities opened up

by these early experiments, all of which were not, however, confined to the author of "Cyanotype." The credit is due to Sir John Herschel for discovering that ammonia ferric citrate acts more freely than any other of the iron salts, although, says Hardwick, it was closely run by the double salt of iron and potassium. It was soon afterwards noted that, as the ferric salts are not affected by the ferric potassic cyanide, it was possible to avoid the trouble of developing by mixing the two salts and applying them to paper, with the precaution of putting them together only a short time before using, and carrying out the process in a yellow-lighted room. Under these circumstances printing by the direct action of light should be continued until the formation of a bronze green in the clear lines or shadows is seen, when it only remains necessary to wash the prints in two or three changes of water to remove the ferric and ferrocyanide salts that would otherwise spoil the print, and the blue coloured image is left.

Formula for preparation :—

Ferric ammonia citrate	80 grains
Water	1 ounce
Ferric potassic cyanide... ...	60 grains
Water	1 ounce

Mix equal parts as required, and apply to the paper with a broad brush or sponge.

Such paper is sold commercially in very large quantities for the reproduction of maps and plans, but if kept for some time it becomes useless. Only by guarding against light, air, and dampness can it be preserved; it is better, however, to make it as required.

For some purposes separate solutions may be preferred, in which case the following formula can be used. Dissolve 600 grains of ammonia citrate of iron in fourteen ounces of water, and upon the solution thus formed float good quality well sized paper for two minutes; dry in the dark room. The paper can be placed in contact with a negative, plan, or other partially transparent object, and submitted to the action of sunlight until an image is just visible on the surface. The print thus obtained should then be transferred to a ten per cent. solution of *red* prussiate of potash, when a vigorous image in *blue* will appear. The last mentioned solution should be used in a yellow light, and it is also advisable that it be freshly prepared from clean bright crystals, as both the salt and its solution deteriorates upon exposure to the atmosphere. Washing in water acidulated with citric acid, and a final rinse in plain water, completes the process.

Mr. J. Traill Taylor recommends the use of ferric ammonia oxalate, and gives formulæ for its preparation. He says, take of crystallised oxalate of ammonia 437 grains, oxalic acid 386 grains, water six ounces; dissolve with heat under the boiling point, and then slowly stir in peroxide of iron (ferric oxide) to saturation. Allow the crystals to form and dry, put away for use in a well-stoppered bottle kept in the dark. The whole process should be done by artificial or yellow light. To use, take sixty grains of this salt, and one ounce of water, and sponge or brush the paper over carefully in two directions, dry in the dark quickly, and expose behind a negative. Development is effected with red prussiate of potash as above, and the usual washing follows. The paper keeps very well preserved from damp and light. As to paper suitable for this purpose, the most easily obtained in small sheets is that known as best white woven writing paper, sold by any good stationer. Plain stout Saxe paper is a very fine basis either for coating with the mixed solutions, or for development. But the most brilliant effects are obtained by taking a sheet of albumenized paper which has not been sensitized for silver printing, and immersing it in boiling water, or exposing it in a chamber full of steam, to coagulate the albumen and render it insoluble. Other methods of procedure will be referred to further on.

In an article in the Year-Book of Photography, 1889, page 87, entitled "Portraits in Blue," by Mr. R. Offord, the use of gelatine-surfaced paper is advocated, such as that known as single or double transfer, and used in carbon pigment printing. We understand that he has floated this, after damping it, upon the ferric salt in solution—either the citrate or oxalate—and that preference is given to the latter because of the dark colour of the former commonly used. Development is effected by soaking in a somewhat weak ferricyanide solution, and any yellow colour removed by treatment with saturated solution of alum acidified with hydrochloric acid. It is also recommended by him to add the ferric ammonic citrate to a solution of gelatine, and coat opal plates therewith, printing them in the usual way and developing as above. The oxalic salt is useless for this purpose, owing to the crystallization. Attention is especially drawn to the increase of speed in the printing in each of the above cases, and the necessity to guard against over-exposure and consequent reversal of the image, which is very easily brought about in the process.

There is no doubt that, for simplicity, the employment of the mixed solutions applied with a sponge or brush to the paper is by far the most advantageous. No more need be mixed than is required, and the separate solutions will keep well if tightly corked and preserved in the dark. Nothing can be easier than the simple washing in clean cold water, and it is a good plan, and not much trouble, to add a few drops of a saturated solution of citric acid to the last, but washing should not be continued longer than is really necessary, or some colour is lost.

It often happens that an amateur desires to see what a negative will print like, or wishes to send off a proof of some subject in a hurry to a friend, and yet has not time to print and tone, &c., on ordinary silver paper. The blue process will be of service in such cases, and there is at least as much permanency in the prints as in those of silver on albumen.

In a recently published work, "Photographic Printing Methods" (Rev. W. H. Burbank), stress is laid on the following points:—Pure chemicals, paper free from deleterious matter, the addition of a few grains of soluble bromide to the mixed solutions, for the purpose of conferring keeping quality on the sensitive paper, and increasing vigour, sensitising in a dim or non-actinic light to insure purity for the high lights, and to a suitable sizing for the paper before subjecting it to the chemicals.

The writer says that albumen coagulated by heat is undoubtedly the best, but recommends the following treatment for a good white paper as being satisfactory: one hundred and fifty-four grains of arrowroot rubbed up with a little cold water, made up with twenty-four ounces of boiling water, and when cold six ounces of alcohol added. Float two or three minutes, and suspend by the end which left the solution last, in order to equalise the coating. He quotes the following formula from the *Photographic Times* as being a good one :—

Solution A.

Ammonia ferric citrate	2 ounces
Water	8 „

Solution B.

Potassium ferricyanide	2 ounces
Water	8 „

Mix in equal proportions before using.

We should be inclined to recommend the use of distilled or boiled water, and to reduce the potassium salt to $1\frac{3}{4}$ ounce or $1\frac{1}{2}$ ounce to render printing rather more rapid. The instructions for coating the paper are as follows:—Lay the paper on a clean glass plate, clipping the same at the corners. Apply the solution with a clean sponge, taking care to squeeze the same moderately dry before applying. Go over the paper in one direction, again dip sponge, squeeze, and go over paper at right angles to first strokes, avoiding streaks, which occur if too much solution is in sponge, or too much pressure is used. When sensitised the paper should present an even yellow tint. Dry

in the dark. Print until shadows are bronzed. If after paper is washed the sky portion or the highest lights are perfectly white, the colour may be deepened by immersion for a few seconds in acidified ferrous sulphate. The proportions given are :—

Saturated solution of ferrous sulphate	... 4 ounces
Sulphuric acid	... 4 drams
Water	... 4 ounces

To obtain a brown black colour, after washing immerse in a solution of—

Tannin	... 2 drams
Water	... 8 ounces

Then change to a solution of sodium carbonate (strength, 2 drams to half a pint of water), repeat the changes until the print assumes a deep wine tint, then wash and dry ; the prints will be almost black. Another plan is that of soaking blue prints in a dilute solution of caustic potash until of a pale orange, then wash in clean water and steep in a three per cent. tannin solution until as dark as desired. This is based upon the reaction of iron and tannic acid which produces ink thus :—$Fe_2Cl_6+H_4C_{27}H_{18}O_{17}=$Ink. Immersion of a blue print in dilute ammonia changes the colour to a lilac tint.

Another formula for toning blue prints is quoted in the PHOTOGRAPHIC NEWS for Nov. 9th last. It consists of—

Borax	70 grammes
Warm distilled water ...	... 1,000 c.c.

acidifying this with sulphuric acid, and just restoring alkalinity by the addition of ammonia, and finally adding 10 grammes of gum catechu. Wash for fifteen minutes after toning.

In Pellett's process we have the advantage of producing black lines on a white ground from a positive like a plan or map on the usual tracing cloth, whereas, with the process just explained, we should have white lines on a blue ground ; therefore a photographic negative is unsuitable in the present case, and a transparency is required instead. The following formula works well :—

Gum-arabic	... 385 grains
Sodium chloride	... 46 „
Tartaric acid	... 62 „
Perchloride of iron	... 123 „
Water to make	... 3½ ounces

Smooth paper is evenly coated with this mixture, dried in the dark, and exposed under a drawing or positive. The image is developed with a saturated solution of potassium ferrocyanide (yellow prussiate of potash), and then fixed in a 1 to 10 solution of hydrochloric acid.

Besides the iron salts—a few examples only are above mentioned—there is a very interesting series of results to be obtained with uranium. The discovery of the value of this agent for photographic printing is attributed to Mr. Burnett. In principle, its behaviour is analogous to that of the iron salts. Paper is sensitized on a bath composed of uranium nitrate one ounce, water eight ounces, dried, printed, and developed, either by floating on acidified silver nitrate or potassium ferricyanide solutions. The former yields grey tones, the latter brown. The strength of the silver developer should not exceed twenty grains per ounce of water, and that of the red prussiate two grains. After washing, pass the prints through very dilute hydrochloric acid 1-20. Any of the rare metals may be used in toning uranium prints. The salts of gold and platinum are reduced to the metallic state upon the image. A printing-out process, known as Wothlytype, was based upon the reducing action of light upon the salts of uranium and silver, these agents being suspended in collodion, and paper was coated with this vehicle.

Returning again to the iron salts, we enter into a more detailed examination of the production of black prints, which are in all respects as useful as those in blue, and afterwards metamorphised.

The following is a formula in which there is a slight modification of the method of the inventor, M. Poitéven :—Dissolve separately, first, gum-arabic 13 drams in water 17 ounces ; second, tartaric acid 13 drams in water 6 ounces 6 drams ; third, persulphate of iron (ferric sulphate) 8 drams in water 6 ounces 6 drams. Pour the third solution into the second with constant stirring, and those again into the first. When the mixture is complete, add slowly, with constant agitation, 3 fluid ounces and 3 drams of a solution of ferric chloride specific gravity 1·450. Filter, and keep from the light. The paper used must be well sized and non-absorbent, and the above must be sponged over it in thin smooth coats, and then dried in the dark rapidly at a temperature not exceeding 130° F. It does not keep well, so must be made fresh every few days, and the colour of it when sensitized should be yellow. The printing can be seen as it progresses by the bleaching of the colour by the action of the light. The developer is gallic acid or tannin 35 to 40 grains, oxalic acid 2 grains, water 35 ounces. The print must be floated on this face downwards, so that no solution reaches the back nor air-bubbles be formed. The developed print is well washed and dried.

All black printing processes give more or less of a tint to those parts of the picture or drawing that should be white, and this is no exception, and it is certainly less prominent in pictures with half-tones than in drawings or plans. Like the Pellett process in blue, this requires a positive, or opaque lines on a transparent surface, and is therefore more suitable for the multiplication of builders' and surveyors' plans than for portraiture. There is a process of black printing, in which no iron is employed, which may be mentioned while on the subject of reproduction in black. The paper for it is prepared by sizing with a one to fifty solution of gelatine, and, when dry, it is floated upon the following mixture :—

Sodium chloride	... 48 grammes
Potassium dichromate ...	... 48 „
Sodium vanadiate	... 0·1 gramme
Distilled water	... 960 c.c.

A further mixture of

Acid (sulphuric)	... 96 c.c.
Water	... 480 „

is cooled and added to the other. The paper is exposed when barely dry for a short time, about seven minutes, and kept until it is convenient to develop it. This is effected by exposing the print to the action of the vapours of water and aniline, and afterwards in water vapour. This gives black lines on a green ground, and the green is afterwards removed by treatment with a one to six solution of ammonia. Wash and dry.

THE MANUFACTURE OF ART.

A FEW SAMPLES FROM THE ROYAL ACADEMY.

BY WIDE ANGLE.

THE Royal Academy has much to answer for. When a man can write R.A. or A.R.A. after his name it means as a rule that he has found a groove, and that the Forty have been pleased to signify their approval by making him an Academician or an Associate. Sometimes an artist has dropped into his groove before he attracts the notice of the Forty, but this is exceptional. The groove is generally coeval with his election, or is dropped into soon after. It would seem that once having formed his "style" a man must adhere to it, and year after year continue to turn out the same subjects painted in the same manner. We do not quarrel with this, but simply draw attention to the fact. At the same time we wonder why. Is it some secret and terrible rule laid down by the Academy which compels this monotonous travelling on one road, or have the R.A.'s or A.R.A.'s discovered that it is a good thing to have one's work recognised by the public without the trouble of looking at a catalogue!

Though the Academy detests newspaper critics, it respects the public, or, to speak correctly, the public's shillings. It paints for the shilling public, it aims at what is known as a "popular" show. But the public from the showman's point of view is what Mr. Bumble called the law—a "hass." To please the public you must go on recognised lines because it saves the public trouble, and the public hates trouble. How annoying it would be if the public could not readily discover its orthodox favourites every year: say, for instance, if Mr. Colin Hunter gave it a grey, stormy sea, instead of ruling his waves in eternally placid parallel lines; or if Mr. Pettie suddenly took to painting in cool tones, instead of in scorching, sulphurous-hued tints!

Trouble is also saved in another direction. The picture dealer likes the groove system, because he can advise his buyers easily. Take the present Academy, for instance. We can imagine him gazing round the rooms and soliloquising in a fashion something like this: "Glad to see that Sir Frederick's all right. Hasn't departed one jot from his usual thing. Same smooth, creamy-coloured, expressionless damsels as ever. Safe man the President—sticks to his style. 'Sibyl' fine example of his mystic manner; 'Girls Playing at Ball' splendid specimen of the feminine gymnastic business he started years ago in 'Atalanta.' Hallo! here's J. C. Hook, 'The Seaweed Raker.' Humph! not quite up to Hook's form. Sea not blue enough. Cheeks havn't got enough red in 'em. What's Hook without a 'Reckitt's blue' sea, and scarlet-faced fisher children? Public won't have Hook if he doesn't stick to what he's known by."

"Yes, Henry Moore's wise. Never gets beyond painting the sea after a storm. Light blue water tinged with pale gold in the distance. Wonder how many he's turned out. It doesn't matter, they're all the best of their kind, and of what consequence is it if they're very much alike? Put a poetical title, and you get a difference at once. 'As when the sun doth light a storm,' 'Cynthia's Shining Orb,' &c.—that's what he's got this year. The beauty of Moore is, you can always pick him out. If he left off painting his light blue seas, he'd be nowhere."

"'Alethe, attendant of the sacred Ibis,' and the rest of it. Long is never without his *cafe au lait* maidens and his sacred Ibis! Getting a little bit played out, though. Worst of it is, Long dare not change. It would ruin him. Coffee-coloured girls suit some people, but it's a pity somebody doesn't tell Long not to make them so awfully alike."

"Seymour Lucas? Yes, Elizabethan costume and woman trotted out again. 'The Surrender'—h'm! seen the same thing before, but it always takes with a fresh quotation. The bother of Seymour Lucas is, that you have to wade through twenty lines of text before you find out what the picture's about. But the public don't mind; a bit of text enlivens the catalogue."

"'The Knight's Farewell,' 'The Boscobel Oak,' 'Hampden riding away from Chalgrove Field'—humph! Ernest Crofts is going in strong for Cavalier and Roundhead business. Well, it's a pretty good standing dish, but to please the public the Cavalier's side must get the best of it. Ernest Crofts knows his book, I fancy."

"G. H. Boughton—Sant—ah! both ditto to ever so many previous Academies. Stop, though; Boughton has one portrait and one landscape. This won't do. Where are his delicate looking girls, his gardens, his pale roses? If Boughton wants to keep his name up he must go back to his old line, unless, of course, he's gone in for portraiture. All the R. A.'s do when they've got a chance. Good old Sant with his healthy complexions! Funny, isn't it, that all the pink and white girls have their portraits painted by Sant, and all the bilious people go to Pettie? Pettie, by the way, is all portraiture this year. A pity. He ought to give us a little armour and a dagger or two, just to remind us of old times."

"It's a comfort to think Henry Woods and H. W. B. Davis know what is expected from them. 'On the Steps of the Scuola San Rocco Venice;' yes, of course—sunshine, Italian girls, flowers—they're all three in proper order. Davis, too, quite himself. Needn't mention his pictures. Deer in 'em all—deer standing, deer sitting, deer running away. Davis and deers always go together. Marcus Stone has his *dear* too. Been painting the same sad loveloru damsel for years. But the public look to him for her, and would be disappointed it he didn't give them the young lady."

"H. Stacy Marks—well, one always wants to see his old eighteenth century men and his pelicans. Got 'em both this year, and he'll go on with old men and pelicans to the end of the chapter. Can't understand what's come to W. P. Frith. Public used to crowd round his canvases. Given up the old line, and gone in for painting doll-like children Great mistake."

"Peter Graham well to the fore with his mountains and mists. What's Peter Graham if he hasn't got a mist? Why, if one of my customers wanted a Peter Graham, and it hadn't a mist in it, with Nature in a sort of tea-kettle kind of mood, he wouldn't have it. P. G. knows the market. And so does B. W. Leader—rather! There are lots of people who like what they call 'nice pretty pictures.' B. W. Leader suits 'em to a hair. Trees in the right place, houses ditto, sky nice and smooth, everything placid. Should think Leader could turn out a good many pictures during the year. No need to go to Nature for 'em, you know."

"To customers who like the pathetic I always bring out Faed. He's had a pretty good monopoly of old women, and young women, and middle-aged women crying in cottages, and that suits old-fashioned people. Faed's style of misery rather stale, though. Frank Bramly's the coming man for this kind of thing. He's made his mark with the miserable, and he'll have to stick to it. If he once paints a girl laughing, his reputation's smashed up. His 'Saved' is in the modern melancholy mood. T. B. Kennington's another man who's gone in for the doleful. Can't say I care for his ugly faces and grey tones, but that's his groove, and a man can't do better than get into a groove as soon as possible. He's groovy enough, in all conscience, in 'The Pride of Poverty.'"

"Summing up the Academy, I should say it just about reaches the expectation of the market, what there is of it. Alma Tadema's supply of marble's rather scanty; and as for Millais—well, what Millais has been about I can't understand. He's dull. Orchardson's dropped his acre of empty canvas, and gone in for crowding it up in his 'Young Duke.' He's wrong. It's not what the public expect from him. He's kept up his usual gamboge tone, though, and that's something. John Brett won't disappoint anyone who likes John Brett. Usual emptying of the colour box all over his pictures. Herkomer—well, Herkomer is Herkomer. Never quite know what Herkomer will do beyond portraits. He's done something this year in 'The Chapel of the Charterhouse' not a bit in a groove.'"

We fancy our picture dealer in his comments has not greatly overshot the mark.

THE MAGIC LANTERN IN PHOTOGRAPHIC STUDIOS.

THERE are various methods besides hanging out sample cases of photographs by which the photographer may extend his business; one way being by the use of the magic lantern, which system is perhaps best adapted for small towns.

Encourage the occasional use of the reception-room for public meetings, by having erected in it a screen at one end and a lantern at a suitable distance.

Prepare transparencies of local scenes and from the negatives of sitters, not merely confining these latter to the aristocratic portion, but including all and sundry likely to make a pleasing picture.

Circulate invitations freely, and the result will be that the public will be entertained and the photographer increase his business, as human nature will cause many persons to get photographed merely for the sake of seeing themselves and letting their countenances be exhibited on an enlarged scale. Others will feel bound to recommend that particular studio as a return for their entertainment, whilst many will desire to obtain local views, particularly views of property in which they may be directly or indirectly interested.—*Magic Lantern Journal.*

Notes.

The *Magic Lantern Journal* is now before the public under the editorship of the two sons of Mr. J. Traill Taylor, and if we may judge from the first number, it will at anyrate deserve success. The price is one penny, and it is published monthly by Messrs. Taylor Brothers, Dorset Works, Salisbury Square, Fleet Street, London.

On p. 407 we reprint a short article from the *Magic Lantern Journal.*

Phototypic reproduction is now so cheaply and so rapidly done by several houses in London, that in the case of tabular work having to be reprinted it is well worth the while of the printer to balance the relative desirabilities of resetting or of having a phototype block made. The main advantages of the photographic method are that the reproduction can be of any exact size required, and there is absolute security against misprints in resetting ; while on the other hand, the phototypic reproduction is rather more expensive unless the matter is complex, involves special characters, or is exceptionally difficult.

The table illustrative of Mr. Dallmeyer's paper (p. 389 of last week's issue) was reproduced in block form by Messrs. Swain, from the original in the *Journal of the Photographic Society*—at the same time being reduced to the width of our columns. Messrs. Piper and Carter tell us that the cost was about one and a-half times that of setting up in type—an increase of 50 per cent. on the cost of composition.

In our paper for the 7th June we suggested that photographic clubs and societies would find it convenient to set up permanent portable and dark-rooms at such places as Burnham Beeches, for the use of wandering photographers, and we added that if an automatic machine for the supply of dry plates were also stationed in the interior of each of the aforesaid dark-rooms, it would be a still greater convenience. *Apropos* to this innocent proposal of ours, a correspondent writes, we regret to say, in a very satirical tone: "You suggest," says he, "that all which a photographer who ran short of 'plates' would have to do, would be to go to one of our portable dark-rooms, shut himself in, drop a penny in the slot of the automatic supply machine, and take out what he required. So far so good." Our correspondent goes on : "But you seem to forget," he adds, "that in these days amateur photography is a fashionable amusement, and that, as a consequence, *amateur* photographers swarm at Burnham Beeches. Surely, then, the requirements of these innumerable amateurs should be considered ; and I would therefore suggest that automatic machines should be set up in all those places which they frequent with the *malice prepense* purpose of indulging in their "fashionable amusement," and that from these machines, after dropping their money into the slot, they should be able to draw out not unused dry plates, as you suggest, but properly finished photographs of the scenery they had professedly come to take for themselves. For thus a double end would be attained : *Messieurs les Amateurs* would be spared the expenditure of a vast amount of fussy and virtually vain labour, and would at the same time become possessors of a series of well-taken photographic views at a moderate figure, which they could easily show round to their friends as their own."

We have quoted enough, we think, to show the spirit in which the above letter was written. Clearly amateur photographers, even when they envelop their heads in a black cloth, have a "red-rag-on-the-bull" effect on some members of our craft ; though it would be difficult to say why. Amateurs are often a photographer's best customers.

If you want a thing done, do it yourself! In other words, if you can't get an official photographer attached to your household, why, set to and take your own negatives. This, at all events, is what Lady Lansdowne is doing in India. During Lord Lytton's Viceroyalty he himself appointed a photographer who used to attend his semi-royal progresses ; but as a matter of fact this was a private arrangement of the Viceroy's, and the photographer never became a recognised viceregal official. But both Lady Dufferin and Lady Lansdowne are, as it happens, amateur photographers of more than average skill, and they have each, in turn, shown a very pretty capacity for the handling of a camera. The latter was very busy at Simla on the Queen's birthday, so it seems ; and in spite of the not unnatural timidity of some of the pretty groups of hill women she focussed, obtained a series of capital photographs of a most interesting day's proceedings. Still, as long as Viceroys' wives themselves adjust the tripod and the lens, the advent of the official photographer cannot be delayed, though future generations will assuredly marvel at the illogical nature of our Court arrangements, which, whilst lavishly providing, at the public expense, for a Grand Falconer, a Hereditary Armour Bearer, and a Royal Cup-Bearer, though there have for centuries been no falcons to look after, and no armour nor cup to bear, persistently refused to recognise and conform to the spirit of the age by appointing a royal Photographer-in-Ordinary, whose duty it should be to perpetuate State ceremonies and national celebrations of historical importance.

There are still provincial photographers who go in extensively for fancy backgrounds ; chiefly for the sake, it would appear, of servant girls who delight to be "taken"

sitting on rustic garden seats covered with "property" moss; or posed most uncomfortably behind the pasteboard profile of a boat which is apparently moored immediately under a large-sized waterfall which would promptly swamp it, were it not (the large-sized waterfall, we mean) made principally of paper shavings and cotton wool. But it cannot have been for servant girls, surely, that a photographer in a large town in the West of England recently added to his assorted studio "properties" the snow-clad peak of a most inaccessible looking Alpine mountain. It is said, indeed, that there has been quite a run on this "practicable" summit since its arrival, and that the mayor, the ex-ditto, and a majority of the town councillors have been already taken triumphantly posed on the snow-clad top, waving an alpenstock or shaking a Union Jack pocket handkerchief; or in some equally demonstrative way expressing their mountaineering triumph.

The ex-mayor, it seems, did in his younger days go up Cader Idris on a mule, but as neither he nor his colleagues have ever left England, it is hard to see the appropriateness of their Alpine photographs. Their action in being so taken is even more silly than that of the Cockney tourists who, when they go up the Caledonian Canal, are photographed at Fort William in a Highland kilt kept by the photographer for their special use. We had hoped the day for all such photographic shams was well-nigh past, but the "Alpine summit" incident makes us fear that provincial "sitters" have still the "old Adam" in them, and that they will be weak enough, if the chance be afforded them, to get themselves photographed stalking "property" lions, or shooting imaginary black men *à la* Stanley, or hanging on to a property trapeze, or even descending from a painted sky in a make-believe parachute like the famous Professor Baldwin!

It is only in the comic papers, let us hope, that photographers say such offensive things to their customers. Take, for instance, that excessively rude remark which, according to an anecdote which is now going the rounds in a somewhat modified form, the operator in a London studio lately addressed to a lady whose features were, all of them, of a most pronounced type. The lady, it seems, after she had been duly posed for the cartes she desired to have taken, proceeded to develop, what is often called in studio slang, "an interesting expression," a lapse which the photographer no sooner observed than, brusquely clapping on the cap of the camera again, he exclaimed, "If you really wish, my dear madam, to have your features compressed into a carte-de-visite, I must really beg of you not to smile. If you *do*, your likeness will run into a cabinet at the very least."

Society journals are always thankful for a photographic story. One of these, being hard up, rescuscitated a very ancient artistic story—first attributed, we fancy, to Hogarth, but no doubt going back to Apelles—and gave it a photographic twist. The story ran this way. A photographer in the East end of London summoned a customer for the value of a coloured life-size portrait. The defendant rested his claim on the plea that the picture was not a bit like him, and the judge, agreeing, non-suited the plaintiff. The artist, so we are seriously informed by the journal in question, is exhibiting the picture outside his studio as "Jack the Ripper," and the "unhappy sitter is going around tearing his hair and rapidly qualifying for a strait waistcoat." The weak part of this story, apart from the fact that something like it has been told before, is that the County Court Judge decided against the photographer. In our experience the Judge has always favoured the photographer. Anyway, we cannot recollect an instance to the contrary.

Mr. Warnerke's idea that each monthly meeting of the Photographic Society should be photographed by the flash light, and in this way preserve an interesting record of the proceedings, might be extended with advantage. The list of attendances at Board of Guardians, Vestries, and the like are often very untrustworthy as evidence of the attention of the members to their duties. It is by no means an uncommon practice for men to hurry into a meeting, sign their names in the attendance book, and hurry away again. Now if the meeting were photographed, say, ten minutes after assembling, and ten minutes before breaking up, it would give the ratepayers a tolerably truthful notion as to who are the men who really look after the business. A clerk who was a photographer would of course be a *sine qua non*.

It would be extremely interesting to have Sir John Millais' opinion of photography. According to the personal column of a daily contemporary, his son is an accomplished amateur photographer, and it is impossible not to think that the great painter must have had many interesting conversations on the subject of photography. One would like to know whether he considers photography an aid or a hindrance to the artist.

The quaintest use to which a photograph has been put is surely that in the advertisement of a sporting "prophet." The prophet in question is a brother of a well-known jockey, and the problem he had to solve was how to make use of his brother's name without compromising the jockey, and at the same time to convince the public that the relationship was *bonâ fide*. He does it in this way. He puts in his advertisement a reproduction of his own photograph and that of his brother, both in jockey's dresses, with this intimation: "I do not insert my brother's photo here with a view of implying that he is connected with this circular, but merely as a guarantee against imposition, so that the reader can identify the family likeness." The joke of the matter is that both reproductions are of the roughest type, and one has to make believe a good deal, not only to find out the family likeness, but the likeness to anybody who ever existed.

It is a moot point whether a man should or should not be accompanied by his wife when he goes to be photographed. Keene spotted this difficulty when, in the pages of *Punch* some five-and-twenty years ago, he drew

the old gentleman who is told by the photographer to turn his eyes in a certain direction where, at the other end of the studio, happen to be a couple of pretty girls. "I should like to see him do it," remarks his better half, who is watching her spouse with a remarkably cat-like glance. The expression on the face of the miserable gentleman is comical in the extreme. A story is told which corroborates this instance of unhappy influence. A soldier being photographed, happened to mention the name of the regiment to which he belonged, whereupon the photographer said that he had photographed the colonel of the same regiment, and showed the private a copy. "By George!" said the soldier, "I've seen Colonel —— a good many times on the parade ground, to say nothing of the Soudan, and he never looked like that." "Yes," said the photographer, "but you must recollect that the colonel was neither on the parade ground nor in the Soudan when he was photographed." "Well, but I've seen him alone, and he always looks as if he were going to jump down your throat. In this photo you'd think he couldn't say bo to a goose. Was he alone when he came here?" "Well, no," said the photographer, with unconscious irony, "he had his wife with him." "Oh!" said the soldier thoughtfully, "that accounts for it." Colonel —— was notoriously hen-pecked.

ON STRIPPING THE ORDINARY GLASS NEGATIVE.

BY WM. LANG, JUN., F.C.S.

HAVING now worked stripping films for a considerable period—in fact, almost since their introduction—and having accumulated a goodly number of film negatives, I am more convinced than ever that for an amateur whose cupboards and presses have been gradually filling up with the accumulation of season after season's work on the ordinary glass plate, the advantage in more ways than one is wholly on the side of the films. So impressed have I been with the fact, that I am now at work converting into film negatives all the old glass negatives I have in my possession, and which are deemed worthy of preservation. The convenience of having all one's negatives contained in a single box, instead of it may be in a score or two, is so apparent that it need not be enlarged on. With film negatives all danger of the glass of one negative injuring the surface of another is entirely got rid of, and this itself is no slight recommendation. I am not sure that the process advocated by Mr. Wilkinson in his paper read before the Camera Conference is a practical one, at least I have not been able to succeed with it. The curling of the gelatine film with its collodion surface when it leaves the glass plate is simply insurmountable. In the method I have adopted there is really nothing novel to communicate; it is more a matter of the way in which it is done. Plener's method of stripping films by means of hydrofluoric acid is the one made use of, but, to insure success, certain attention to minor details is necessary, and as some of your readers may wish to convert a glass negative into a film negative, I trust my experience in the matter may be of service to them. Taking an unvarnished negative and cleaning the glass and sides from any adherent gelatine, the first thing to be done is to coat it with a good enamel collodion; the plate is immersed in cold water when the collodion has set, in order to remove the alcohol and ether. In another dish of clean cold water immerse one of the stripping skins supplied by the Eastman Co. As these can be had in all the various sizes, it is only requisite to take the size for the particular plate we are working with. Do not let the skin remain for any length of time in the water, but so soon as damp transfer it to the dish where the collodionised plate is, bring the plate and the skin out together, and, using the back of the hand as a squeegee, cause it to come into contact with the collodion surface and eliminate all air-bells. Set aside to dry. When dry transfer it to a tray containing half-an-ounce hydroflouric acid to ten ounces of water. Let it remain for a minute or so in the solution, and do not attempt to strip when in the tray. Take plate out of the tray, and let it get somewhat dry, then gently try one of the corners of the negative, and catching the image-bearing film and the skin between the forefinger and the thumb, pull them backward, when the whole should be found to come away together from the glass plate. Immediately on getting the film off, immerse in a tray containing methylated spirit, and keep there till the skin gets flat, but no longer; transfer afterwards to cold water, and, having a collodionised plate ready which has received in the first instance a dusting with French chalk, place the film negative on the plate—image-bearing film next collodion—and lift the whole out of the tray where the collodionised plate has been lying. Take a piece of damp mackintosh, and with the squeegee establish contact between the film and collodion. The remaining operations consist in allowing the whole to dry, and afterwards cutting all round the negative so as to detach it from the plate.

I have sent to the editor a specimen of a negative that has been stripped from its original glass support in the manner which has been just described, and I should be glad to have his opinion on it. It is a sample taken at random from several dozens which have been prepared in a similar manner. Where a particular negative has got cracked, and no injury has been done to the image-bearing film, there should be no difficulty in getting a perfect printing film negative by adopting the method here advocated, the only requisite which will suggest itself to every one being the employment of another glass plate to support the cracked negative during the operations of removal. As a matter of detail, it may be noted that it is better, if the picture be a landscape, to seize that corner where the sky happens to come, as at the point of seizure there is generally just the least bit of disturbance, and on that account it is better that it take place at a corner where it would not show in the print. While it is not advisable to hurry operations during the stripping, it is by no means judicious that the soaking in either the alcohol or the water when the picture is actually free from the glass be prolonged. The glass which is to receive the stripped film should be the best patent plate, and should be of a size sufficiently large to give a considerable margin all round the picture; this prevents the possibility of the film negative leaving the glass before the drying be completed. A film negative which has once cockled in the drying is one of the most stubborn things to deal with imaginable. The only way that I know in order to get it to come straight is to transfer it to methylated spirits, afterwards to water, and quickly put it down on a collodionised plate, and when dry it is to be stripped in the usual way. I have, in one or two instances, in working Eastman films, owing to the slipping of the film, got such extraordinary examples of warped pictures that no print could be drawn from them. Fortunately, I was able to rectify matters by the foregoing method. The use of a plate giving a considerable margin is the best preventive against such untoward results. For a whole plate film negative nothing less than a plate 10 × 8 should be employed.

In conclusion, it should be pointed out that the foregoing method applies only to unvarnished negatives. A negative that has the varnish on it will not yield to the above treatment. In the case of negatives where varnish has been applied, its removal must be provided for before commencing operations.

SOME OLD PHOTOGRAPHS AND THEIR TEACHING.

BY JOHN SPILLER, F.C.S.

IN the course of last year Mrs. Robert Hunt sent me two parcels of early photographs taken by her late husband, some of which (dated 1852) were selected out and shown at the Photographic Society's Exhibition, where they were examined with a certain amount of interest and with the respect due to their antiquity. Frame No. 449 (Catalogue 1888), "Sea Weed, an early Cyanotype print," was a fine example of the blue printing process, which is even now frequently employed for copying draughtsman's plans and sketches, lace, feathers, and objects in outline, where the representation of half-tones is a matter of little consequence. Examination of this print shows no evidence of deterioration, nor did others bound in two volumes, which I saw offered at auction sale in March last amongst the items comprising Mr. Hunt's library.

Frame No. 450 contained three pictures by Sir John Herschel's Chrysotype process, two of which were developed with gold and one with silver. This process is described in Hunt's "Researches on Light," p. 163-4. The paper is washed over with a ferric salt, which becomes reduced to the ferrous state on exposure to light, and the image is afterwards developed with a solution either of gold, silver, or mercury. They were not camera pictures, but direct prints by super-position. Ammonio-tartrate or citrate of iron was commonly employed with or without bromide of silver, and the pictures were developed in the manner above indicated, being afterwards fixed by washing with hyposulphite of soda. Three other prints, now in my possession, are modifications of those shown at the Exhibition, one being produced with iron alone, simply to show the stages of the process and the faint ochrey image apparent previous to development.

There are, besides, four early Talbotypes: one, a portrait group done on paper marked "J. Whatman, 1844;" another is a triangle intended to show the different photographic effects of the three primary colours and their simplest combinations. The third is a picture of the "Bath Hotel, G. Wookey," and adjoining houses, of which I do not know the locality. The fourth is a very fine direct print (negative) of two leaves showing venation, which I passed round for inspection amongst the photos exhibited at the Technical meeting on 26th March last.

I come now to a dozen prints mounted within ink-ruled lines, which appear to have been exhibited at one of the early meetings of the British Association—possibly that of York in the year 1844—when Sir J. Herschel read his paper on the "Amphitype Process." The evidence is, perhaps, rather slender, but Mr. Hunt's references to this event are twofold ("Researches on Light," p. 171, and the Chronological Catalogue of Processes, published in No. 2, *Photographic Journal*), and I find that several of the papers used for these illustrations bear the water mark "J. Whatman, Turkey Mill, 1844" If not actually produced at this time, we know that they were all fully described in Mr. Hunt's book a few years later, when he had collated all his early experimental results and processes.

First, there is a capital print (copy of engraving) produced on ammonio-tartrate of iron, and fixed by washing. This is greatly superior to the "Iron, No. 1," of the 1852 series already referred to. Then we have two prints (indifferent) taken respectively on paper treated with protosulphate of iron and persulphate of iron. Another on "acetate of mercury and silver" (pretty sharp), and one done with pernitrate of mercury, showing very little action. Then follow two chloride of silver prints produced with "muriate of cobalt" and "nitro-muriate of bismuth," for which Mr. Hunt claims special sensitiveness, for he says in his "Researches," p. 184: "If paper is washed with muriate of cobalt, and then nitrate of silver, in proper proportions to allow the silver to be in excess, it will be found to be superior to the ordinary muriated paper; and it is so far economical that a very much weaker solution of the nitrate of silver may be used, and as deeply coloured an impression made as when a larger dose of the silver has been applied."

Five prints are illustrations of Mungo Ponton's Chromotype, with modifications entailing the use of gold, silver, and mercury salts. These are all fully described in the "Researches," pp. 177 and 178, 185 and 186; and of the chromate of mercury it may be remarked that the picture extends through the substance of the paper, "being equally visible, with semi-metallic appearance, both on the front and back," exactly according to Mr. Hunt's description.

Amongst the remaining photographs are several specimens of the "energiatype," 1844, which are understood to be calotypes developed with sulphate of iron; a Talbotype portrait on Turner's paper (Chafford Mills); and a remarkably fine sepia print, copy of an engraving, on plain chloride of silver paper, which shows no sign of fading. And lastly, one of the most important illustrations of the whole series is a print, eight by three inches, bearing the inscription "Well Done," in one inch letters. Accompanying it is the following manuscript account:—"This was printed in about one minute from a piece of plate glass exposed one year to sunlight, and having on its surface in black painted letters this inscription: 'Well Done.' At the end of one year, on removing the paint I had an inscription in colourless letters on a purple background.—T. G." As I stated at the March technical meeting of the Photographic Society, the initals T. G. are probably those of Thomas Gaffield, who sent an account of his experiments to the *American Journal of Science and Arts*, which will be found reprinted (page 157) in the *Journal of the Photographic Society* for December, 1867. Since then his results have been frequently noticed and amply confirmed.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

THE London meeting of 1889 will be held at St. James Great Hall, Piccadilly, W., from August 19th to 24th inclusive. The Secretary has issued the following circular letter:—

"DEAR SIR,—The fourth annual convention of professional and amateur photographers will be held in London, at the above Hall, on August 19th to the 24th inclusive.

"The proceedinge, which will be opened by a *conversazione*, will include papers by eminent authorities, excursions, and lantern displays. An exhibition will be held daily of the latest and most improved apparatus, materials, and accessories; also photographs by eminent workers, as well as a separate exhibition of coloured pictures, on or from photographic bases, a new feature calculated to be of much interest. Large and influential local committees have charge of the exhibition, entertainment, and excursions departments. There will also be a collection of articles and works illustrating the history of photography.

"Programmes of excursions, with full details, and a list of convenient hotels, with their tariffs, will be forwarded to each member.

"The annual subscription is 5s: a ticket of membership passes the holder to all meetings in the Hall during Convention week.

"Members who desire to read papers or give demonstrations are requested to forward their names at once. Those who desire to exhibit apparatus or pictures will find conditions, regulations, and application forms accompanying this circular.

"The notable yearly increase in the number of members since the first convention was held, the amount of good work done, the pleasure experienced by members, and the evident advantages arising from friendly intercourse between photographers from every quarter of the kingdom, lead to the conclusion that there is a vast future for the convention. City and country, professional and amateur, art and science, dealer and customer, have here a unique opportunity of meeting and exchanging ideas, and the advantages of these conventions have been not only theoretically argued, but practically felt and acknowledged.

"On account of the size, situation, and suitability of the Hall acquired for this year, and as a commemoration of the Jubilee Year of Photography, the conventiou of 1889 will, it is coufidently expected, be a memorable event in the annals of photography. I trust, therefore, that you will support the convention, and enhance its utility by your preseuce as a member.

"The names of those renowned in their various fields, who have expressed their interest by becoming patrons of this year's convention, are a guarantee of the position the conventiou now occupies in the worlds of science and art.—I am, yours faithfully, J. J. BRIGINSHAW, *Hon. Secretary.*"

LIGHT AND COLOUR.

BY CAPT. W. DE W. ABNEY, C.B., F.R.S.*

LECTURE IV.

Now, it has been said that moisture and oxygen are essential for the fading of water-colour-pigments. Is it possible that they can fade without light? I think here we have an absolute proof that such is possible. I have here a stream of oxygen passing through this tube in which are some papers coated with pigments; half of each paper has been damped and the other half is dry. In connection with this tube is an ozone generator, and a Ruhmkorff coil produces ozone, or the active state of oxygen, which is said to be particularly present near the sea. In this frame [shown] you have a series of colours which have been exposed to moist ozone. A great many are bleached entirely, thus proving, if you have ozone and moisture together, you get a bleaching without the presence of light at all. Here are some papers which were exposed to moist ozone before the lecture, and you will be able to see the amount of fading that has taken place. I think they were exposed for about ten minutes. In the example of indigo the bottom part was damped and the top part left dry; the first half has faded, the other has not. In carmine, too, you will see that where it has been damped the colour has eutirely gone; the dry part is much less changed. We come then to the conclusion that oxygen and moisture are sufficient for the fading of water-colour pigments, and that it is not absolutely necessary that there should be light present in order that this fading may take place. Now, as before said, you are supposed to have more ozone at the seaside than inland. It is therefore a matter for consideration whether it may not be the fact that water-colour drawings fade more rapidly near the sea, where there is more ozoue present, than they would do inland. That is a question I am not going to touch upon now, but when we make a subsequent report no doubt that will be brought forward prominently.

We have seen the results of light, and I wish to show you how it is that light acts upon matter. Matter is formed by molecules, or very minute particles, far beyond the vision of the best microscope that was ever made; you can only reason and argue about them from the circumstantial evidence which nature from time to time puts before us. The molecules themselves are composed of atoms. Thus, in the molecule of water it is supposed there are two atoms of hydrogen and one of oxygen. Each molecule is presumably of identical shape, and size, and composition. There has been a certaiu amount of evidence brought forward that perhaps some molecules of the same kind of matter are rather bigger than others, but to my mind such evidence is incomplete, and I cannot accept it. At any rate, as a rule, we may take it that the size of the molecule is the same for the same species of matter; that, for instauce, all water molecules are the same size and composition as are those which go to form the molecules of these pigments we are cousidering.

I want to give you a homely notion of what a molecule is like, aud how we may suppose the atoms vibrate. I have here a little cell of water, through which a beam of light can be thrown. Around this cell of water I can cause a current of electricity to pass through a coil of wire. Whcu you have a current passing there is a certain amount of magnetism produced which repels magnetism of the like kind. I have here some little needles which are magnetised and inserted in small bits of cork by one end, the same poles being in the corks. The corks will float on the surface of the water, thus supporting the needles. Now, if we float some of these little magnets in the water, they will repel each other aud tend to go farther apart, the reason being that magnetism of the same kind repels. Now if I turn on the current in the wire passing round the cell you will see that they are found to approach one another, and as I move the wire up and down they alternately approach to and recede from one another.

You must recollect that at the same time that these atoms are vibrating one towards the other, the molecules themselves are vibrating to and fro from one another, so that we have vibrations of the molecule and vibrations of the atom. Now I have told you that the waves of light vary in length; the red waves are the longest, and the blue waves are the shortest, and as they all travel at the same speed the time of oscillation of the red wave is longer than the time of oscillation of the blue wave. We may take it that the oscillation of a molecule is slower than that of any atom, and it is much more likely to be isochronous with a wave of red light than it would be with one of blue light. Similarly, the waves of blue light are much more likely to be isochronous with the time of oscillation of the atoms than the molecules, and, as a matter of fact, such we find to be the case.

Now let me give you another homely example of what we mean by oscillation on the part of an atom or a molecule. You can quite understand, I think, that if you have a body oscillating to and fro from another body, both of which attract one another, if you increase the oscillation, a time comes when the attraction between the two is so small that there is a great tendency for them to fall apart. If there is another body at hand which is willing to take up one of those atoms—which has a great affectiou for such atom—it will take hold of it and briug it to itself. The bob of this pendulum, which is of iron, is supposed to be an atom swinging, and behind it there is a magnet. By blowing at the same rate as the pendulum vibrates I can increase the amplitude of that oscillation until I get up a swing so great that, eventually, the attraction of the magnet for the bob of the pendulum is greater than the force of gravity, and it reaches the magnet and is held by it. This very simple experiment teaches us a lesson. Here we have an atom swinging away, we will suppose, from another atom of something. My breath timing itself with the swing may be taken as the oscillation of a ray of light. The wave of light perpetually beating on the atom will increase the amplitude of swing of that atom so greatly, that if there is another body near it which will take up the atom, it leaves the original atom for it. When such a re-arrangement of atoms takes place, we say that a chemical action has taken place—that is, that light is able to decompose a molecule by robbing it of some of its atoms, and giving them to another body. We get, then, by the decomposition new molecules formed, and consequently new matter, and such a new body may be in the shape of a faded pigment.

Throwing a spectrum on the screen, I put a layer of pigment in front of the slit, the light passes through it, and we get, as you saw by previous experiments, some colour taken away from the white light, and other colours left behind. In the case before us the red and the green and the blue are left, but most of the green is cut off. I will put another substance (permanganate of potash) in front, which gives a beautiful absorption spectrum, and there are a number of dark bands in it. If I take the iron salt which I used in the experiment in measuring the quantity of light which came to galleries of South Kensington, you see that it cuts off the blue almost entirely. You can see, then, that these various solutions cut off a certain amount of colour from the spectrum. Now the question is this, What becomes of the rays that are cut off? The whole principle of the chemical action, aud the heating effect of light upon pigments, is answered by the answer to that question. It is this. Where you have an absorptiou of light, there you have work done upon the body on which it falls. In that permanganate of potash, for instance, which you saw gave a fine spectrum—the rays missing, which gave the black spaces, were doing work on it. They were heating up the permangauate of potash, or chemically changing it into something else. You cannot have work donc on any body unless there is absorption by that body. You understand what I meau by absorption—the cutting off the light by the body. When there is chemical action taking place, the work done is the swinging the atoms away from each other; when heating effect takes place the molecules are swung further apart from one another. I hope I have made clear to you that my view is that when you have chemical action taking place, the absorption takes place in the atoms; when it is a heating effect which takes place, it is the molecules which are acted upon, and made to jostle each other more vigorously. As far as chemical action is concerned we have a very familiar example in photography. I am going to develop a spectrum for you. This has been done

* Continued from page 350.

before in this room by myself, but as there are many here who have not seen the experiment I think it might be as well to repeat it. [The photograph of the spectrum was developed.] The paper was covered with bromide of silver, and if I place a slab of bromide of silver in front of the slit, you will see that the absorption exactly agrees with the locality where chemical action has taken place.

Now I have another experiment to show you, and that is the heating effect of radiation. I have here a little instrument called a thermopile, which consists of strips of two metals soldered together at one end. If the junction be heated, a current of electricity will pass through wires attached to the other ends when joined; and if a galvanometer is in the circuit the galvanometer needle will be deflected. By means of a mirror attached to the needle, which will reflect the light from a lamp on to a scale behind, I can show you the deflection. I now form a very small spectrum, and cause different parts of the spectrum to fall on the junction of the metals. The needle deflects very slightly with the blue, showing that the heating effect is small; as it gets towards the green and travels into the yellow the deflection is greater, and when we get into the red portion it is again more. At the very limit of the red the deflection is greater still, and outside this colour and in apparent darkness we see that the light on the scale travels further still, showing an increased heating effect. Thus an invisible part of the spectrum, which lies beyond the red, heats this junction of the two metals more than any part of the visible spectrum. We have here a proof that not only the rays which cause the sensation of light have a heating effect, but that we also have a heating effect due to dark rays which are not visible.

We have now had proof that light is capable of causing chemical action, and also that it is capable of heating a body on which it falls. If light acts only on the molecules it heats the body; if it swings the atoms further apart the probability is that there is a chemical decomposition taking place. Those dark rays might possibly have had a chemical action on these pigments which were exposed in our tubes, but it was not probable. You see now the reason why we made experiments with light plus heat. I told you we exposed the pigments on paper against a vessel of boiling water to see whether the decomposition was accelerated. It was possible that these dark rays might have heated up the paper to such an extent that the heating action aided chemical decomposition by the blue rays which we found most effective.

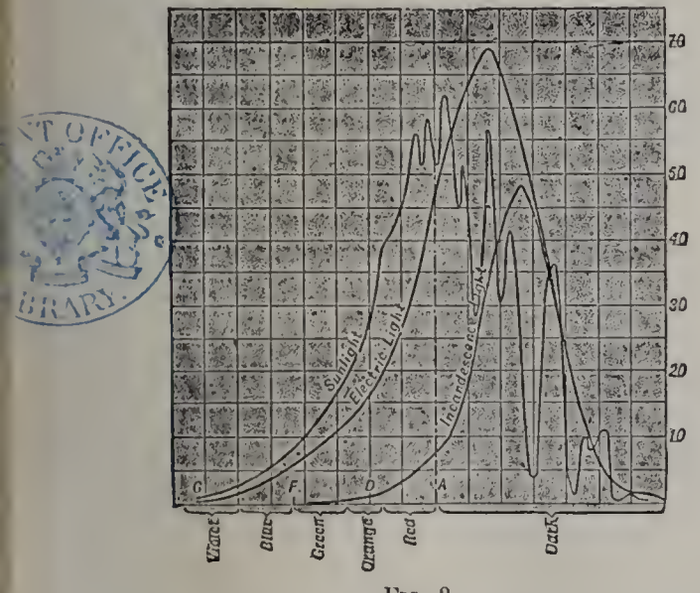


Fig. 2.

Now I want to call your attention for a minute to this diagram (fig. 2), which represents the heating effect of different sources of light. The height of the curve is a measure of the heating effect. The curves on the right hand of the dotted line show the energy of the dark rays, whilst on the left the heating effect of the visible spectrum is shown. The heating effect (which is a measure of the energy) of the dark rays is very much greater than the heating effect of the rays which lie in the visible part of the spectrum. I want to call attention to the solar curve; you see what a peculiar jagged curve it has. The jagged indentations mean that some of the visible and dark rays of the sun, which lie in it, penetrating our atmosphere, are partially cut off by something, that something being water. These rays are absorbed by the water particles, and vapourise them. The vapour, on being chilled again, condenses into clouds, and so we have a constant succession of aqueous vapour and clouds. I also want you to notice the enormous disproportion there is in the energy of the dark rays to visible rays in the incandescence light, as compared with sunlight. You see the incandescence light has very little heating effect in the visible spectrum, and a very large effect in the dark part of the spectrum. The same applies to gas-light and candle-light.

(*To be continued.*)

Patent Intelligence.

Applications for Letters Patent.

8,737. August Leutner, 323, High Holborn, London, for "Improvements in Heated Calenders for Photographic Purposes."

8,746. Henry Joseph Shawcross, 15, Water Street, Liverpool, for "Improvements in or connected with the Production of Copies of Drawings, Designs, Pictures, Photographs, Printings, Writings, and the like; also the Manufacture and Treatment of Paper, Woven and Tissue Fabrics, and other materials for employment therein."

8,899. Thomas Thorns, 62, Chelsham Road, Clapham, London, for "Rendering Albumenised and Sensitised Photographic Paper Free from Smell."

8,946. Jacob Husnik, 8, Quality Court, London, for "Improvements in the Production of Semi-Transparent Marks or Designs on or in Paper by Means of Gelatine Relief Printing."

9,012. Antoine Hipolyte Cros, 24, Southampton Buildings, London, for "Improvements in Colour Photography."—Date applied for under Patents Acts, 1883, Sec. 103, 8th November, 1888, being the date of application in France.

9,161. George Dicken, 2, Eskell Chambers, Market Place, Nottingham, for "An Improved Instantaneous Shutter for Use in Front Part of the Lens of Photographic Apparatus."

9,212. Joseph Appleyard, Portland Street, Manchester Road, Bradford, Yorkshire, for "A Photographic Burnishing Machine."

9,312. George Charles Inkpen, 12, Havelock Road, Southsea, Hampshire, for "Improvements in Photographic Box Cameras."

9,403. Archibald Barr and William Stroud, 2, East Parade, Leeds, Yorkshire, for "Improvements in Apparatus for Copying by Photography."

9,475. Frank William Allchin and John Eteson Robinson, 55 and 56, Chancery Lane, London, for "Improvements in Apparatus for Washing Photographic Negatives or Plates."

9,520. John Henry Smith, 11, Radcliffe Street, Wolverton, Buckinghamshire, for "The Delivery and Regular Distribution of Gelatino-Bromide of Silver or other Emulsion, or Viscous Liquid upon Glass, Paper, or other Plane Surface."

Specifications Published.

8518. Auguste Emanuel Letalle, of Mary Street, Balsall Heath, in the County of Worcester, Photographic Artist, and Frederick Billing, of Livery Street, Birmingham, in the County of Warwick, Manufacturer, for "New or Improved Process or Processes for the Production of Coloured Photographs upon Glass and like Substances."—Dated 11th June, 1888.

The Patentee says—

It is well known that alkaline chromic salts, such as bichromate of potash, prevents gelatine from swelling when treated with cold water, or dissolved or made soluble in warm water, when light has acted upon the said gelatine or a film thereof.

Several photographic processes are based on the aforesaid properties of swelling and dissolving in water, viz., the Woodbury-type, Collo-type, and carbon printing processes, make use of or employ a photographic negative in order to render the gelatine insoluble, in the parts where the said negative had allowed light to pass through.

In the Woodbury-type process the washing away of part of

gelatine not rendered insoluble by light, is also done in carbon printing, and in the Collotype process in not washing away in hot water the gelatine not insolubitised by light, but in swelling in cold water, for repulsing the greasy ink with which the gelatine is rolled over to produce a picture, as is done in lithography.

Our invention consists in producing coloured photographs upon glass, opal, china, and other like substances.

According to one part of our invention coloured photographs are produced by covering the aforesaid substances, or a part of the surfaces thereof, with a film of gelatine sensitized for light, with a salt of chrome, and exposing the said sensitised and prepared film under a transparent positive instead of under a negative, as in the preceding processes, as hereinbefore referred to.

Thus, for example, a plate of white opal glass is taken, and one side thereof covered or coated with a gelatine film, sensitised for light by a salt of chrome. This plate is now exposed under a transparent positive, and then placed in a bath of cold water, and the salts of chrome thus employed washed away. The plate is then dried and subsequently immersed in a bath of dye containing a large proportion of glycerine (about one half).

The parts of the film or surface not hardened by the exposure to light, absorb or take up the dye, and produce a photographic picture in the colour of the dye used.

The surface of the plate thus treated is then immersed in a bath of alum, and left to dry.

Thus, the process, or the combination of processes, in the production of photographic pictures on the surfaces of the materials as aforesaid, and according to our invention, consists essentially in employing dyes in connection with gelatine films, or rather those parts not hardened by light under a positive.

According to another form of our invention, we use dyes in connection with gelatine films, as before described, but sensitised with perchloride of iron and tartaric acid, and with the said prepared and sensitised surface, placed under a negative instead of a positive.

The plates are dried in a warm room at abont 120° Fah.

The dye solution is made by putting the colouring matter (which must be soluble) either in pure water or in water and methylated spirit, with or without glycerine, gum arabic, or other bodies of a like nature, or constitution added.

Our said invention is eminently adapted for the reproduction in colour of drawings, works of art, portraits from life, landscapes, and other scenery from nature—advertisements, tablets, coloured windows, and for all other purposes where ordinary photography has been applied.

The surface substances upon which the photographs are reproduced may be of any colour desired.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1st. The production of coloured photographic pictures, by employing dyes or stains in connection with gelatine films, or rather those parts hardened by light under a transparent positive, as set forth.

2nd. The production of coloured photographs upon glass, china, and other like substances, by employing dyes or stains, in connection with gelatine films sensitised for light by a salt of chrome, and exposed under a transparent positive; and which said process of production, or the combination of processes, is or are conducted, or carried out, in manner and by means, substantially as set forth in the first part of our invention.

3rd. The production of coloured photographic pictures upon glass and other like substances, by employing gelatine films sensitised for light with perchloride of iron and tartaric acid, and placed under a negative, substantially as described in the second part of our invention.

5,173. DANIEL KINDLE ZUMWALT, of Visalia, in the County of Tulare, State of California, United States of America, for "Improvements relating to the Mounting of Photographs, and to the Preparation of Fac-similes of Public and Private Records, Deeds, and the like."—Dated 26th March, 1889.

The Patentee says—

My invention relates to an improved method of mounting photographic proofs or prints in such manner as to neutralize the tendency of the sheets to cockle or curl up, which in connection with other steps of my said invention, as hereinafter fully explained, is particularly adapted to the production of fac-simile copies of public records, deeds, and legal instruments of record in a form suitable for convenient handling and reference, and as a substitute for and an improvement upon the mode or method of copying such papers, and instruments by hand as heretofore generally done in public offices.

The objects sought to be attained in and by my invention are, to reduce the size and bulk of record-books to give fac-simile copies of all papers and instruments where written or printed, with every erasure, interlineation, peculiarity of handwriting, and every characteristic of the original, to prevent fraudulent alterations in such records, and to greatly reduce the cost of preparing the same.

To attain the ends of my said invention I mount the photographic proofs or prints of the papers or instruments previously taken in the usual way by means of a camera, and place and fix the sheets in pairs back to back without any intervening card or sheet, so that the tendency of the sheets to cockle or curl up is neutralized, and the prints preserve a flat condition at all times.

By photographing deeds, mortgages, and like instruments of record, and then mounting the prints back to back in the manner named, and binding or uniting the mounted sheets in book form, with the pages properly following one another, I prepare and produce reduced fac-simile copies of such papers, which are exact in every respect.

In the case of a deed or other instrument presented for record, instead of being copied by hand into a record-book, as heretofore, I now take a photograph of it, and from the negative obtained I print copies in the usual way upon albumenized paper. A print is obtained in this way of each page of the instrument, and then every two prints or copies are firmly pasted together back to back to produce a single leaf or sheet. As many leaves or sheets are formed in this manner as it requires to produce all the pages or sides of the instrument, and all the copies thus prepared of instruments filed for record from time to time are made of uniform size, and are bound together in book form to produce a volume of convenient size.

By mounting two sheets of the albumenized paper back to back in such manner I am enabled to dispense with card-board or paper mounts, because the tendency to cockle or curl is entirely overcome, and the sheets will lie flat and smooth when the book is opened. In consequence of this, it is practicable to bind a considerable number of these leaves or sheets together. A volume of these photographic copies will be more compact, and of less bulk than a manuscript volume of the same matter.

This method of producing and forming fac-simile copies of public records is particularly applicable to the preparation of Abstracts of Title in a complete form. In such case of application of my said invention copies of the deeds, and other instruments in the chain of record are prepared as before described, and the photographic copies thus obtained are mounted as before mentioned, and then bound together in the order of their dates. An abstract thus produced will present a reduced fac-simile copy of every deed, transfer, mortgage, and other instrument affecting the title in question, and will be produced at much less expense in many cases than could be done by hand.

5,211. KARL RAMSPECK, Machinery Manufacturer, and BARTHOLD SCHAFER, Merchant, both of 2te, Jacobstrasse, in the City of Hamburg, Empire of Germany, for "Apparatus for Automatically Producing and Completing Photographs."—Dated March 26th, 1889.

The object of this invention is an apparatus which shall be capable of producing and completing automatically the photographic likeness of persons. The essential features of the apparatus are, that a motor actuated by clockwork, by weights or by electricity or otherwise, revolves an upright shaft arranged in a closed box or casing. The shaft carries a radial arm attached thereto, at the end of which is a holder which seizes a plate at its upper end shifted forward from a conveying apparatus. The plate is revolved by the rotating shaft, and during this rotation it receives the necessary preparation for producing the photographs as well as the further treatment after exposure necessary for developing and fixing the picture. This is done in the following manner:—During revolution of the shaft the arm carrying the plate dips the latter by corresponding downward movements first into a solution of collodion and then into a bath of nitrate of silver. The plate thus prepared arrives in course of the further revolution of the shaft in front of the lens, and during a short stoppage of the arm in front of the said lens, a shutter opens and the plate is exposed. The plate then continues its movement, and is successively brought in front of several syringing and rinsing apparatus. Finally the picture is immersed in a solution of lac and quickly dried. The

baths arranged underneath the arm are in basins in a circle around the shaft.

Instead of carrying the plate around the circle the baths can be revolved by attaching them to the vertical axis; the plate then only moves up and down.

The intervals of time which are necessary for the immersion and the remaining of the plates in the baths and for the stopping in front of the lens are regulated by the motor.

The Claims are :—

1. In apparatus for automatically producing photographs the construction whereby the series of various operating agents are arranged in a circle about a central holder in which the plate to be treated is supported, so that said plate may be brought under successive operation of said agents for the production thereon of a photograph by the rotation of said holder or of said series of operating agents.

2. In apparatus of the nature set forth in claim 1 for automatically producing photographs, the construction of the plate holder, and of the several mechanisms for performing the stages of the process in combination with said holder, substantially as illustrated and described.

5449. HERBERT JOHN ALLISON, of 52, Chancery Lane, London, in the County of Middlesex, a communication from Carl Paul Stirn, of 20, Park Place, in the City, County, and State of New York, Merchant, for "Improvement in Photographic Plate-holding Boxes and Cameras."—Dated March 30th, 1889.

An arrangement whereby a series of sensitised plates, stored in a suitable plate-holding box, may be severally automatically dropped by gravity into proper position within the camera for exposure, and be thereafter returned by its reversal to the same plate-box, to be kept until opportunity arrives for their development. An index outside shows the correspondence between the grooves of the plate receptacle and the exposure groove of the camera.

Correspondence.

MR. HARRISON AND HIS PHOTOGRAPHIC ANNUAL.

SIR,—Will you kindly allow me to inform the contributors of papers to "Anthony's International Annual of Photography," that as the authors' copies which will be sent to them have to be specially bound, it is not possible to send them out till a short time after the publication of the ordinary edition. They will be despatched by Parcels Post just as soon as ready.— Yours, &c.,

W. JEROME HARRISON.

365, *Lodge Road, Hockley, Birmingham, June 18th*, 1889.

Proceedings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual meeting was held on the 13th inst.; Mr. T. E. FRESHWATER occupied the chair.

The subject of Retouching was introduced.

Mr. W. H. PRESTWICH did not retouch any of his negatives to any extent; he preferred rather to take another negative.

Mr. C. H. COOKE had no objection to retouching if done properly. He had noticed that as a rule light and shade was not properly rendered, and the effect of reflected light almost entirely ignored.

Mr. A. COWAN remarked that in sending out proofs of portraits his experience was that if one was not quite sharp, from a movement of the sitter, that one was generally selected. In using a portrait lens, greater diffusion of focus could be obtained by separating the back combination of the lens.

Mr. H. P. EVERETT had tested a single landscape lens with a rapid rectilinear, both having same aperture; he believed the difference in the speed of the two was quite 10 per cent. in favour of the single lens.

A question was asked as to the length of focus of a single lens most suitable for taking heads from two to three inches.

Mr. A. COWAN recommended a 20-inch focus lens.

The CHAIRMAN suggested having monthly competitions of prints. At another Society to which he belonged, the plan was adopted, at the commencement of each season, of selecting a list of titles of subjects for competition. The competitions were held monthly, and created a great deal of emulative spirit among the members; he would like to see similar competitions introduced into this Society.

The subject for discussion for the 27th inst. will be "A Practical Method of Testing Lenses."

HACKNEY PHOTOGRAPHIC SOCIETY.

THE monthly meeting was held last Thursday at the Morley Hall, about forty-five members being present; Mr. HENRY BURTON in the chair.

Mr. FENTON JONES (the Honorary Secretary) made an announcement with regard to his editing a written journal for the use of members only, wherein all the transactions of the Society could be recorded for future reference. This proposition was enthusiastically received, and (after some discussion, in which Dr. Kibbler, Messrs. Hubert, Hodgson, and Huddle took part) carried unanimously.

An election of new members then took place *en bloc*.

Mr. C. HUDDLE exhibited a neatly made camera constructed by himself.

The CHAIRMAN showed some interesting photographs printed by him upon Pizzighelli paper. It was remarked that they were as good prints as could possibly be expected by that process.

Mr. HODGES also exhibited some excellent 12 by 10 prints, both on platinum and silver.

Dr. ROLAND SMITH (who promised to read a paper at some future time) brought a very fine transparency taken on a Fry's German plate, in proof of his contention that although he never backed his plates, he was not troubled with this defect. The subject, an interior of a church, received an hour and fifty minutes' exposure, and did not show any sign of the fault mentioned.

The CHAIRMAN then called upon Mr. Hubert (Vice-President) to read his paper and give a demonstration on the Platinotype process.

Mr. HUBERT thereupon read a poem of fourteen verses which he composed for the occasion, and which was very favourably received. After explaining the process in detail (in prose), he proceeded with development by the hot bath process. He also brought some samples of the Pizzighelli, which, however, bore no comparison with the patented process.

A member asked whether it was possible to print without the india-rubber pad.

Mr. HUBERT replied that he had occasionally done so without detriment, but thought it dangerous if the atmosphere were in a moist condition.

Another member questioned whether an ordinarily good negative would be suitable.

Mr. HUBERT remarked, though it would be preferable to use a slightly denser negatives, it was quite practicable.

Another member asked whether the prints dried much darker.

In reply, Mr. HUBERT said that the additional density was but slight. He further mentioned that he deprecated a gloss for platinotype prints, but would recommend the use of encaustic paste, which imparted a beautiful richness. The prints developed were mostly recognised as local celebrities, and much admired. Mr. Hubert then passed the negatives round for inspection.

The CHAIRMAN, in complimenting him upon his very able demonstration, proposed a hearty vote of thanks, which was carried amidst applause. The meeting then adjourned till July 13th.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

A MEETING was held on June 17th, with Mr. HUMPHRIES in the chair, when Mr. S. Quincey was elected a member.

Photographs of lightning flashes taken in the late storm were exhibited by the members, one by Mr. G. Treadway, in which the flash had apparently struck a tree.

A sample of the dusting-on process was shown, and the method of working explained, the one exhibited having been taken from a negative which was disfigured by spots from chemicals having been accidentally dropped on the film; but in the copy obtained by this method no trace of them was visible.

A new detective camera on the screw principle was shown, which was generally approved; the size being, when made in $\frac{3}{8}$-in. wood, and fitted with $5\frac{1}{4}$-in. focus lens, 9 by 7 by 5 ins.

Mr. MARCHANT asked how he ought to proceed to make a lantern slide from a half-plate negative.

Mr. HISCOCK: The best way is, if you have an enlarging camera, to use that, putting the negative to be copied where the enlargement would usually be, and the lantern slide in the position where for enlarging you would place the negative; or, with an ordinary camera, it could be done by placing the negative from which you desire to obtain the slide upside down in a frame against the window, taking care that the film was inside, and then placing your camera inside and photographing it in the usual way.

Mr. WALKER stated that he had lately bought some waxed paper cloud negatives, which were very good, but that in printing there generally appeared on the print a number of greasy spots. It was suggested that this might be due to too much vaseline (which was used to make them transparent) being left in the paper, and he might overcome this by heating them very strongly over a paraffin lamp or gas stove; or a safer method was to place them between pieces of blotting-paper and pass a very hot iron over them.

All future meetings of the North Middlesex Club will be held in the Jubilee Hall, Hornsey Road, next to the Hornsey Road Railway Station on the Midland.

Next meeting July 8th, when Mr. Valentine Blanchard will demonstrate his platinum black process; commence at 8.15. Visitors invited.

Talk in the Studio.

ANOTHER PHOTOGRAPHIC VERSIFIER.—Last week we quoted some lines from the "Wobblejaw Ballads," and now we have to record another development of the versifying tendency among the photographic fraternity. At the meeting of the Hackney Photographic Society, Mr. Hubert discoursed on platinotype, and, to celebrate the occasion, he wrote a long series of verses, which we cannot reproduce in its entirety; but we give a sample:—

If over-printed is your proof,
From too great heat hold it aloof.
But if you find it underdone,
You must immerse it very long.

However, after a certain stage,
No further advantage can we guage.
You then transfer to watered acid,
Thrice or more before you wash it.

OBITUARY.—We receive the following communication from Messrs. Norman May and Co.:—"We beg to inform you that our Mr. Norman May died this morning (June 19th) through consumption. He has been somewhat delicate for many years, so much so this last two years that he has been unable to attend personally to business. His sudden end has caused considerable excitement in Malvern, as many of his friends had built hopes on his recovery. Yesterday he spent driving and walking on the hills. In the evening he ate a good supper, and went to bed in high spirits. This morning between 7.30 and 8 he breathed his last."

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting Tuesday, June 25th, at 8 p.m., at the Gallery, 5A, Pall Mall East.

PHOTOGRAPHIC CLUB.—The subject for discussion on June 26 will be "Printing Processes." Saturday outing at Rickmansworth.

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," (but not letters intended for insertion under the heading "Correspondence") should now be sent to Mr. Spiller, who is alone responsible for all which appears under the heading "Answers to Correspondents." Such communications, if now sent to the Editor, are forwarded by him to Mr. Spiller. Failure to attend to the above instructions may lead to disappointment.

Answers to Correspondents.

This column is now under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, is placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

W. P. D. (West Norwood).—You might consult Mr. W. T. Wilkinson's recent work on photo-mechanical processes; or Colonel (then Lieut.) J. Waterhouse's "Report on the Cartographic Applications of Photography," Calcutta, 1870, which is full of practical information relating to transfers. The last-named book (240 pages) is an official document, and would doubtless be found in the British Museum, India Office, Patent Office, and National Art (South Kensington) Libraries; also in the Royal Engineers, Chatham, and Royal Artillery Institution, Woolwich.

SUBCRIBER.—1. Wollaston's or Cadett's shutter ought to suit you, if a hood adaptation is imperative; otherwise Messrs. Sands and Hunter's, which works between the lenses. 2. Instead of using reflectors to overcome hard shadows in your photos of interiors, why not try and diffuse the illumination by using one or two small supplementary flash-lights fired simultaneously by pneumatic communication?

H. E. (Gomersal).—The lens which you name at the price of £6 could be used either for half-plate heads or full-length portraits; but it would be necessarily close to the sitter, and therefore somewhat difficult to get an even focus for heads so large as two inches.

PHOTARGUS.—First Letter.—Referring to Mr. W. K. Burton's mode of eliminating hyposulphite in paper prints by hot water washing, and A. Stosch's experiments of 1864, it may be true that too much soaking is prejudicial, and that sulphur toning supervenes when the heat is applied too hastily; but after all that can be said against the practice, the advantage of finishing off with warm water as advocated by Mr. Burton will be accepted as a distinct improvement. Thanks for reference to M. Viollet le Duc's statements about halation.

Second Letter.—Making gelatine plates colour-sensitive with aurine collodion. If Dr. Meydenbauer's recommendation is to be followed, and the plates stained on *both* sides with aurine (NEWS, 31st ult., p. 256), then a dipping bath could be employed, at once to colour-sensitise the film, and back the plate for preventing halation; or should not the yellow collodion be applied direct to the back of the lens? Well, Captain Abney has already done so, and finds that the exposure is very greatly hindered. The idea of using the dipping bath is worth a practical trial.

W. L. (Glasgow).—The portrait of the late Robert Hunt has been sent on to you by post. We shall be glad to hear of your success.

P. S. and Co.—Thanks for your letter; we have duly passed on the information therein contained.

AMATEUR.—The new Russian printing paper is a decided novelty, and we hope to hear of its commercial introduction. The original tone is too red or ochrey; but, as Mr. Warnerke explained to the meeting, this could be modified by hypo, and probably further trials will indicate even better methods of toning. It is believed to be an iron preparation of some sort—not chromium, platinum, or uranium.

BELGIAN TOURIST.—"Walks in the Ardennes," published at 125, Fleet Street, and Gaze's or Cook's excursion pamphlet, might assist you.

F. C. S.—An admirable portrait of the late Dr. Warren De la Rue, taken by Joseph Albert, of Munich, was reproduced in the *Illustrated London News* of the 11th ultimo.

OPTICIAN.—We think the German lens mountings are darker only by reason of the colour of the lacquer; but it may be that a certain proportion of tin is used along with the copper and zinc, and so the alloy partakes more of the character of bronze.

AMERICA.—The description of a new mode of painting china by photography given in the *New York Herald* of 16th inst. can scarcely be true in all particulars. It is a kind of combination of the photo-enamel process, with the dusting-on method applied to gelatine; but there is something fallacious about the mode of applying the dry colours.

IRIS (Nunhead).—Carbonate of soda is best for neutralizing your platinum solution, for both potassium and ammonium carbonates would interfere by causing a precipitation of the double chloride.

COLLOTYPE.—The standard or duplex burner of Thos. Fletcher and Co., Warrington, ought to answer your requirements, or a large form of Bunsen burner for rapid heating.

BOX.—The advertisers adopting this signature in the advertising columns of last week's NEWS write to say that they have received so many applications, as to make it impossible to inform each applicant separately that the vacancy is now filled up.

PATENT OFFICE LIBRARY

THE PHOTOGRAPHIC NEWS.

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VOIGTLANDER'S NEW RAPID WIDE ANGLE EURYSCOPE.

ANOTHER triumph in lens construction, and one involving considerable gain as regards conditions generally regarded as more or less incompatible with each other, has been made by the eminent optical firm of Messrs. Voigtlander and Son, and the result is before us in the shape of a rapid wide angle lens of a kind now on the market, and forwarded to us by the English agents, Messrs. Marion & Co., of Soho Square.

A lens of nine inches equivalent focus, and covering a 10 by 8 inch plate, when working with a clear aperture of 1¼ inches, will be alike welcome to the operator in the studio for group work when but little space is available, and to the outdoor worker—more especially for street views. Indeed the instrument before us should put a new power in the hands of those wishing to do this class of work. It is only by taking advantage of the new sorts of glass made at the Jena factory that the construction of the present instrument has become a possibility; including, as the instrument does, an angle of 80° with a rapidity of but a small fraction under $\frac{1}{4}$; indeed, the lens in question has precisely the same rapidity as Messrs. Voigtlander's well-known rapid Euryscope, but includes an angle which is greater by 10°.

We may refer to the admirably constructed Iris diaphragm which is fitted to the lens sent us, the whole being included within the tube, except a small stud which projects. Indeed, we may take it that the weight of the fittings incident to the Iris diaphragm does not exceed half what an ordinary set of Waterhouse diaphragms would weigh.

EXAMINATION OF PACKAGES BY THE POSTAL AUTHORITIES, AND APPARENT CARELESSNESS IN REPACKING.

As long as the present strange system prevails, by which different postal rates are charged for the transmission of letter matter, and the various articles coming under the "printed matter" rate, there will be a constant liability of inconvenience from the undoing of printed matter packages in order to ascertain if they contain anything of the nature of a letter subject to the higher rate. This inconvenience is especially great in the case of photographs tightly rolled on cylinders, and we have such frequent complaints of damage to them from postal examination that we think it desirable to call prominent attention to the matter as one materially affecting the interests of the photographic trade.

As a rule, the photographs and wrapper are so tightly rolled on the cylinder as to make it impossible to draw out the contents of the package from the end, and when the postal authorities slit up the wrapper for examination, it is a very common thing for the prints to be utterly spoiled by being torn or cut. Still the most common source of damage is from the re-rolling of the prints the wrong way, so that the ends oversail the roller. Any rational person in sending prints would select a roller a little longer than the narrow way of the prints, and would roll them up accordingly; but the postal officers often act as if they thought the prints ought to be rolled the long way on the cylinder. They appear to have done this in the case of Mr. Stokoe, whose correspondence with the Post Office we give below.

Another circumstance tends also to the accentuation of the position just now: the fact that owing to the present rebellion in Ireland the "Examining" department in the Post Office is exceptionally active in its search after political matter, and for greater security the political documents of the "Opposition" are frequently sent in printed matter packages.

It cannot be too generally known that the secret opening, examination, and copying of letters is quite a common thing at the Post Office, an extensive department being devoted to the work. It is not within our function to give any opinion as to the desirability of this sort of thing, but we may point out that the opening of letters was legalised in the time of Queen Anne. Under the older Government, even to the time of Pitt and Lord Liverpool, letters which had been tampered with by the Postal authorities were stamped "opened by authority;" but from the beginning of the reign of the present Queen, letters have been opened secretly and reclosed by specially trained officials, every care being taken to conceal the fact. The practice is for instruction to be given for the opening and copying of all letters addressed to or supposed to be sent by particular persons, and those who will refer to the *Times* of January 21st, 1887, will find a letter by Mrs. Fawcett in which, speaking of 1881, when her husband held the office of Postmaster-General, she says: "Three warrants from the Home Office were, in February of that year, issued authorising the letters of three persons connected with the Irish party to be opened, and this was accordingly done."

As the "Secret Opening Department" was never probably so busy as at this time, photographers should be watchful as to their interests.

As the main object of the Secret department is to conceal the fact of the letters having been opened, several ingenious devices are in use for getting at the contents of letters without making the fact of the tampering apparent; one of the cleverest of them being a steel hook, like a knitting needle with a barb at the end. This is inserted under the flap, close to the top, and the letter is wound round it and withdrawn in this position; after which it is returned by a reversal of the operation. Photographs

are especially liable to damage during this process, as the barb generally penetrates the paper. With regard to Mr. Stokoe's case, the following correspondence explains itself :—

Mr. Stokoe to the Editor of the PHOTOGRAPHIC NEWS.

Clare, Suffolk, June 21st, 1889.

SIR,—In the course of last month, I forwarded some photographic prints to a customer in London ; they were rolled on a tube, print outwards, and the tube projected beyond widest print ½-inch at each end. They were encased in a stout wrapper, and a string passed through and outside the tube, and securely tied at the end, kept all in place. On receipt my customer wrote that seven of the prints were damaged ; and added, "They should have been rolled picture outside ; and the roller was too short." These remarks convinced me that the package had been disturbed and the prints replaced in a very careless manner, and I wrote to the Secretary of the G. P. O. with a complaint to that effect. I enclose the reply received, a copy of my rejoinder, and the final communication from St. Martin-le-Grand. The only comment I have to make is that, just as "soft words do not butter parsnips," so expressions of regret do not replace damaged prints.—I am, sir, yours truly, T. STOKOE.

General Post Office, London, 31st May, 1889.

SIR,—Careful enquiry has been made upon the subject of your letter of the 1st instant, but it cannot be ascertained that the photographs in the packet which you sent to Mrs. Evans, Duncannon Street, were improperly treated by any officer of the Department. If, however, the slight injury which some of them appear to have sustained did occur during transmission of the packet through the post, the circumstance is much regretted, and it is hoped that the notice taken of the matter will not be without good effect. As, however, the packet was not registered and marked "Fragile, with care" (see pages 17 and 18 of the Post Office Guide), your claim for compensation could not in any case be entertained.—I am, sir, your obedient servant,

J. E. SIFTON.

Clare, Suffolk, June 11th, 1889.

SIR,—You will pardon my saying that I consider the letter of the 31st ult. with reference to damaged photographs unsatisfactory and unfair. What are the facts of the case? The views were sent from here rolled the narrow way, so that the roller projected beyond the prints ½-in. at each end. They were rolled with the picture outwards, as is always done in the trade, and had a stout wrapper outside with a string passed through the cylinder and securely tied at the end to keep all in place. In that form they needed not to be marked "fragile," as they would have travelled safely round the world if undisturbed. The package was delivered to my customer in a state which showed that, whether for purpose of inspection or from curiosity, the prints had been unrolled and had been replaced on the roller picture inward, and rolled the wide way, so that the prints projected beyond the roller, and thence arose the damage to seven which I had to replace. I must, therefore, ask a reconsideration of the case, as, failing a satisfactory reply, I shall lay the subject before the trade in the columns of one of the trade journals.—I am, sir, yours respectfully, T. STOKOE.

General Post Office, London, 15th June, 1889.

SIR,—With reference to your further application of the 11th instant, I beg to state that full enquiry was made in regard to the damage to the photographs in question before the reply of the 31st ultimo was sent to you, and it does not appear that anything further can now be done in the matter. I must, however, again express my regret for the damage.—I am, sir, your obedient servant, S. A. BLACKWOOD, *Secretary*.

THE LATE JOHN PERCY, M.D., F.R.S.

ON the 19th instant, after a somewhat long illness, died Dr. John Percy, one of the founders of the Photographic Society, and for the first five years member of the Council, becoming a Vice-President in 1857. At the period of formation of the Society, Dr. Percy was an enthusiastic calotype amateur, and sent contributions to the Inaugural Exhibition held in the large room of the Society of Arts, out of which event the Photographic Society sprang into existence. On the motion of Mr. Peter Wickens Fry, seconded by Dr. Percy, the original code of rules which had been drawn up by Mr. Roger Fenton, was passed and adopted at the meeting held on 20th January, 1853. A fortnight later, at the first ordinary meeting, Dr. Percy read a paper on the "Waxed-Paper Process as Applicable to Hot Climates," and in the following May exhibited a collection of stereoscopic photographs. In June, 1853, he described his chloride of silver actinometer, in regard to which he gave further details in March, 1856; but the principal service which Dr. Percy rendered was in connection with the Positive Printing Committee, formed in 1855, to investigate the causes of fading. This committee instituted experiments on silver prints produced by every known method, toned with and without gold, mounted in different ways, and preserved under dry and moist conditions. The conclusions to which they arrived, as set forth in their report, dated November 21st, 1855, may be briefly stated as follows :—

1st. That the greatest care should be bestowed upon the washing of the prints after the use of hyposulphite of soda, and for this purpose hot water is very much better than cold.

2nd. The majority of the committee think that gold, in some form, should be used in the preparation of pictures, although every variety of tint may be obtained without it.

3rd. That photographs be kept dry.

4th. That trials be made of substances likely to protect the prints from air and moisture, such as caoutchouc, gutta-percha, wax, and the different varnishes.*

The report was signed by Messrs. P. H. Delamotte, H. W. Diamond, T. F. Hardwich, T. A. Malone, John Percy, Henry Pollock, and George Shadbolt.

Mr. T. F. Hardwich was deputed to continue the work of the committee, and afterwards conducted alone an extended series of experiments on the causes of fading, publishing his results at intervals during the following year, the so-called "sulphur toning" being condemned.

In the summer of 1856, Dr. Percy made a lengthened stay in North Devon, and photographed, on 15 by 12 wet collodion plates, many of the picturesque old water mills in that locality, which had been pointed out to him by his artist friends—the Messrs. Landseer, Mr. Fripp, and Mr. T. H. Henshaw. In some cases, painter and photographer were at work upon the same ground, and it was possible, afterwards, to compare in a manner the artistic results of these individual efforts, when the pictures came to be shown in the following year's exhibitions. In later years, Dr. Percy does not appear to have taken any active part in the proceedings of photographic societies, confining his attention to the study of art generally, and to his all-absorbing pursuit of metallurgical chemistry, becoming eventually the standard English authority on metallurgy by the publication of his three ponderous volumes, which have now attained a world-wide celebrity.

The subject of our memoir was born at Nottingham in 1817, his father being a solicitor in that town. He was educated in Paris and at Edinburgh, where he took his degree of Doctor of Medicine at the early age of twenty-one years. He was shortly afterwards appointed resident medical officer at the Birmingham General Hospital, from which circumstance he was often brought into contact with those who desired his co-operation in working out some of the metallurgical problems of the time, amongst them being the extraction of cobalt and nickel from their ores, the manufacture of sundry alloys, the electro-deposition of metals, &c. So that eventually he gave up the study of medicine, and was appointed, in 1851, Professor of Metallurgy in the newly-founded School of Mines at Jermyn Street, London, having for colleagues, Dr. Lyon Playfair, Edward Forbes, Robert Hunt, Allan C. Ramsay, and Sir Warington Smyth. He continued in this office until 1879, when the schools were removed to South Kensington.

* The use of encaustic paste in later times is a practical realisation of the advantage to be gained by adopting the fourth recommendation, and it will be seen that Mr. W. K. Burton's recent proposal to use hot water for washing was foreshadowed in this report.

Dr. Percy was elected a fellow of the Royal Society in 1847, and in 1883 the freedom of the Turners' Company was presented to him. Whilst at Birmingham in 1849, he was elected president of the Chemical Section of the British Association, for the meeting held in that town; in 1877 the Iron and Steel Institute awarded him the Bessemer medal; and later, in 1886, he was elected president of the Institute. For many years he was entrusted with the ventilation of the Houses of Parliament, served on ordnance committees, and superintended the instruction in metallurgical science of artillery officers at Woolwich; and lastly, just before his death, the Albert gold medal of the Society of Arts was conferred upon him in recognition of his researches and writings on the subject of metallurgy. He leaves behind him a magnificent collection of minerals and metallurgical specimens, and a fine historical series of water-colour drawings collected in the course of a long life devoted to artistic and scientific pursuits.

On Monday last his remains were interred at Kensal Green Cemetery in the presence of a large assembly of his friends and former pupils. Dr. Percy was married to his cousin, Miss Grace Piercy, of Warley, who died nine years ago, leaving no issue.

PHOTOGRAPHING LIGHTNING FLASHES.

At the last meeting of the Physical Society, Dr. Hoffert exhibited a photograph which goes far to prove the simultaneously multiple nature of certain flashes.

We extract the following report from the *Chemical News*:—

"The photograph was obtained during the storm on the 6th inst., whilst the camera was being waved about in the hands, and shows three similar and parallel flashes, thus proving that successive sparks in multiple flashes may traverse the same path and may be separated by appreciable intervals of time. The supposed primary spark is intersected by numerous tributary ones spreading out on both sides, the second spark shows one tributary, and the third none. Faint bands of light pass across the plate parallel to the direction of motion, and these prove that some residual illumination exists during the intervals between the successive flashes. Evidence of a dark flash is also presented by the plate.

"Prof. Herschel, who had taken photographs during the same storm, referred to the fluttering appearance of the flashes and on their long duration; in many cases the time was sufficient to allow him to direct the camera towards the flash and make a successful exposure. He had also observed multiple flashes with the unaided eye, and on waving his hand about he had sometimes noticed about a dozen distinct images of it during one discharge.

"Mr. Gregory said that he watched the storm along with two others, and they could seldom agree as to the shape of the flashes, or on their simple or multiple character. The want of agreement as to multiplicity he thought might be caused by their eyes being directed towards different parts of the sky when a multiple flash occurred; the one who happened to be looking towards the flash might be conscious of only one impression, whereas the others, in directing their eyes, would receive the flashes on different parts of the retina. In some cases as many as three distinct flashes (occurring at intervals of about ten seconds) traversed the same path, and a number of the discharges presented a beaded or striated appearance. The beads seemed to remain after the main flash had faded, and this might account for the bands shown in Dr. Hoffert's photograph.

"Mr. C. V. Boys, in referring to multiple flashes, said that although his statements made in the discussion of Mr. Whipple's paper on April 13th were not readily accepted, yet no one who watched the recent storm could doubt their existence.

"Prof. S. P. Thomson thought the order of the flashes on the photograph may have been the reverse of that supposed, for he observed that the bands of light extended on both sides of the so-called primary flash, whereas the outside of the third flash was quite dark.

"Mr. E. W. Smith noticed many cases of 'sympathetic discharge,' in which a flash in the north seemed to precipitate another in the N.W. within a few seconds, and in this he was corroborated by Mr. Gregory, who viewed the storm from a different locality.

"Mr. C. V. Burton thought the heating of the air by the first spark of a multiple flash might give rise to the tributary sparks in subsequent ones.

"Mr A. W. Ward mentioned a long flash observed at Cambridge, which passed from the zenith and struck some farm buildings at a distance, and he was particularly impressed by the considerable time occupied in its progress."

LOCAL REDUCTION OF DENSITY.

BY W. H. HARRISON.

The photographer of to-day who is anxious to please his clientéle is fully conscious of his dependence upon the retoucher's skill, and, so far, this is as it should be; for doubtless the pencil, in capable and artistic hands, is a great, nay, indispensable help in the production of good and pleasing work. But is not the operator, from this very feeling of dependence, somewhat too ready to pass a faulty negative, with the excuse that "it will be all right when it's retouched?"

Now I hold that we are far too ready to attach the blame to the poor overtaxed retoucher, when, in reality, the fault is with the operator. Much may, in many instances, be done to improve the negatives before being varnished and sent to the retoucher. A fault, all too prevalent with many photographers, is uneven, patchy lighting, caused generally by over-lighting and insufficient use of reflector; sometimes by injudicious use of reflectors, and not unfrequently by violent contrasts in the dress of the sitter. One plan of toning down these harsh lights very much in vogue is to rub away the excessive density with fine cuttle-fish powder; and it was while using this method in a somewhat obstinate case that I made what was to me at that time a discovery.

As Dame Nature has endowed me with but a limited stock of patience, I found that it was becoming reduced more rapidly than my negative, and I also found that objectionable scratches were appearing. I next moistened the cuttle-fish powder with a little methylated spirit, and made a few experiments on a waste plate, when presto! I found I had produced the much desired shadows of a dry plate negative, bare glass, for once, too literally. The next thing was to omit the powder altogether, and I found that the spirit on a small piece of clean, soft rag produced the desired effect.

But here I must pause to ask the kindly reader who has used this means for years, to bear with me and charitably smother his contempt for another so-called discovery. Alas! how many there are who light upon some startling discovery only to have their ardour cooled upon finding in the next week's Correspondence column of the Photographic News a letter which is corroborative evidence of Solomon's words, "Nothing new under the sun."

Another cause of much trouble and annoyance—viz., halation—may, to a very great extent, be overcome by a judicious application of the means I have just described. Take, for instance, the interior of a church, including, perhaps, one or two windows, and we have a forcible example of the ruinous effects of this trouble.

Now if we take a little cotton-wool, or a small piece of clean, soft rag moistened with spirit, and rub gently round the edges of the window, we shall find it a comparatively easy matter to tone down the over-lighted portions of the walls to the required shade.

If we have infringed a little on the edges of the window itself, that, of course, can be rectified by the use of the pencil or a little colour. These remarks naturally apply equally to other cases than the one which I have mentioned as an example; as in the case of a portrait, the hands, a book, paper, &c.

Now in photographing cats, dogs, and other small cattle—aye, and some little samples of the coming race in the shape of troublesome babies—their comfort is often greatly enhanced by the close proximity of the beloved owner thereof; or in the latter case, their fond parent or nurse. Hence we often find in the negatives of these subjects a fine picture of the human hand. As, of course, this is an unnecessary embellishment, I would advise that it be removed in like manner.

No doubt, also, most photographers have met with a peculiar stain, almost like a thin film over the gelatine, chiefly towards the edges of the plate, which appears merely as a slight brown stain by transmitted light, but which reflects lights of all colours. A somewhat similar appearance we sometimes find on the leaves of our rose-trees; but in that case we attribute it to the track of an unfriendly snail, and in this it is most probably due to the fact of the plates having been stored in a damp place. Anyway, these stains sometimes are submitted to the influence of the alum and acid baths, and yet "none of these things move them." What, then, are we to do? Fly to the teetotaler's pet aversion in a methylated form, and they will be spirited away with the rapidity of the celebrated greased lightning.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

TWENTY-SIXTH ARTICLE.

BY W. M. ASHMAN.

PRINTING by means of the Platinotype processes is very popular amongst those amateurs who desire their work to be lasting, as well as characterized by some of the qualities sought after by the more artistic workers in photography. This popularity of that which is really an extremely easy process to manipulate, bids fair to increase now the proprietors of certain patent rights have at last thought it expedient to remit the tax which for many years has been imposed by them upon all, amateurs or professionals, employing this method of printing. We are glad to draw especial attention to the following notice, issued in January last, and to express the conviction that it will usher in important changes in the production of positive prints. It runs thus:—"*No licence is required* for printing on the sensitized papers manufactured by the company, and sold by them or by their agents. The sensitive paper should keep in perfect condition for three mouths after date of manufacture, and, though it often keeps much longer, yet it generally tends to deteriorate after this period. As a guide, the date of manufacture is stated on each tube." The paper, as supplied by the company, is sent out in sealed tubes, either cut to ordinary photographic sizes, or in sheets measuring 26 by 20 inches, and the necessary instructions for working accompany each package. There are several descriptions of paper to suit different subjects and sizes, comprising rough and smooth surfaces, and varied thicknesses; also a special kind which yields brown tones when treated with the proper developer. Except in the latter case the image produced resembles somewhat a steel engraving of the mezzo-tint or almost lineless order, and is even more similar to positive or bromide paper which has been developed by means of ferrous oxalate. In point of colour it is often very difficult to distinguish the positives obtained by the former process from those produced by the latter.

Platinotype printing as at present practised is due to the invention of W. Willis, who, in 1874, patented the reduction of platinum by means of ferrous salts, through the agency of potassic oxalate and light; but as far back as 1795 Fischer observed the action of light upon the ferrocyanates of iron.

The process, however, may be regarded as a modification, albeit a very important one, of printing by the aid of the salts of iron, already referred to in the previous chapter. The property possessed by iron to reduce some metals from their salts is here taken advantage of. Ferrous oxalate, added to solutions of gold, silver, or platinum, will reduce the latter to a finely divided metallic state, but, in the last instance, Willis found that *the insoluble iron salt must be dissolved in potassic oxalate before it will effect the object.* Another important discovery of his was that the platinous chloride was more useful than the ordinary platinic chloride, and it remained only to arrange the sequence of operations by which the best possible results might be obtained. In the last chapter we pointed out that ferric salts exposed to light under a negative are always changed to a varying extent into ferrous salts, and that, in blue printing, the presence of the same ferrous form was indicated by the precipitation of the blue pigment. In the case of platinotype, the ferric salt is exposed in the same way, and its presence is revealed by means of that same peculiar property which it possesses of reducing a platinum salt to a metallic form in the shape of a black powder. A few words of explanation will show wherein lies the difference between the three processes presented for our selection. In each instance ferric oxalate is on the paper, as it is that which the light really attacks. In the first or hot bath process, potassic platinous chloride is also on the paper, ready for reduction by the ferrous salt which is to be produced by the light. But, as already noticed, the solution of the same ferrous salt in potassic oxalate is necessary before the precipitation can take place; therefore the developing bath is composed of this potassic salt, and heated to facilitate the action. In the second, or cold process, the ferric oxalate only is upon the paper, with a trace of a mercuric salt; therefore the platinous chloride must be added to the developing bath, which is, as before, made up of potassic oxalate with this addition. The advantage in this method lies in the better keeping qualities of the paper, and in the variation of tones to be obtained by altering the proportions of the two salts in the developing bath.

In the third, or printing-out process, we have a mixture of both sensitiser and developer on the paper, and therein it presents more of a parallel to the blue process, in which the ferric salt and the developing agent are mixed before application to the surface. The advantages claimed for this method of preparation are those of being able to modify the printing more easily as it proceeds, and of reducing the subsequent operations to the utmost simplicity. It is also considered to be more adapted to somewhat weaker negatives than can be made available with the other formulæ. After all, the chief difference between these processes and that of cyanotype is in the the nature of the metal composing the ultimate picture, the one being iron in the form of a compound with cyanogen, and the other, of which we are now treating, being metallic platinum in that fine state of division known as platinum black, a substance of the permanency of which there can be little doubt.

Those who have leisure and the inclination to prepare a suitable paper for their own use, will find full instructions how to proceed in "Platinotype," a work published in 1882 by Capt. Pizzighelli and Baron A. Hubl, at Vienna, a translation of which is issued by the Photographic Society of Great Britain, through their publishers, Harrison and Sons, 59, Pall Mall, S.W. Briefly, a good quality of paper is floated on a solution of gelatine, or brushed over with arrowroot paste to provide a smooth impermeable base for the picture. When dry, this is sensitised by brushing over it a mixture of ferric oxalate, chloro-platinite of potassium, and chlorate of potash in an apartment illuminated by yellow light. As soon as this

is surface dry, the paper must be placed where it will become thoroughly dry, desiccated, and then kept from the effects of moisture in an air-tight compartment provided with a bag of dry chloride of calcium. This precaution against damp must be continued during printing, and right up to the time of development. The negative, printing-frame, and pads should be dried before use, and one or more sheets of india-rubber, the size of the negative, are the best damp-excluding pads to employ. If the prepared and unexposed paper is stored in metal tubes containing calcium chloride, care must be taken to protect it from particles of the latter settling upon it, so as to produce white spots. The calcium chloride is best mixed with equal parts by bulk of asbestos, and when it is charged with moisture the process of drying it over a clear fire in a shovel is facilitated, and its action as a desiccator improved by its being less caked together.

Dampness is productive of impurity in the whites of the picture and want of proper vigour in the shadows. We do not assert that the production of brilliant prints is impossible when a paper has been kept for a lengthened period, or has become somewhat damp, for evidence to the contrary has been adduced; but the beginner, whether he tries to sensitize his own paper, or purchases from the company, will do well to be guided by the instructions laid down. Assuming that this sensitive paper, which is of a lemon tint, is provided, answering to the first of the three processes described above, the next step is to expose it in daylight under the precautious just indicated. The negative should be a *vigorous* one, to produce satisfactory prints; the printing should be done under a glass roof in this climate, and the time of exposure one-third of that required by the same negative when albumenized silver paper is employed, for this platinotype paper is at least three times quicker. The frame is then taken to a dimly-lighted dry room and the print examined, when the yellow paper will be seen to have become changed: the half-tones and details in the lights are now of a greyish yellow, and the deep shadows of a brownish hue. This stage reached, when a strong negative has been used, all further action of light must be stayed. Thin negatives are not so suitable for platinotypes, but good results are obtainable by modification in printing and developing, which latter process, as employed in the first or hot bath system, we will next consider. The developer in this case is simply neutral potassium oxalate, slightly acidulated with oxalic acid, and its function, as we have shown, is to dissolve the powdered ferrous oxalate produced by the action of the light, and so to allow of its reducing the platinous salt with which it is intimately mixed on the surface of the paper. A saturated solution, to the depth of half an inch, is heated in a flat-bottomed enamelled iron dish to a temperature varying between 170° and 180° Fah., and the print floated face downwards upon the solution for about the space of five seconds. Until the hand is trained to recognise by touch the right temperature for the purpose, it is better to employ a thermometer, and when this degree is reached the lamp or gas can be removed, and the prints quickly laid on the surface. The development is very much dependent upon the correct timing during printing, and weakness in the shadows may require a little longer floating. Over-exposed prints require an exalted temperature, and under-exposed less heat by 10 or 20 degrees. The same solution will serve for a number of prints, but the surface must be watched for air-bells or crystals of ferric oxalate, which should be removed before developing the next print. As soon as developed, the print is immersed in three consecutive baths of acidulated water, in each of which it is well to leave it for some ten minutes in order to remove all the ferric and ferrous salts, leaving only the platinum which forms the image. If no cloudiness is communicated to the last bath the process is complete, and a final washing in a few rapid changes of water will prepare the print for mounting or drying as preferred. That which has taken many words to explain and describe is really simplicity itself, and offers considerable advantages over the processes of finishing silver prints. The toning, fixing, and subsequent prolonged washings are done away with, and we have only three distinct and simple things to do—to print until the details are discernible, to develop from five to ten seconds upon a potassium oxalate solution at a temperature of about 175 degrees F., to soak in acidified water bath, and a little washing completes the whole.

We now come to the second or cold bath process, in which the paper carries only that salt which is sensitive to the light. To prepare such a paper, a substratum as in the first instance is necessary, and it is then coated with a solution of ferric oxalates, to which has been added about a grain of mercuric chloride to every ounce. Such a paper keeps a long time with the same precautions as in the first method. The printing is nearly the same, though, perhaps, it is less easy to distinguish the progress of it than in the former case. The developing solution is sold with the paper, and requires mixing in proportions suitable for the prints in hand. It can be made by preparing a solution of potassium oxalate from thirty to one hundred and twenty grains to the ounce, and adding to it potassic chloroplatinite from five to fifteen grains to the ounce. An average strength would be nine grains of the latter and fifty of the former. For warm tones decrease, and for cold tones increase, the proportion of oxalate. Concentrated solutions of both salts are kept and mixed as required. To develop, cover the bottom of a porcelain tray with the mixture, and float the paper face downwards thereon for some five seconds, lift the paper and allow it to drain, and refloat, repeating that operation until the full vigour is reached in the deeper shadows. Some prefer to remove the print as soon as well wetted, and lay it flat to watch the development, floating it again for a second if necessary, the object being to prevent the ferrous oxalate on the paper from being removed as soon as it dissolves before the platinum is thrown down by its presence on the surface. At any rate, if it is flat, and face upward, the developing action can be arrested in any particular spot by touching it with a brush dipped in the acidulated waters. There are those who advocate the use of a spray-producer or a brush for applying the developer, and do not float the paper at all.

Whichever method is adopted, the print is plunged into the acid bath as soon as it is sufficiently developed, and kept moving to equalize and increase the solvent action; then the same process is repeated in two other similar baths, and clean cold water concludes the operation as before. This second method is scarcely so rapid as the first, and time must be given in developing for the proper reduction of the platinum, especially as it is not intimately mixed with the ferrous salt in the paper, but is in the developer. In any case, when acid clearing baths are used, it is necessary to keep the prints or the solution in constant agitation to ensure the elimination of the iron salts, and so guard against one cause of yellowness in the finished prints.

The third or printing-out process is perhaps hardly so perfect at present as the other two. Paper known as "Pizzighelli's Platina Direct Printing Paper" can be purchased at the dealer's. As before stated, the whole of the salts employed are found on the surface of the paper, so that only the three acid baths, and final washings, are required to complete the process after printing. The same platinous salt is used as by the Platinotype Company, but the oxalate is that of sodium, and the sensitive salt is the compound double one, called sodium ferric oxalate. If the paper is quite dry when exposed under a negative, we have only the faint image caused by ferric and ferrous oxalates, because the latter salt if dry cannot reduce the dry platinous salt; but with the least moisture, such as the presence of a trace of glycerine in the mixture would afford, the platinum is reduced as the printing proceeds. The same effect is obtained by breathing on the paper

before or during printing. The greatest amount of vigour, however, seems to be obtained if the paper is printed dry, and the precipitation of the metal allowed to take place in the acid bath afterwards. Theoretically the paper is intended to print right out, so as to show exactly what it will be when washed and finished. The addition of glycerine to the formula is for this purpose, but keeping in air-tight tubes with calcium chloride would in course of time modify the value of this addition. We must refer our readers to the YEAR-BOOK OF PHOTOGRAPHY for 1889 for details if they wish to sensitize some paper, and require the necessary formulæ. As a matter of fact, with this method of printing, simple immersion in cold water will bring to light or develop a picture in platinotype. Much trouble has often been caused by a tendency on the part of prints in platinum to show yellow discoloration, and frequently it is difficult to trace the cause when strict attention has been given to the washing in acidulated water, and when moderately fresh paper has been employed. As it is not always certain that these important conditions have been observed, some plan of correcting the difficulty when it occurs is desirable. An agent possessing bleaching properties answers. It has been recommended by H. M. Hastings to add to the developer a minute quantity of calcium chloride, or to treat the finished prints with water in which a trace of that salt has been dissolved. Properly, the colour should be black and white, except when the special paper and developers are used for brown or sepia tones.

AMONG THE REJECTED.

BY WIDE ANGLE.

THE Royal Academy is justified. After seeing the "Rejected" and "Doubtful" at Olympia, we can sympathise with the unfortunate Forty. There are but 647 pictures in this remarkable collection, and of these more than one-third are works described, with delightful vagueness, "which may or may not have been exhibited elsewhere." We have thus more than 400 pictures which sought entrance at Burlington House. But was not the number sent in over 12,000? If so, and if this 400 at Olympia is a fair sample of the "Rejected" and "Doubtful," it is a wonder the Forty are not wandering about the face of the earth stark staring raving lunatics. To tell the sober truth, the Olympia show must be approached with great caution, and the pictures looked at in homœopathic doses. With great foresight, the management has provided an excellent band of music, and, fortified by melodious strains, the visitor may, perhaps, be allowed to run loose. Otherwise we should certainly recommend him or her to be in the keeping of an exceptionally strong-minded person, for there are not a few pictures which are calculated to upset the reason.

For instance, we had a notion that we knew pretty well the appearance of the Trafalgar Square fountains. The water of the fountains is, as a rule, the colour of that species of fog known as the "London particular." Mr. Chater, however, has been fortunate enough to see it of iridescent hue, and has given the spray the semblance of a bundle of rainbows. The Thames, in his picture of the Embankment, is dyed in the same tints; while some wonderful people he has drawn are as equally true to life. The "Light of the Harem," so far as we could understand it, consists of half-a-dozen stumpy ladies of the ballet in scanty clothing sprawling over a floor while at the back, is a spectral young woman whose precise function is not very clear as she is not quite a ghost, and not quite solid flesh. Five minutes' speculation in front of this picture is about as much as we should recommend. If one's mental equilibrium has not been disturbed by the "Light of the Harem," it will probably begin to be a little shakey when a few of the landscapes have been examined. Such greens, such blues, such reds, have never been seen before outside a Berlin woolshop. We need not particularise—we can only wonder.

A comic picture is that of "The Village Blacksmith in Church," with the appropriate quotation. It may be, of course, that village blacksmiths who are widowers, and who hear their daughters' voices singing in the village choir, look like the one in the picture; but to our mind the expression is far more suggestive of unripe gooseberries for supper the night before. We are thankful, however, to the authorities for hanging such a droll work of art next to the most terrible night-mare we have seen for a long time. The night-mare is a horse—we do not intend a joke—and a horse of fearful and wonderful anatomy. It has legs about the size and shape of the legs of a billiard table, hoofs of the size and pattern of half-quartern loaves, and body like a sack of meal. If the quadrupeds which are sold in a French horse market are really like this extraordinary beast, the sooner a few are brought over here and exhibited the better; they would certainly draw the public. Mrs. Gertrude Scott, with unconscious irony, calls her picture of an ancient gentleman, "Of what is the old man thinking?" If he is thinking of anything at all, we should certainly say he was wondering of what crime he had been guilty to entitle him to be placed at Olympia.

It would be cruel to pick out any more of the "Rejected," or we might write of the shock which the picture of two young ladies entitled "The Month of June, Lincolnshire Fens," caused us, or of the portrait of Colonel Wickham, an unfortunate gentleman with a lip-salve coloured complexion, or of the absurd and impossible landscape called "The Last Gust of a Dying Storm," or of a dozen more which have, unfortunately, fixed themselves in our memory. But we forbear, and pass on to Section 3. Here there are a few decent pictures, but not one worth journeying to Addison Road in order to see. The best is "A Sister of Mercy," by Walter C. Horsley; the worst a piece of snobbish vulgarity by Chevalier Henry Campotosto magniloquently styled "A Festival in Heaven (The Jubilee Picture)." Here we see a framed oleograph of her Majesty supported by four naked cherubs who are squatting on a solid cloud looking thoroughly ashamed of their task. The whole thing is a hideous absurdity, and how Chevalier Campotosto, who can paint a presentable picture, can have brought himself to produce it, is inconceivable.

Among the "Doubtful," there are several of which it may be said that they are quite equal to a good many now hanging on the walls of Burlington House. But can one be enthusiastic over mediocrity? There is really no good purpose served by criticising these respectable pictures, and we accordingly leave them alone.

On the whole, it may be said that those who like a good band will find it at Olympia. Those who expect to find good pictures had better stay away. For photographers the comforting reflection remains that could there be an exhibition of photographs, the work of beginners in the art, it would show to far better advantage than does the exhibition of the beginners in painting.

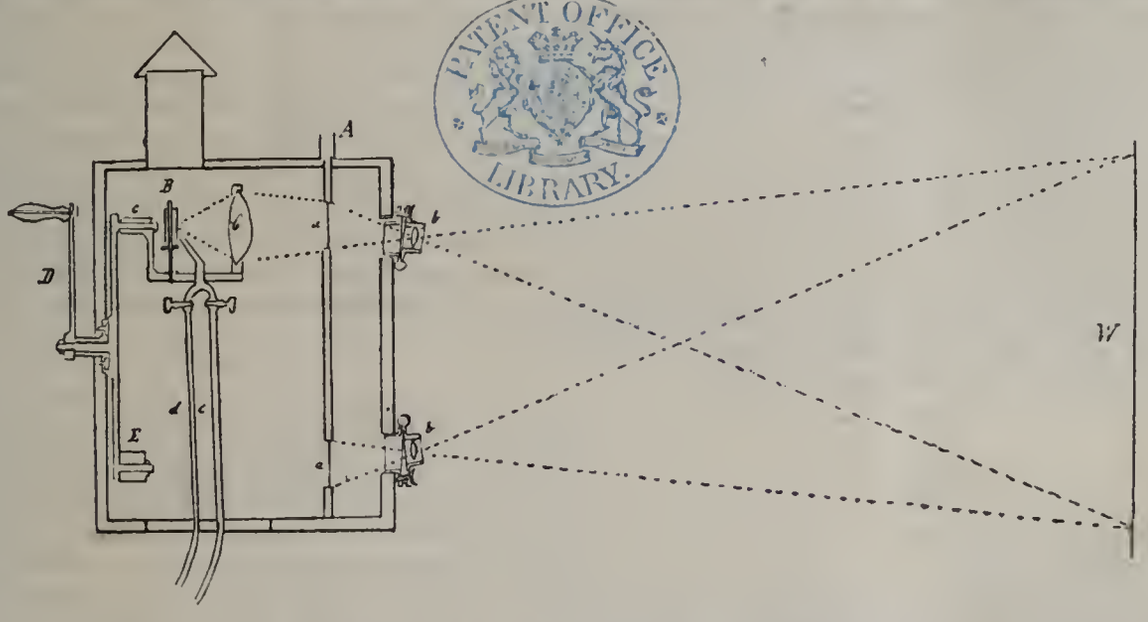
PHOTOGRAPHY IN GERMANY.

BY HERMANN E. GUNTHER.

STROBOSCOPIC DISK OF HERR ANSCHUTZ—PROJECTING MOTION PICTURES—COLLODION NEGATIVES ON PAPER—DEVELOPMENT WITH PYROCATECHIN.

The Instantaneous Pictures of Mr. Anschutz, shown by aid of the Stroboscopic Disk.—Some days ago I visited Cassel, where an exhibition of hunting, fishery, and race takes place at present under the auspices of Prince Heinrich. I did not expect to find at this exhibition anything pertaining to photography; notwithstanding, our art science was ably represented there, though by one apparatus only, namely, by the well known stroboscopic disk of Mr. Anschutz, by which the wonderful instantaneous pictures of

this talented artist are shown in motion. As is known, this apparatus has for its purpose to combine a number of motion pictures, of which each one is only a very little different from the preceding one, so as to give the impression of real motion. Pictures of this kind have been made in large numbers and in a most perfect manner by Mr. Anschutz, and some of them have been reproduced in the Photographic News. After the small original negatives, transparencies on glass, with a diameter of about four inches, are produced, and these are placed together in a vertical circle, according to the motion to be represented, upon a steel disk of large diameter, which can be made to rotate very fast around a horizontal axis. Vertically over the centre of this disk, and behind it, is fixed a Geissler tube wound spirally to a circular face of the same diameter as the one of the transparencies, which at the moment when each picture—the disk being set in motion—passes the tube, sends out a flash-like beautiful light for the time of about 0·001 to 0·005 of a second, when it at once falls again into darkness. The room where the apparatus has been erected is of course darkened, and if the disk is made to rotate fast enough, so that the succession of the pictures takes place so rapidly that about 0·03 of a second will not pass, then the Geissler tube seems to shine with a continuous light, and in consequence of the continued light impression in the eye, all the phases of the motion combine to a single continuously lighted picture, which, though it stands still itself, gives the impression of real motion. Herr Anschutz showed by the aid of this apparatus the different kinds of steps taken by horses, marching soldiers, gymnasts turning topsy-turvy, &c.; and in all these representations the most wonderful truthfulness to nature prevailed. As I am aware, Herr Anschutz is engaged in arranging his apparatus for projecting pictures also, so that this beautiful appearance may be presented to a large number of spectators contemporarily. I have not learned whether Herr Anschutz has found a practical means of realising this intention, but it might be advisable, at all events, to call to mind here a method invented many years ago—in the year 1853, I believe—by an Austrian officer, Franz Uchatius, which was employed for the same purpose, though instantaneous photographs were of course still unknown at that time, and only drawings were shown in the apparatus. *a*, *a* are the transparent pictures which, in vertical position, are inserted as nearly as possible together into the wooden slide A. In front of each picture is fixed an objective lens *b*, *b*, which, by means of a hinge-joint and a thumb-screw, can be inclined towards the centre of the apparatus. The inclination of all the objective lenses should be arranged so that their optical axes cross each other at that distance at which the projected image is produced. It results therefrom that



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all the images will be projected on one and the same place of the screen W. The lantern consists of a cylinder of lime, B, which, in the usual way, becomes incandescent, and of the condenser, C, by which the rays are rendered slightly convergent, and by which always only one picture is illuminated at the same time. The radiant, by means of a simple mechanism, can be made to rotate by the handle D, quicker or slower, according as it is required; the illuminant maintaining thereby its upright position by its own gravity, it being suspended, easily moveable, at the pin *c*. The two elastic india-rubber tubes *d* and *e* are moving up and down through the perforated bottom of the lantern body. The lead mass E serves as a counter-weight of the illuminant. The result is obvious. The successively illuminated images relieve each other on the screen like dissolving views, only much quicker, and give thereby the impression of real motion. The original apparatus of Uchatius was arranged for only twelve object pictures, but it would certainly be realizable to construct it with at least twenty-seven pictures, so that the wonderful motion pictures of Mr. Anschutz and other pictures of this kind might be shown by it to a large audience.

Collodion Negatives on Paper.—An original method is employed by Herr Friedrich Sandtner, of Prague, to produce paper negatives for photo-lithographic purposes. A plate glass is warmed to 140° F., and coated evenly with pure white wax, which melts on the glass during coating. The plate is then allowed to cool, and is then covered on the prepared surface with a piece of very thin moderately sized paper, free from structure, having previously been damped; it should be about one-eighth of an inch larger each way than the glass. The edges of the paper are bent round the back of the glass plate and pasted with starch-paste; then the paper is allowed to dry on the glass. The plate is now once more warmed until the wax on its surface is melted and penetrates the pores of the paper; then it is placed on a table, and by rubbing with a clean rag it is freed from all blisters and air-bubbles. After cooling, the plate is dipped for a moment into sulphuric acid; then it is thoroughly washed with much and clean water, and the paper on it coated twice with an albumen solution of 20 : 100. These prepared plates are now in the usual way coated with iodized collodion; this is sensitized, and the plates are treated exactly as wet collodion plates. After developing, the finished negative is covered also on its film with thin paper as indicated above, and also this paper is rendered transparent in the warmth with wax. After cooling, the

negative film is stripped from the glass plate, after the edges of the paper have been cut through with a sharp knife. The stripped negative film, which is perfectly even, may be kept in a book for any length of time. These collodion negatives on waxed paper possess the advantage over the gelatine negatives that they are perfectly inductile and unchangeable at any temperature; for this reason they are of great use for chromo-painting; for chromo-collotype as well, where 12 to 15 uniform negatives may easily be made by this method, as for direct printing on zinc plates.

Development with Pyrocatechin.—Pyrocatechin, the composition of which is $C_6H_4(OH)_2$, has been repeatedly recommended in this country as a developing agent for gelatino-bromide plates. Recently, Dr. Arnold has made experiments with this substance, and, according to his statements, the pyrocatechin developer possesses the following advantages:—The negatives obtain by it a colour which facilitates printing; the plates do not fog; as soon as the plates are placed into the developing solution they lose their sensitiveness to light, so that they may be developed at a distance of twenty inches from a gas flame, or in weak diffused daylight. Even at a comparatively low temperature (41 to 43° F.) the developer acts sufficiently energetic; the solution does not stain the fingers; it is simple to prepare, as the ingredients readily dissolve; for 500 plates of 13 by 18 c.m. only 5 grammes of pyrocatechin and 1,000 grammes of potassium carbonate are required. The formula adopted by Dr. Arnold is the following:—Dissolve 1 gramme of pyrocatechin in 100 c.c. of water, and 20 grammes of potassium carbonate in 100 c.c. of water. To develop a plate of 18 by 24 c.m., 1 c.c. of the pyrocatechin solution (about 16 drops), and 5 to 10 c.c. of the potassium solution are added to 60 to 80 c.c. of water. For instantaneous pictures the quantity of the pyrocatechin solution may be increased to 5 c.c. The developer works uniformly, it is true, and gives very fine negatives, but unfortunately, it is so exceedingly slow, that the advantages enumerated above are almost paralysed, and that only those who have leisure can use it with advantage.

Notes.

The continuation of our article on "The Aims of Art" stands over till next week.

A domestic servant the other day discovered a new use for a photograph. She had left one situation for several months, and during the time had been engaged at a boarding-house. Leaving here, she found a difficulty in getting another place, a boarding-house not being altogether a good reference. Accordingly she wrote to her former mistress explaining the circumstances, and asking for another character. With a wisdom which showed she thoroughly understood the ways of servant-gal-ism, she sent her photograph, and wrote: "I enclose my photo, so that you will know which servant it is." As in London seven or eight servants per annum is about the rate of change, she was quite justified in thinking that her former mistress might be a little confused as to her identity.

Lady photographers will be interested in learning that Lady Hampden, who is organising an exhibition of Women's Work in Art and Industry, to be held at Brighton in the winter of this year, is anxious to receive photographs executed by ladies. Lady Hampden believes such an addition to the exhibition would be interesting, and no doubt it would. The ranks of lady amateurs are being added to gradually, though not so rapidly as one could have expected. Chemistry rather frightens a lady, and she still has a lurking suspicion that photography is "dirty and messy;" in addition to which she probably has been so victimised by being "taken" by her brothers and cousins with a fancy for photography, that she rather fights shy of the subject. But no doubt as time goes on she will see that it may be made a feminine and a pleasurable amusement.

To monarchs of a thrifty turn of mind the framed photograph comes in remarkably handy. Where a jewel of real value would in former times have been given, the photograph is now made to do duty. Her Majesty has in this way been very liberal in spreading abroad counterfeit presentments of herself, especially in her Indian and Colonial possessions, and it is not at all wonderful that the fashion has reached Persia. The Shah, in imitating the example of the Queen, is probably not actuated by parsimonious motives, and he gives his photograph because he thinks it is the proper and the European thing to do; but it is not at all unlikely that his actions may be misconstrued. Thus we read that the courtiers of Germany, who had been expecting diamond rings and *bonbonieres*, were immeasurably disgusted at being presented with photographs of his Majesty mounted in silver gilt frames of German make. Let us hope, however, that it was not the Shah's photographs which disgusted them, but the silver-gilt German frames. They probably knew the price of the latter.

We still hold our opinion as to the so-called spirit photographs—and this in spite of several arguments addressed to us by "believers;" but, at the same time, have no objection to give publicity to some things which have been cited or referred to in support of a belief. The objection that if spirits are real, they should be unclothed, is perhaps somewhat affected by the following remark in "Spirits before our Eyes" (p. 61), and having reference to an alleged apparition. Mr. Harrison writes: "My opinion is that at the time Captain Ridd saw the spirit in the clothes of his brother, a diminution took place in the weight of the normal clothes and the body of the recently drowned man at the bottom of the sea." The author thus contends for a materiality of apparitions, and also cites what he regards as experimental proof. If this be true, the photographing of the spirits and their clothes should be easy enough. Further on, the same author says: "Apparitions which can be seen by normal eye-sight are solid to the touch;" and, after suggesting that there is an inverse ratio between the weight of the original and the weight of the ghost, he intimates the opinion that if the beds of a hospital were balanced on self-registering apparatus, records of the diminution of weight due to some portion of the body going on ghostly wanderings would be obtained.

Truly the paths of scientific investigation are manifold and wondrous. If, as Mr. Harrison contends, the

material of the clothes is partly transferred to a distance when the ghost walks, it would be interesting to know where the phenomenon stops. A scarf pin is a part of the attire if it really holds the necktie together, and should be duplicated; but would the same apply to a watch or a pocket handkerchief? If so, why not such articles as are in personal use at the time—as a camera and tripod? Then, again, how interesting it would be if the partially materialised clothes or other articles could be retained and investigated chemically. We might even get proof of the compound nature of the so-called elements. Still, in spite of all, we must confess ourselves as still unconvinced—at least, unconvinced of the reality of such manifestations.

When you are out with a camera on political thoughts intent, some disappointment may be expected. Thus a lady recently visited Donegal and took some photographic apparatus with her, so that she might preserve instructive records of the poverty there, with a view to reproduction in England. Seeing a young woman working in the fields clad in what was little better than a bundle of rags, she thought what an excellent effect a photograph of the poor creature would make. She mentioned the matter to the girl, who rather demurred, but at last said she didn't mind if the lady would come to her cottage when the day's work was done. The lady agreed, and at the time arranged went to the cottage with her camera, when to her disgust, she found the girl dressed in her Sunday clothes, with her face clean, her hair tidy, and looking altogether a presentable young woman. She hadn't the heart to disappoint the girl, but the photograph was perfectly useless for the purpose intended.

Equally unsatisfactory was the experience of Mr. Byles, of Bradford, who was about to photograph an eviction party dining in the fields, when he was "removed" by order of Captain Plunkett; a circumstance which that very irrepressible evening sheet the *Star* commemorates by a cartoon.

Apart from the question whether Captain Plunkett had any legal right to "remove" Mr. Byles, we cannot help commenting on the stupidity of the proceeding. The Government evidently does not wish eviction proceedings to be photographed, but they go the way to set every photographic tourist hankering after securing negatives of the forbidden scenes, and the thing is so easy with the detective camera nowadays.

The "Official Secrets" Bill prepared and brought in by Mr. Attorney-General, Mr. Secretary Stanhope, and Lord George Hamilton, and which has passed the House of Commons, is short, but very much to the purpose. Clause II. prescribes that anyone in the Queen's service who communicates a Government document, model, or sketch, to a foreign state, may be adjudged guilty of felony, and sentenced, if the court sees fit, to penal servitude to life as a maximum, and to two years' imprisonment as a minimum punishment. We only allude to the said Bill in this column because it is explained in Clause IV. that the expression "sketch," when used in wording of the measure, must be taken to include "*any photograph* or other mode of representation of any place or thing." Thus, if the Bill be literally construed, any civil servant sending a carte of a new kind of military balloon, say, to the Czar of Russia, or to the Shah of Persia, would render himself liable to imprisonment for life.

A suggestion as to the use of the camera at the latest fashionable craze—the Charitable Fancy Fair—comes from India. We read that at a function of the kind at Simla a number of the hill tribes were admitted, and, wandering about in their native costume, gave a very picturesque aspect to the scene. But this was not all, for Lady Lansdowne—who, it seems, is like her predecessor Lady Dufferin, an amateur photographer, "adjusted the tripod and the lens, and amused herself with taking pretty groups of hill women, besides numerous characteristics of the fun of the fair." Why cannot this idea be adopted in London? It would be certainly a novelty if, at a fancy fair in aid of an East End Hospital, a number of typical East-enders—'Arrys, 'Arriets, street Arabs, and hard working artizans and their wives—were admitted free, and permitted themselves to be photographed. The camera could also be used in the orthodox fashion, that is to say in taking portraits of the visitors. Nor would any skill be necessary, because if the visitor's portrait did not come out well, or refuse even to come out at all, he could not grumble or demand his money back, because if he did he would be met by the inevitable answer that it was all in the cause of charity—an argument which in the mouth of a lady is irresistible. On the whole it would appear that the advantages of the camera at a fancy fair have been sadly neglected.

Mr. W. Jerome Harrison, of the Icknield Street Science Laboratory at Birmingham, writing in the *Summer Annual*, of which he is English editor, says of Dr. Emerson's "Naturalistic Photography:" "If his work only succeeds in making the average photographer understand that he must study art principles, and go to painters and paintings for information, he will not have written in vain."

THE CENTENARY EXHIBITION IN PARIS.

BY OUR SPECIAL COMMISSIONER.

The Swiss Photographs.

The collection of photographs sent by the little republic of Switzerland next claims attention, from the circumstance of being in point of time so far in advance of that of most other countries, as in fact to share with the British display the honour of being ready for inspection when the photographic departments of other nationalities were either very incomplete, or not open at all. It was in this department that your Commissioner met with what appeared to him to be a very absurd piece of officialism, and one which at the time he supposed to proceed from the self-importance of the functionary in attendance, and not to be in accordance with any directions from the authorities. A similar thing, however, having happened to a companion whilst in another, the Algerian department, leads to the conclusion that there may have been some official rule, possibly

strained or imperfectly understood by the functionaries in question—which they took as warranting them in their interfereuce.

Whilst jotting down some notes relating to the photographic exhibits, au official, on whose cap was a band bearing the word "Suisse," came up aud demanded what your commissioner was doing. Upon being answered that he was writing his ideas, the official said that it was prohibited (*defendu*). This was too much for the writer, who, considering that such interference could not be authorised, told the man so, and continued his work, which he was allowed to do without further molestation. In the case of the official in the Algerian department, he was more persisteut, and insisted upon the putting away of the notebook and pencil.

Of the twelve exhibitors in the Swiss photographic department, the most important displays are those sent by F. & E. Boissonas, of Geneva, and by Orell Fussli & Co., of Zurich. The latter firm send a number of well-executed reproductions, amongst which some are described as photographs coloured by a new process—photochromes and litho-photographic prints.

Calling for special attention is a photograph of a sea scene, called "A Tempest in Algiers," in which there is a very striking effect of stormy waves. Another remarkable picture represents eight horses leaping a wall. There is, of course, variety in the positions, as such a leap is not taken absolutely simultaueously by the animals engaged; but all are good, and the definition is clear throughout the picture. The exposure also is sufficient, and the picture is very bright in effect. Whilst on the subject of equestrian photographs—of which there were also some examples in the French department—the writer may be permitted to refer to a reflection which occurred to him whilst looking at the paintings in the Gallery of the Beaux Arts. There is here a large painting by Reisshoffer representing the charge of the 9th Cuirassiers. In this picture the positions of the horses are not confined to the stereotyped attitudes which were so universal in the pre-Muybridge era, but are such as might be taken from some of the pictures of that pioneer of instantaneous animal photography, or from other photographs of detective character. The chauge in the ideas of the painters of equestrian subjects was not confined to this particular picture, although it was here very strongly marked; but the notion suggested itself very forcibly, that as photography has taught people to reject the erroneous conceptions and representations of the miniature painters and engravers of an earlier generation, when hands and feet were habitually made smaller than in nature, and eyes were made larger and wider apart than they really were, so the conventional form of the leaping horse is being abandoned for more real representations. It will be remembered that at first great complaints were made against portrait photographs of exaggerating those members which were not represented according to the couventioual standard—complaints which were only to some extent justified by the perspective effect of greater dimensions of nearer objects, but were mainly due to the false impressions which the constant representation of a false ideal had established. Perhaps, therefore, the idea that has been put forward that Muybridge's and other photographs of similar character do not so well represent as the conventional forms the impression produced upon the spectator, may iu time be discarded, and pictures of horses with representations such as are obtained by photography be generally accepted as satisfactory.

As might be expected in the Swiss department, several exhibitors send pictures of mountain scenery, and a fault that is commonly present in near representations of mountain summits and snow-clad rocks and glaciers is somewhat too prevalent here. The large shadows, in most cases, are too black and deficient in detail to be satisfactory. The exhibit of Lienhard and Salzborn struck the writer as an instance of this defect, damaging what would otherwise be a good series.

Otto Pfenniger has a set of carte, cabinet, and some larger photographs, the most striking of which is one at the top of the display, representing a child crawling upon the floor.

Romedo Guler, of Seefeld, has a set of photographs of hotels and bathing stations of the Canton des Grisons. These are mostly mountain scenes, and many of them suffer from that blackness in the shadows that has been before referred to. Some of the photographs, particularly the second from the left in the bottom row, are interestiug both as pictures and as showing the character of the cattle belonging to the region.

Wirth, of Zurich, shows a collection of photographic portraits and "tableaux de genre," the best of which is that of a lady with a domino. Other photographs in this collection are bright, and of a character such as is generally pleasing to the public, and calculated to sccure a good share of patronage.

Stephan's collection of photographic portraits is not very satisfactory. The faces are rather chalky, with short heavy shadows in the flesh.

J. Moegele has a large collection, including some striking photographs of dogs, one of which, of life size, is very fine. There are also two good life-size portrait heads; one of these representing an old man is the best, and does not show so much after-work as the companion picture.

R. de Greck, of Lausanne, has a bright set of pictures, all of large size, and generally pleasing in character.

F. and E. Boissonas, of Geneva, send a very large collection, illustrating various departments of photography. Amongst these are some excellent photographs of good size children; well exposed and having the shadows in the flesh luminous, and full of detail, offering examples from which many photographers attempting this kind of work may take most useful hints. Particularly noticeable is a picture of a child with tambour, the smiling expression of which is very charming, and is not detracted from, as is sometimes the case with such fortunate hits, by any slovenliness, or inferiority of the photographic work, that being of great excellence. Another striking picture is that of a child, also wearing a bright natural smile, standing by a river bank, and holding a flowering reed. The make-up of the photograph is very complete, and includes a reflection in the water of a part of the figure.

Mdlle. Elise Hinnen shows a set of characteristic mountain scenes, and some photographs including animal life; and Alex Flury has a dozen photographs of mountain scenery, one of which includes a group of about forty figures in the foreground.

ORTHOCHROMATIC PHOTOGRAPHY.

BY C. H. BOTHAMLEY, F.I.C., F.C.S.*

EOSIN DYES (*continued*).

Substitution.—It has already been stated that the eosin dyes are derived from fluorescein by the process of substitution. Chemists use this term to denote the expulsion of one or more of the atoms of hydrogen originally present in a molecule, and the introduction of an equivalent number of atoms of chlorine, bromine, iodine, or some other element. Not unfrequently a *compound radicle*—*i.e.*, a group of elements which behaves as if it were a single element, and can be transferred intact from one compound to another—plays a similar part to chlorine, bromine, iodine, &c., and can be substitued for an equivalent quantity of hydrogen. Amongst the more importaut of these compound radicles are *nitroxyl*, NO_2, the radicle of nitric acid; *ethyl*, C_2H_5, the radicle of ordinary alcohol; *methyl*, CH_3, the radicle of methyl alcohol or wood spirit; *phenyl*, C_6H_5, the radicle of benzene; and *hydroxyl*, OH. All the elements and radicles quoted as examples are monovalent or monad—*i.e.*, they replace one atom of

* Continued from page 379.

hydrogen. Elements or radicles which replace two atoms of hydrogen are divalent or dyad; those which replace three are trivalent or triad, and so on. The names of substitution derivatives are formed from the name of the original substance, and the name of the element or radicle which has been introduced, with the numerical prefixes mono-, di-, tri-, tetra-, &c., to indicate how many times substitution has taken place. For example: resorcinol, $C_6H_4(OH)_2$, is *di-hydroxy-benzene*, because two of the atoms of hydrogen in the original benzene, C_6H_6, have been replaced by two hydroxyl groups, OH; $C_6HBr_2(OH)_2$ is *dibrom-resorcinol*, because two of the atoms of hydrogen in the resorcinol have been displaced by two atoms of bromine; $C_6H_2(NO_2)(OH)_2$ is *nitro-resorcinol*, because one of the hydrogen atoms has been replaced by a nitroxyl group, NO_2. Chlorine, bromine, iodine, and fluorine are, as is well known, called the *haloid elements* or *halogens*, and the derivatives which contain them are termed generically haloid derivatives.

Chloro-, bromo-, and in many cases iodo-, derivatives are obtained by the direct action of chlorine, bromine, and iodine; and nitro derivatives by the action of nitric acid of suitable strength, but in many other cases a less direct method has to be employed. In the formation of nitro-derivatives water is likewise produced—as, for example, in the preparation of nitro-benzene—

$$\underset{\text{Benzene.}}{C_6H_6} + \underset{\text{Nitric Acid.}}{HNO_3} = \underset{\text{Nitro-Benzene.}}{C_6H_5.NO_2} + \underset{\text{Water.}}{H_2O}$$

When haloid derivatives are obtained by the direct action of the halogens, the hydrogen which is eliminated combines with an equivalent quantity of the halogen, forming hydrochloric, hydro-bromic. or hydriodic acid, as the case may be. For example, in the formation of mono-, chlor-benzene—

$$\underset{\text{Benzene.}}{C_6H_6} + \underset{\text{Chlorine.}}{Cl_2} = \underset{\text{Mono-Chlor-Benzene.}}{C_6H_5Cl} + \underset{\text{Hydrochloric Acid.}}{HCl}$$

and in the formation of dibrom-resorcinol.

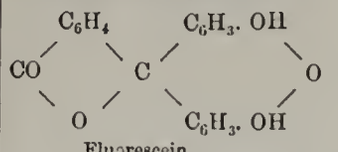
$$\underset{\text{Resorcinol.}}{C_6H_4(OH)_2} + \underset{\text{Bromine.}}{2Br_2} = \underset{\text{Dibrom-resorcinol.}}{C_6H_2Br_2(OH)_2} + \underset{\text{Hydrobromic Acid.}}{2HBr}$$

It will be seen that only half the halogen enters into the substitution derivative, whilst the other half combines with the hydrogen which is eliminated. In preparing these derivatives it is therefore necessary to employ double the quantity of halogen that will eventually exist in the product of substitution.

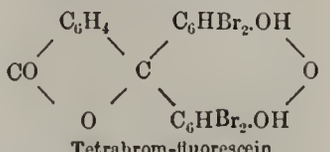
Returning now to fluorescein, and examining the structural formula already given (p. 378), we see that it contains three distinct benzene residues, C_6H_{6-x}, and it is evident that further substitution may take place in one, two, or all of them. It is important, however, to observe that two of these residues are similar in composition and in function, and represents the original resorcinol, whilst the third is different from the other two; it contains four atoms of the original hydrogen instead of only three, has a different function, and represents the original phthalic anhydride. From these considerations we should expect to be able to obtain three distinct groups of substitutiou derivatives—namely, those in which it has taken place in the resorcinol residues, those in which it has taken place in the phthalic anhydride residue, and those in which it has been effected in both ways. Derivatives of all three classes do actually exist. Further, the products may be divided into *simple derivatives* which contain only one substituting element or radicle, and *mixed derivatives* which contain two or more. We shall have to deal with several examples of both classes.

It is evident that the number of fluorescein derivatives theoretically possible is very large. It is still further increased by the fact that the fluorescein derivatives contain the two hydroxl groups present in the parent fluorescein, and hence have the power of forming metallic derivatives or salts. The metallic derivatives which it is possible to form are of course very numerous, and the hydrogen of the hydroxyl may be replaced not only by metals, but also by compound radicles, such as ethyl, methyl, &c. It is unnecessary even to meution all the derivatives which are actually known, and atteution will be given only to those which are made on a large scale, and are likely to be met with in actual practice.

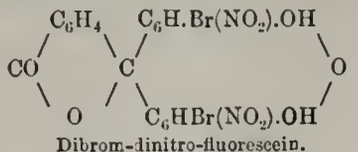
The composition of the more important derivatives and their relation to fluorescein and to one another is indicated by the following formulæ:—



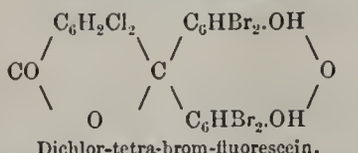
Fluorescein.



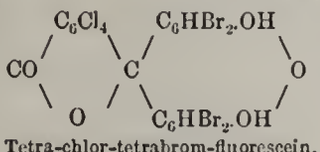
Tetrabrom-fluorescein.



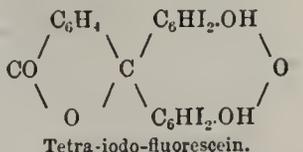
Dibrom-dinitro-fluorescein.



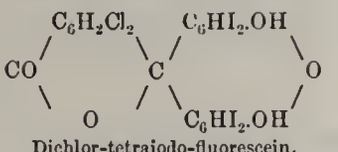
Dichlor-tetra-brom-fluorescein.



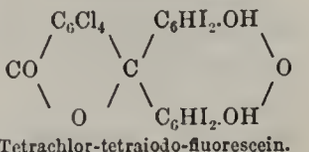
Tetra-chlor-tetrabrom-fluorescein.



Tetra-iodo-fluorescein.



Dichlor-tetraiodo-fluorescein.



Tetrachlor-tetraiodo-fluorescein.

Although the systematic names of these compounds seem long, they are formed in accordance with the principles of nomenclature already explained, and it will be observed that they actually represent the composition of the derivatives which they denote. In some cases, however, shorter and more convenient names have been given to the compounds, and are in constant use; they are as follows:—

Tetrabrom-fluorescein = Eosin.
Dichlor-tetrabrom-fluorescein = Phloxin.
Tetra-iodo-fluorescein = Erythrosin.
Dichlor-tetraiodo fluorescein = Rose Bengal.

The question of special trade names and their numerous peculiarities will be discussed later on.

General Properties.—The substituted fluoresceins or *eosins*, in the free state, are solid substances with a colour which varies from orange red to a brownish or purplish crimson. When obtained by precipitation they are usually amorphous, but they can in most cases be obtained in a crystalline form by crystallisation from some suitable solvent, and they then show the peculiar green metallic lustre which is observed with so many coal tar dyes. The free eosins are practically insoluble in water, but dissolve to a considerable extent in alcohol, especially on heating. As a rule the alcoholic solution of a free eosin shows no fluorescence. They also dissolve to some extent in hot glacial acetic acid, are less soluble in ether, and almost insoluble in benzene. They dissolve readily iu water which contains even a small quantity of an alkali such as ammonia, caustic potash, or caustic soda. The crystallised eosins are much less readily soluble than the same compounds in an amorphous condition. The differences between the eosins and fluorescein are much greater than those usually observed between substitution

derivatives and the parent substance. The replacement of part of the hydrogen by halogens has resulted in the production of compounds the tinctorial powers of which are enormously greater than the tinctorial powers of fluorescein. Many of them exert an energetic selective sensitizing action on gelatino-bromide plates, whilst fluorescein is at best a feeble sensitiser. They are also less easily soluble, and crystallise more readily.

The acidic properties—or, speaking more correctly, the phenolic properties—of the eosins are considerably stronger than the phenolic function of fluorescein, a result which is frequently observed to follow the introduction of the halogens or nitroxyl into a molecule. The substitution of ammonium, potassium, sodium, silver, lead, and other metals for the hydrogen of the hydroxyl groups (see the formulæ) yields a series of compounds which are often termed salts, because to a certain extent they are analogous to the metallic derivatives of the true acids. They are, however, somewhat less stable. The hydrogeu of the hydroxyl may also be replaced by organic radicles such as ethyl, methyl, and phenyl, which give rise to the so-called ethereal salts, and we shall meet with instances in which this hydrogen has been partly replaced by a metal, and partly by one or other of the organic radicles.

The relatiou between these so-called salts aud the free eosin is indicated in the simplest way by the followiug formulæ :—

$C_{20}H_6Br_4O_3(OH)_2$	$C_{20}H_6Br_4O_3(OK)_2$	$C_{20}H_6Br_4O_3(OAg)_2$
Eosin.	Potasium Salt.	Silver Salt.
$C_{20}H_6I_4O_3(OH)_2$	$C_{20}H_6I_4O_3(ONa)_2$	$C_{20}H_6I_4O_3(OK)(OC_2H_5)$
Erythrosin.	Sodium Salt.	Potassium Ethyl Salt.

The constitution of these salts will perhaps be more easily understood if refereuce is made to the structural formulæ of the free eosins, bearing iu mind that the metals and basic radicles take the place of the hydrogen in the hydroxyl (OH) groups.

The nomenclature of these salts is not yet very systematic; sometimes they are called eosides or eosinates, as potassium eoside or potassium eosinate, silver eoside or silver eosinate, silver erythroside or silver erythrosinate, potassium ethyl erythroside or erythrosinate, and so on; sometimes the names are formed by placing the name of the metal or radicle before the name of the eosin without altering the termination of the latter, as potassium erythrosin, silver erythrosin, silver eosin, ethyl eosin, methyl eosin, &c.

The ammonium, potassium, and sodium salts, aud some of the silver salts of the eosius, differ from the free eosins in beiug readily soluble in water, whilst the other silver salts, and the salts of most of the other metals, are even less soluble in water than the free eosins. All the silver salts dissolve in ammonia, and all the salts dissolve to a considerable exteut in alcohol. It is noteworthy, however, that whereas the free eosius are insoluble iu water, but dissolve in alcohol, the salts which they form with the alkali metals sodium and potassium, and with ammonium, are less soluble in alcohol than they are in water. All the salts are practically insoluble in benzene, but some of them dissolve to a slight extent in ether. When many of the insoluble metallic salts of the eosins are treated with a caustic alkali or an alkaline carbonate, they are decomposed, the metal being separated in the form of an insoluble hydroxide or carbouate, whilst the eosin goes into solution in the form of an alkaline salt.

With scarcely any exception, the eosin dyes met with in commerce are sodium or potassium salts, and are soluble in water.

The behaviour of solutions of soluble cosin salts when mixed with acids is of some importance, especially when it is desired to add such a salt to an emulsion which has been acidified with, say, hydrochloric acid. When a soluble eosin is mixed with nitric, hydrochloric, or sulphuric acid, the metal combines with the acid, and forms a nitrate, chloride, or sulphate as the case may be, and the eosin is set free, thus—

$C_{20}H_6Br_4O_3(OK)_2$	+	H_2SO_4	=	$C_{20}H_6Br_4O_3(OH)_2$	+	K_2SO_4
Potassium Eosin.		Sulphuric Acid.		Eosin.		Potassium Sulphate.

$C_{20}H_6I_4O_3(OK)_2$	+	2HCl	=	$C_{20}H_6I_4O_3(OH)_2$	+	2KCl
Potassium Erythrosin		Hydrochloric Acid.		Erythrosin.		Potassium. Chloride

Now siuce the free eosins are insoluble in water, especially if the water is acidified, it follows that the addition of an acid to an aqueous solution of an eosin produces a precipitatc of the free eosin. With nitric, hydrochloric, or sulphuric acid in slight excess, decomposition is complete, aud after the flocculent orange red, crimson, or purplish crimson precipitate has settled, the supernatant liquid is colourless. With acetic acid decomposition is sometimes incomplete, and part of the eosin remains in solution in the acid liquid. If in any case a sufficient quantity of ammonia, caustic potash, or caustic soda is added to neutralise the acid and reconvert the precipitated eosin into an alkali salt, the precipitate at once redissolves. When an acid is added to an *alcoholic* solutiou of an eosin salt, no precipitate forms, because the free eosins are soluble in alcohol; but the liquid loses any fluorescent properties that it may have possessed before addition of the acid. This latter fact iudicates that the eosin salt is really decomposed, but the free eosin is kept in solution by the alcohol. On addiug an excess of alkali the original fluorescence re-appears.

Before proceeding to study the optical properties of the eosin, we must briefly cousider certain chemical properties, a knowledge of which may possibly become useful in discussing the sensitising action of the dyes. When phthaleins are subjected to the action of nascent hydrogen they take up two additional atoms of hydrogen, forming a class of compounds known as the phthalins, which, however, readily undergo oxidation, and regenerate the phthaleius. The names of the two classes of compounds are distinguished by the terminatious *-ein* and *-in* respectively. If, for example, fluoresceiu is treated with nascent hydrogen (obtained from zinc powder and a solution of caustic soda) it takes up two atoms of hydrogen and forms fluorescin, which has the composition $C_{20}H_{12}O_3(OH)_2$. Fluorescin is colourless, and its salts form colourless solutions. This holds good generally; the phthalins and their salts are colourless, whilst the salts of the phthaleins have a high tinctorial power. Fluorescin readily oxidises, the additional two atoms of hydrogen being eliminated in the form of water, and fluorescein is again produced. This reaction also is general. When the haloid derivatives of fluorescein, *i.e.*, the eosins, are treated with nascent hydrogen, the haloids are removed in combination with hydrogen, and hydrogen takes their place, the original fluorescein being rengenerated.

$C_{20}H_6Br_4O_3(OH)_2$	+	8H	=	$C_{20}H_{10}O_3(OH)_2$	+	4HBr
Eosin.		Hydrogen.		Fluorescein.		Hydrobromic Acid.

The change is in fact just the reverse of the process of substitution. Further action of nascent hydrogen converts the fluorescein thus formed into fluorescein.

All the eosiu dyes are affected by light, and some fade very rapidly. At the present time we have no knowledge of the nature of the products which are formed. So far as regards the behaviour of the dyes upon fabrics, it is known that the iodine derivatives are somewhat more stable than the bromine derivatives, but that is practically all. The effect of light on these dyes is one of the questions which I have at present under investigation, and I hope to have some definite information before this series of articles comes to an end.

(*To be continued.*)

PATENT OFFICE LIBRARY.

LIGHT AND COLOUR.

BY CAPT. W. DE W. ABNEY, C.B., F.R.S.

Lecture IV.

In estimating the chemical action of radiation on a body, there are two factors to be considered, the intensity of the radiation acting, and the time during which it acts. This is very important. Thus, if a certain coloured surface be exposed to a radiation whose intensity we may call 100, which bleaches it in one hour, then, if a similar coloured surface be exposed to intensity 1, it will require 100 hours' exposure to effect the same amount of bleaching. There is an idea abroad that if the light be very feeble, no matter what length of exposure be giveu, it will not effect a bleachiug; this, however, is uot the case. The same proportion of the total energy absorbed by the body which, with intense radiation, effects chemical dccompositiou, on exposure to feeble radiation, is doing the samc kind of work. We may say, briefly, that the deductions from scientific experiments lead us to believe that if strong light causes fading, a feeble light will do the same, if the exposure to it be prolonged. The pendulum experiment, I think, fully illustrates what I mean. I will give you a rather fuller illustration, however. The amount of increased swing that light can give to the atom means an increase in the amplitude of a wave, and the amplitude of a wave in the sea is the height from the crest to the trough. Suppose we have a heavy church bell hung without friction on its supports, and without any resistance to its motion, and suppose it to make a complete swing once a second. Suppose also that at the end of the bell-rope there was a small horizontal plate, and at intervals of a second a thousand grains of water fell from a fixed height on the plate. The bell would gradually oscillate; the bell would be like this pendulum, aud finally it would oscillatc so greatly that the bell would ring. Now if, instead of 1,000 grains falling from thc samc height, we had but one grain falling every second, it would takc 1,000 times longer before the bell rung; or if the weight were $\frac{1}{1000}$ of a grain, it would take one million times as long before it rung. The work done by the dropping water may be looked upon as the work done by the amplitude of the wave of light on the atom, as it, too, moves without friction and without resistance.

As to the light to which pigments in watcr-colour drawings are ordinarily exposed, a few remarks may be made. There is no doubt that pictures as a rule are carefully protected from direct sunlight, but it is nevertheless true that the greater portion of the light they receive is reflected sunlight. On a bright day the clouds reflect sunlight, and on a dull day the diffused light is also sunlight, which is reflected according to the laws of geometrical optics, and a large per-centage reaches the earth from the clouds. There is also a fair proportion of light from the sky; this is bluer than that reflected or diffused from the weakened sunlight. In cases where the windows of a gallery are in vertical walls, which is the most ordinary case, and have an interrupted view of the horizon, the blue light reflccted is comparatively small, the light near the horizon being distinctly

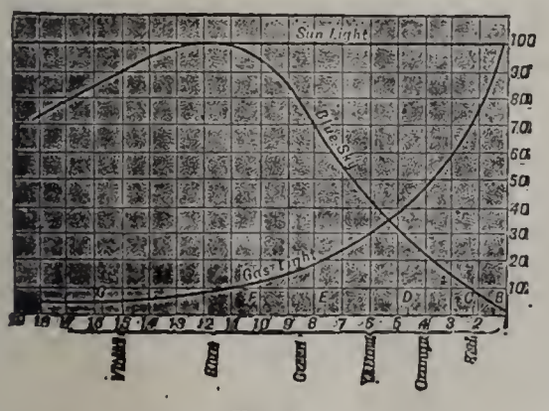


Fig. 3.

more like sunlight than that nearer to the zenith. In galleries lighted like those at South Kensington the light comes from above. The artificial lights to which water-colours are exposed are gas-light, electric arc, and incandescent lights. The first and last are very deficient in blue rays (see Fig. 3). You see, for instance, how

• Continued from page 412.

deficient gas-light is iu blue rays compared with sunlight or blue sky. Blue sky, you will notice, possesses hardly any red light whatever.

Now I think you will see why we were justified in exposing our pigments to sunlight instead of skylight. If you know the amount of blue rays that are in any particular light, and the amount of work such rays are capable of performing, it is quite fair to translate the action which one source of light has upon a pigment into the amouut of effect from a different source of light. That is to say, if I know what action sunlight will have upon a pigment, then from diagrams such as the above we can calculate the amount of action which skylight will have, and also the gas-light, whether the intensities of the total light are the same or different.

It is now necessary to explain to you how it was that we came to use three kiuds of glasses for our experiments to see which part of the spectrum was most effective. As a preliminary, I should like to show you that a pigment may be very rapidly acted upon, although apparently perfectly inappreciably to the eye. I have here two transparent films which werc treated with two dycs. Those two films were exposed behind a transparent cross to the electric light for ten seconds, and were then floated over with silver and a developer. From previous experiments we knew that where these particular dycs had been acted upon by light, there silver would be deposited on them, aud I think you will see that these two show that such is the case. The first film was dyed blue originally, and you will see where the light has acted the silver has deposited upon it. Here is another film, originally red, on which the same thing occurs. I want you to lay this thing to heart. Do not think that because an object does not visibly fade in a year that, therefore, it has not begun to fade at all. A year to one pigmcut may be the same as thirty seconds to anothcr pigment, and if you expose pigments for a year, which will only fadc as much as that particular pigment faded iu thirty scconds, then, applying this silver salt, you will probably get exactly the same action after a year's exposure as you did with that shorter exposure on the more fugitive colour.

One more experiment. Here I have a piece of paper which has becn impregnated with silver salt, and has also been dyed with a colour. I want to show you that the smallest action of light on this particular colour will cause the reduction of silver salt. I am going to expose the paper to the spectrum for ten seconds. [The paper here was developed.] You see in this case that we have a black band corresponding to the absorption spectrum of the dye with which it was dyed. This band is absent where the silver alone without the dye is acted upon. The dye has been acted upon, and thus caused a reduction of silver to takc place where it has been altered, although such alteration is perfectly invisible to the eye.

Now I can show you why we chose red, blue, and green glasses for our experiments. I want you to notice the different

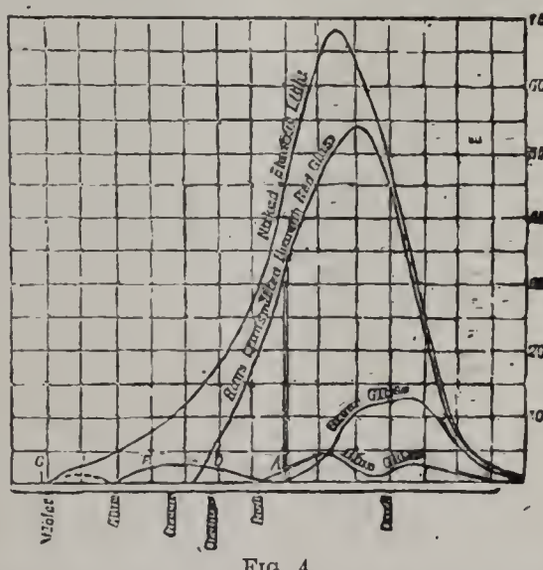


Fig. 4.

parts of the spectrum that these particular glasses absorb. Passing the glasses through the spectrum, the red glass allows the red, and a little bit of yellow and green to pass. With the green glass a great deal of the red is cut off, and all of the violet,

With the blue glass you will see that a great deal of the red is cut off. Thus, in the case of the blue glass, we have the blue principally left, in the case of the green the green principally left, and in the case of the red glass we have the red principally left. Now, suppose I put the red glass and the blue glass together, what would happen? We only ought to have a bit of the red of the spectrum left, and if I put the green glass with these we ought to have nothing left, which is the case. In other words, the rays transmitted by those three glasses make up the whole spectrum, so that when using those we are utilising the rays of every part of the visible spectrum. It was for this reason we chose those particular glasses through which to expose our pigments. Fig. 5 shows the heating effect of the light after passing through the different glasses. Notice the dark rays. They are nearly entirely transmitted through the red glass, very slightly through the blue and green glasses. Had the fading of the colours we have examined been due to the dark rays, it ought to have been shown beneath the red glass far more than under the green or the blue glass. This was not the case, as a reference to Table IV. will show. We may, therefore, say that the blue, violet, and ultra violet rays are

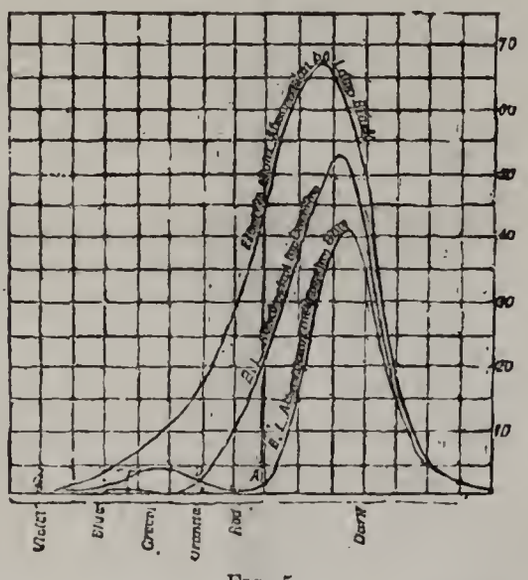


FIG. 5.

those which are by far the most active in producing a change in the pigments with which we have experimented.

I may say a word or two about the exposures we gave, and the results deduced. We exposed between May, 1886, and the middle of August, and we found that during that time these pigments had 705 hours of bright sunshine. That bright sunshine we reduced to so much sky light, and the total amount of effective sky light received in that time was 1,700 hours. Allowing for overcast skies, and for blue sky light and sun light, we find that these pigments had an average of 2,225 hours of average of blue sky—or, roughly speaking, 2,500. We may now go a step further, and calculate the amount of illumination which a picture shown in a gallery such as those at South Kensington would have during the same period. There is no direct sunlight, and making calculations from photometric observations, and seeing how much light came into the gallery, compared with that outside, we came to the conclusion that to have the effect on these pigments in the galleries which took place in the sunlight, we should have at least thirty-two years, supposing the light was always equally bright to that between May and August. But we know it is not equally bright, and we came to the conclusion that it would take 100 years to get the very little fading such as we got outside the laboratory in four months.

Now let us see what would happen to a pigment supposing it were exposed to gas light. Calculating the amount of blue light in such light, and also the total illumination in the gallery in question, we found it would require at least 2,000 years of continuous exposure for the same amount of effect to take place as occurred in the four months of sunlight exposure. After an exposure of one year and nine months, we have the astonishing result that to obtain fading of the same amount in the colours exposed, it would have taken 485 years of average daylight in the galleries to have got that amount of bleaching. If we had exposed it continuously to gas light, the time required is almost incredible to believe, viz., 9,600 years. With these facts before us I think you will say it is not at all surprising that we chose to use sunlight instead of any other source of light for our experiments. We wished to have whatever credit might attach to tracking out the cause of the fading. I am afraid that neither Dr. Russell nor myself are good for 480 years, and therefore we preferred to use the shorter time of one year and nine months in order to arrive at the conclusions we did.

The methods of measurement that I have brought before you are for the most part new, but I believe they can escape any very serious criticism. The details of many of the experiments from which our calculations have been derived have been published in various papers laid before the Royal Society and the Physical Society. I may say we have the greatest reliance on the accuracy of them.

Reviews.

PRACTICAL AMATEUR PHOTOGRAPHY. By *C. C. Vevers*. (Fourth edition. Crown octavo, 60 pages. Price sixpence. Leeds, 1889.—C. C. Vevers, 12, Market Street, Briggate; and New York: Ed. L. Wilson, 853, Broadway.)

WE have here a fresh issue of a convenient and favourably-known hand-book, containing much information in a little compass; and due prominence has been given to recent introductions.

Patent Intelligence.

Specifications Published.

5013. NEWNHAM BROWNE, of 73, Cheapside, in the City of London, for "Improvements in Apparatus for Hot-Rolling Photographs," which invention has been communicated from abroad by Hugo Engler, of 34, Prager Street, Dresden, in the Kingdom of Saxony and Empire of Germany, Photographer to the Royal Court of Saxony.—Dated 22nd March, 1889.

Hot-rolling apparatuses, as heretofore constructed, are defective, inasmuch as the photographs otherwise ready for delivery, are frequently spoilt when passing through the apparatus for the purpose of "enamelling" or polishing the surface, and this involves considerable loss to the photographer.

The adjusting-device provided directly under the polishing-bar or plate, prevents an even distribution of the flame and an even heating of the entire polishing bar or plate, so that equal polishing or "enamelling" of the entire surface of the photograph is not possible. The adjusting-device usually supports the polishing-bar or plate in a single point only, and the whole attention of the operator is therefore directed to the introduction of the photographs between the polishing-bar and the roller at that exact point, as otherwise uneven stretching causes distortion of the picture.

The chief cause for the spoiling of photographs is, however, the naked heating flame. The slightest draught causes the flame to flicker, so that the picture is scorched or stained by soot.

The present invention obviates these defects. The improved apparatus is shown in the drawings accompanying the specification.

Fig. 1 is partly an elevation, partly longitudinal section of the apparatus; fig. 2, a transverse section; fig. 3, a plan, and figs. 4 to 8 show details.

In this hot-rolling apparatus the polishing-bar *a* is combined with a double roof-like heating portion *b*, the latter carrying the former. The heater *b* is supported on standards *c*, *c*, and has arms *d*, *d*, on one side and an arm d^1 on the other. Under each arm a set-screw (*e*, *e* and e^1 respectively) is provided on the base plate, and these allow the polishing-bar to be exactly adjusted with reference to the roller *w*; a pin *f* passes through the screw e^1 and serves partly as a stop for the said screw, and also in conjunction with a graduated scale on the base plate as an index, showing the distance between the polishing-bar *a* and the roller *w*.

The flames *g* are provided within the heater *b*, and through the latter transmit heat to the polishing-bar. The heater

covering the flames protects the pictures against all contact with the flames as well as with the products of combustion.

To produce the friction required between the back of the photographs and the roller, in order to feed the pictures forward it was heretofore necessary to keep the surface of the roller roughened by artificial means. To obviate the recurrent labour of roughening, the present invention provides the following means.

Over the surface of the smooth roller *w*, made of washable material, a movable cover *h* is provided, this being lined with felt or other absorbent material. When the apparatus is to be used this lining is moistened with water, which is in minute quantities passed to the roller *w*, when the latter rotates, so that its surface is covered with a very minute film of water, which is partly evaporated by the heat radiating from the polishing-bar *a* and heater *b*, and as a vapour reaches the card of the photograph to be rolled. The card thus loses its rigidity or hardness, and becoming more elastic is better pressed against the polishing-bar. The dampness of the roller increases its adhesion to the pictrues, and perfectly replaces the roughening hitherto practised.

When the moisture of the lining decreases it is sufficient slightly to depress the cover *h* to press out the quantity of moisture required for dampening the roller.

To prevent injury to the surface of the polishing-bar *a*, as well as to that of the roller *w*, guard caps *i* are provided on the former, upon which the ends of the roller bear.

The Claims are :—

1. In a machine for hot-rolling photographs the combination of the polishing-bar with a roof-like heater.

2. In a machine for hot-rolling photographs the adjusting-device, consisting of the arms, set-screws, and index-pin and scale.

3. In a machine for hot-rolling photographs the arrangement of the flames within the heater.

4. In a machine for hot-rolling photographs, the moistening device consisting of a movable cover *h*, and the lining of felt or other absorbent material.

5. In a machine for hot-rolling photographs, the guard caps on the ends of the polishing bar.

3363. Michael Iljinsky, of Charlottenburg, near Berlin, Prussia, in the Empire of Germany, Chemist, for "Improved Petroleum Lamp for Photographic and other Purposes."—Dated 5th March, 1889.

A petroleum lamp with ruby chimney and flash-light attachment.

8535. William Harding Warner, of No. 3, Unity Street, College Green, in the City and County of Bristol, for "An Improved Photograph or Picture-holder."—Dated June 11th, 1888.

This consists of a stiffened back, or frame, or its equivalent, formed of any suitable material (hereinafter called the "frame").

To the front of this frame, and near its outer edges, I fix three or more clips, some being fixed and others movable. Preferably two fixed clips are placed near the lower front edge, and one movable clip near the upper front edge. By turning the latter clip upwards the picture can be readily placed so as to rest in the two lower clips ; the upper clip is then turned downwards so as to clip and thereby secure the picture in its place.

The clips may be made to secure glass, or other material, in addition to the pictures if desired.

The back of the frame is fitted with a hinged support or bracket, having a spring to make it incline outwards, whereby the holder is rendered capable of standing upon a table or other article. This support may be connected to the frame by means of a hinge formed with any elastic material, such as leather or cloth. The spring is made in two parts, one part fixed to the hinged bracket having its upper part formed with a bent hook. A corresponding hook is attached to the back of the frame to receive the spring hook. When the spring has pressed the bracket outwards a sufficient distance, the two parts of the spring arrangement become locked, and the bracket is fixed at its proper angle for supporting the frame. For packing and such like purposes, the bracket can be laid close to the frame.

Correspondence.

A DEVELOPER.

Sir,—We are pleased to inform you that we have made arrangements for the introduction into this country of Dr. Andresen's new developer Eikonogen, and from the information we have received we are led to believe this developer will surpass all others. Marion & Co.

AMATEUR SOCIETY FOR RICHMOND.

Sir,—It is proposed to start a Club for Amateur Photographers in Richmond ; communications respecting same to be addressed to me at the above address. Would you be kind enough to give us a notice in your paper to this effect ?

Railway Hotel, Richmond. Horace S. Hopkins.

Proceedings of Societies.

Photographic Society of Great Britain.

A monthly technical meeting was held in the small room attached to the Gallery, 5a, Pall Mall East, Mr. John Spiller, F.C.S., in the chair.

The Chairman referred to the papar recently shown by Mr. Warnerke, in which treatment only with water is required after exposure in the printing frame. He found the paper to contain iron, but no uranium, mercury, silver, or gold ; efforts to tone the image had failed to give satisfactory results. Ammonium sulphide immediately blackens the paper for the formation of sulphide of iron ; platinum also appears to be absent.

Mr. Spiller mentioned that he only had a piece about two inches square.

There was a good deal of conversational discussion as to the old prints of Robert Hunt, obtained by iron methods.

Mr. Friese Green said that a simple solution of hydroquinone serves well to clear yellow negatives or emulsion prints on paper. After fixing and washing, an immersion for a few seconds in a solution of hydroquinone, one part of a 10 per cent. solution and sixteen parts of water, serves to clear away all trace of yellowness. A moderate washing serves to remove the hydroquinone.

The next meeting will be the technical meeting of July the 23rd, an interval of four weeks. After the meeting had closed, the desirability of organising an informal out-door meeting on the afternoon of the second Tuesday in July was discussed, and appeared to be generally approved of.

London and Provincial Photographic Association.

The usual meeting was held on the 20th inst., Mr. H. M. Hastings in the chair.

Mr. T. V. Kerr showed a series of diaphragms he had made in vulcanized fibre. He considered this material was well adapted for purposes of this kind ; it was unbreakable, and possessed other advantages over the ordinary brass stops.

Mr. A. Haddon believed the material contained no india-rubber ; he believed it to be cellulose of some kind, probably treated with chloride of zinc.

Referring to the adoption of the metric system, Mr. W. E. Debenham was not in favour of it ; he gave a decided preference to the duodecimal system, which he believed would ultimately be adopted. Until this was the case, he preferred the present system.

Question from the box :—"In calculating the size of the aperture of stops for single lenses, should the distance between the lens and plate, or between the stop and plate, be taken ?"

Mr. W. E. Debenham replied that the distance between the lens and plate should be calculated.

Mr. H. H. Summers was elected a member of the Association.

North Surrey Photographic Society.

The fortnightly meeting of this Society was held on the 18th inst.

Mr. Valentine Blanchard gave a demonstration of his new platinum process, which was greatly admired by the members present. Questions were freely asked, and some discussion entered into, and a hearty vote of thanks was accorded to Mr. Blanchard.

The Hon. Sec. announced the subjects of five prizes for competition during the next session, beginning October 8th, to which date the Society adjourns its formal meeting ; informal conversational meetings will, however, be held fortnightly during the recess.

The meeting then joined heartily in wishing one of its members, Mr. Bellsmith, a pleasant journey home to America, where he is returning after nine months' sojourn in this country.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE ordinary meeting of the above Society was held at the Club Rooms, Colmore Row, on Thursday, 20th inst., when there was a large attendance. Mr. B. KARLEESE occupied the chair.

Dr. HUXLEY gave his paper on "Platinotype." He commenced with a short description of the chemistry of the process, and a capitulatiou of the various failures which might beset the tyro in starting, explaining the reason why, and how they may be avoided, &c. He then proceeded with a practical demonstration of the *hot process*, giving minute details, and producing very fine pictures. The *cold process* was then gone into, and, lastly, the *Pizzighelli paper*. On comparing the results, the hot process received the most favour.

Mr. A. W. WILLS, J.P., asked what sort of negatives were required for this platiuotype process? He had tried it, and to his idea had failed with it. He considered his attempts produced flat, stale, and unprofitable pictures. He had been informed that his negatives wanted more "pluck," and had a want of contrast of light and shade. Now, he always endeavoured to obtain delicate negatives (without violeut contrasts), and these gave him excellent silver prints.

Dr. HUXLEY, in reply, said: Mr. Wills's uegatives would give good platinotypes; in fact, a negative from which it was difficult to obtain a silver print would yield, by proper treatment, a good platinotype. He always sensitized his own paper (hot process), and when using a thin negative, or one void of great contrast of light and shade, he sensitized with a weak solution, and for a negative with great contrast, a strong sensitizing solution (he here demonstrated the sensitizing of the paper). The full instructions with paper and solutions cau be obtained from the Platinotype Co.

The fine results of these beautiful processes, and the practical instruction given by Dr. Huxley, were much commented upon by those present. After the discussion,

Mr. W. JEROME HARRISON moved, as a recommendation to the council, "That this Society endeavour to organise a Photographic Survey of the County, or parts of the County of Warwickshire." Carried *nem. con.*

"Portrait Paiuting as Applied to Photography" is the subject of Mr. Serchall's paper on July 18th.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

AN excursion of the above Society took place on Thursday, June 20, when members and friends to the number of thirty jourueyed to Rowsley, and thence by carriage to Haddon Hall, being joined at Loughboro' by a few members and friends connected with that Society. Favoured with glorious June weather, the party set to work, some securing the courtyard with its quaint gargoyles, battlemented turrets, and mullioned windows, others focussing the famous terrace and "Dorothy Vernon" steps. Having a master key of all the rooms, the party were free to wander at will, and soon found themselves embarrassed with choice of subjects, the ball-room securing attention from most of the members, while others devoted a plate to the chapel, to the banqueting-hall, and the Elizabethan bedchamber. Of the exterior of the Hall, and the famous "Dorothy Bridge," several good negatives were secured.

On the homeward route the party called at Derby, where they were met by several members of the Derby Photographic Society, inviting their attendance to au art exhibition in connection with their Society. Time, however, not permitting, it was resolved to postpone the pleasure.

One hundred and ten plates were exposed by the members, ranging from 10 by 8 to half-plate, with, as far as has been ascertained, excellent results.

PHOTOGRAPHIC CLUB.

THE subject for discussion on July 3rd will be "Copying." Saturday outing at Hanwell.

*** Everything relating to the Literary Department of the PHOTOGRAPHIC NEWS, excepting questions requiring reply in the section devoted to "Answers to Correspondents," and contributions with regard to which arrangements have been made privately, should be addressed to "The Editor," while advertisements and communications respecting the sale of the paper should be forwarded to the Publishers, Messrs. Piper & Carter, 5, Furnival Street, London, E.C. Questions of a kind previously dealt with by the Editor under the heading "Answers to Correspondents," (but not letters intended for insertion under the heading "Correspondence") should now be sent to Mr. Spiller, who is alone responsible for all which appears under the heading "Answers to Correspondents." Such communications, if now sent to the Editor, are forwarded by him to Mr. Spiller. Failure to attend to the above instructions may lead to disappointment.

Answers to Correspondents.

This column is now under the charge of Mr. John Spiller, F.C.S., whose long and varied experience in many branches of photography, and particularly of its scientific and technical aspects, is placed at the disposal of our subscribers. Letters may either be addressed to him, care of the Publishers, Messrs. Piper & Carter, PHOTOGRAPHIC NEWS, 5, Furnival Street, Holborn, E.C., or sent direct to his London address, 2, St. Mary's Road, Canonbury, N.

D. S. (Gand).—Silver medals are gained very easily in Belgium; the illustrations to which you call our attention are not such as would carry this award in England. Neither is the micro-photograph in any way remarkable. Of course it is possible to combine hydroquinone and pyrogallol; but where is the advantage of using mixtures when either alone will do the work?

OLD TIME.—The seconds pendulum for Greenwich or London, at sea-level, should measure 39·14 inches. With this you should get correct time if you are careful to mark off from the centre of the bob. The length does not exactly correspond with the French metre, which is 39·37 inches.

NITRO.—The patent is No. 5270, dated April 9th, 1888. We are not called upon to give an opinion, and will only say that the highest nitro-cellulose (explosive cotton) is not likely to be degraded or "denitrated" by immersion in nitric acid of specific gravity 1·32.

L. E. M. (Croydon).—The new amido-saccharine discovered by A. Noyer is said to be very much sweeter than the normal saccharine, and to be only sparingly soluble in cold water. Its solution in hot water shows a pronounced blue fluorescence like quinine; but it must indeed be strikingly different in flavour, for the new substance is described as "possessing an intense and persistent sweet taste."

STUDIO (Tamworth).—The aspect should be determined by local circumstances almost as much as by the points of the compass needle. If, as you say, the high trees shut off your best northern light, it might be advisable to use ground glass on that side. As a rule, get all the light you can, and screen off, at the time of sitting, what you do not want.

CAMEROSA.—The red-gum wood of Australia is very close and compact, and does not splinter like teak. We should think it would be very heavy for camera framework; but possibly its extra strength might permit of thin and slender measurements.

D. M. (Walsall).—There are points of similarity as regards manipulation, but, seemingly, enough novelty for the granting of a patent. Look up that taken out just a year ago.

W. B.—Thanks for your letter; we should be glad to have particulars of the emulsion process for reproductions to which you refer.

PRINTERS' INK.—We have not yet seen Prof. Noelting's book on aniline black. It would not be likely that the substance named should enter into competition with carbon for ink making.

G. T.—Platinotypes are unquestionably permanent, and the process is capable of rendering half-tone and gradation quite as well as the ordinary method of silver printing. It always does full justice to a good negative.

CHLORIDE.—It has been often asserted that the nature of the chloride used for salting the paper intended to be used for silver printing has some influence on the later stages of the process. Mr. Robert Hunt claimed a special advantage for the chloride of cobalt (see last week's NEWS, p. 411), but this may arise partly from the fact of a deliquescent salt—in this instance, the nitrate of cobalt—being left in the paper. On account of its low atomic weight, sal-ammoniac (chloride of ammonium) ought to be superior to common salt. Barium chloride was at one time in vogue, but we fail to see any advantage in its use.

BOLD BRITON.—You will have to adopt the Continental system of weights and measures, for they meet with general approval, and lend themselves to decimal proportions. Any change is inconvenient for a time, but in face of concurrent recommendation it is not wise to insist upon the retention of grains and fluid ounces. Old formulæ will have to be translated, and the sooner this is done the better for all.

W. L. (Partick).—You are right in your description of the sea-weed illustrations (two vols., edited by a lady) put up at auction sale in March last. Returned photo has come safely to hand.

EXHIBITOR.—The regulations governing the reception of pictures and apparatus at the forthcoming exhibition of the Photographic Society were published in the NEWS of 14th inst. (see page 387). The names of the judges are also given.

A. C. L.—The marvellous rapidity with which the portraits of the Shah were got ready for publication during his previous visit to this country was made the subject of editorial comment at the time. They were done on that occasion by the Woodburytype process.

TRANSFER.—The late Sir William Newton was probably the first to succeed in stripping collodion negatives from their temporary glass support. Search the records of thirty years ago or earlier.

PATENT OFFICE LIBRARY

THE PHOTOGRAPHIC NEWS.

VOL. XXXIII. No. 1609.—*July* 5, 1889.

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OPTICAL LANTERN ADJUNCTS.

AT a recent *conversazione* of the Royal Society at Burlington House, Mr. Eric Bruce, of Oxford University, exhibited an interesting new adjunct to the optical lantern, and one which will tend to still more popularise that useful instrument. The principle of the invention may be explained by means of the accompanying diagrams.

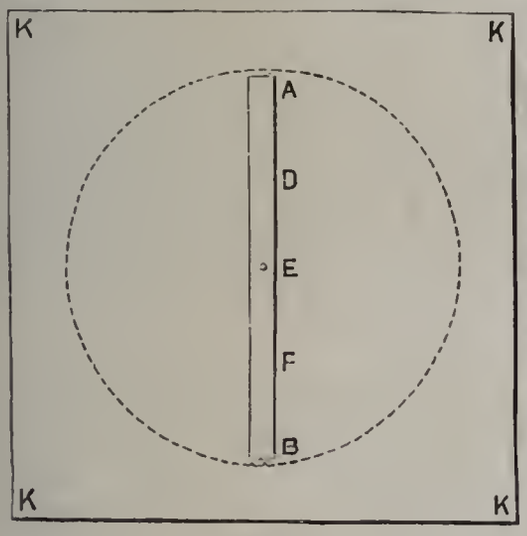


Fig. 1.



Fig. 2.

In fig. 1, A B is a light wooden lath about two feet long, painted white. It is mounted upon a horizontal axis at E, and when in use is made to rotate at high speed by means of a little piece of electro-magnetic apparatus. In rotating, the two ends of the lath describe the circle indicated by the dotted line. A blackboard, K K K K, which should have an unpolished surface, is placed two or three yards behind the lath. The lantern, which is placed in front of the rotating lath, is made to project an image thereupon, the whole of which image is visible to the observers because the principle of persistence of vision comes into play; at the same time objects behind the image can be seen, the rotating lath not having the power to cut them off from view, so that the luminous image cast by the lantern is seen standing apparently in mid air. The lath must be accurately mounted, otherwise a slight flickering or tremulous appearance is given to the image. The object of the blackboard is to receive the out-of-focus image, but partially cut off by the rotating lath, and to so greatly reduce its luminosity that the secondary image shall draw little attention.

The image received by the lath is not of equal luminosity throughout, because at A and B much more light passes the rotating lath than is reflected by its surface; at D and F, in consequence of the smaller circle described, more light is caught by the lath, whilst at the centre E the whole of the light is received by the lath, and none passes to the blackboard. This defect, which is not glaringly apparent except to critical observers, might be largely remedied by altering the shape of the lath, either by cutting away the shaded portions represented in fig. 2, or by painting those portions dead black.

A highly luminous image representing a white angel was shown by Mr. Bruce at the Royal Society gathering, also a few nights later to the company in the library of the Royal Institution, after the close of a Friday evening lecture. At the latter place no blackboard was used, and the secondary image was chiefly received by the dark bindings of some of the books upon the shelves, so as to obtrude rather more upon the attention than when received upon a dead black surface.

Mr. Bruce, in the course of the year 1886, invented and patented a method of giving relief to certain objects at will in optical lantern pictures by the projection of the picture partly on a screen directly visible to the observers, and partly on a screen reflected to come within range of their vision. The screen directly seen by the observers is translucent and near the back of the theatre, and a portion of the picture is projected upon it by a lantern behind. Between this screen and the observers is an inclined plate of clear glass, in which the other part of the picture is seen by reflection, and is produced by the aid of an optical lantern beneath the stage, and an inclined screen below the level of the stage, but in front of the sheet of glass. The arrangement of this screen and glass plate is much the same as in the optical illusion which created so much sensation in London when it was first publicly exhibited by Professor Pepper at the Polytechnic. A public exhibition by Mr. Bruce of his method of projecting lantern views as just stated might be of interest.

PHOTOGRAPHIC OPTICS.

BY W. K. BURTON.

CHAPTER IV.—THE FORMATION OF THE IMAGE IN THE PHOTOGRAPHIC CAMERA—PHOTOGRAPHIC LENSES.

WE now come to consider the way in which the image is actually formed by the lens in the photographic camera.

It is a very old experiment to make a small hole in the shutter of a darkened room, and to place opposite to this hole, and at some distance from it, a sheet or any other white screen, when an image—somewhat blurred, but still recognisable—of whatever scene may be outside the window is obtained. The image is formed by light passing from all points of the object through the hole in the shutter and

falling on the screen. The blurring is due to the fact that the light coming from a point reaches the screen as a disc at least as large as the hole. We may stop down or decrease the size of the hole, but the result is, that whilst

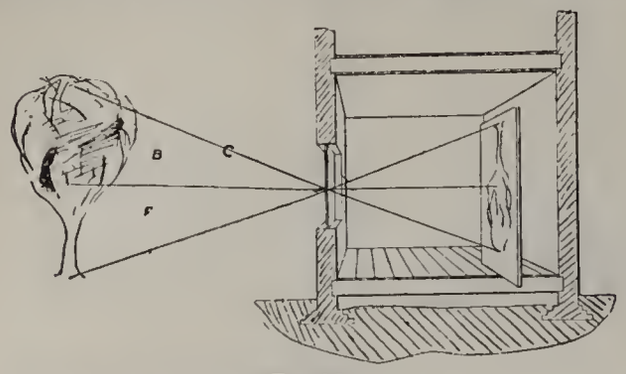


Fig. 15.

we increase the definition or sharpness of the image, we lose brightness, because we cut down the amouut of light. It is here that the lens comes in. The function of a converging lens is, as has been explained, to cause parallel rays to come together at a poiut. It will perform the same function for slightly divergent rays. We have then merely to place in the hole in the shutter a lens of such form that it will cause the rays which fall on it from the scene outside to converge to points on the plaue of the screen, when we get a sharp image, even if we greatly increase the size of our opening.

The action of the lens is here indicated by a sketch.

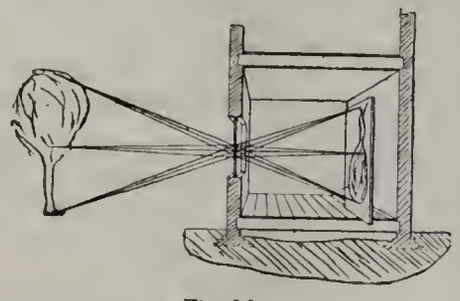


Fig. 16.

I have here, for the sake of simplicity, shown a double-convex lens without correction for chromatic aberration or for any other defects, and, as a matter of fact, even such a lens will give, with a considerable apertuie, a better image as regards definition than wi l be got with quite a small aperture without a lens. It will, however, give nothing like the definition needed in photography, and is defective in many ways. The whole science of photographic lens making consists in doing the most possible to overcome the defects inherent in a lens such as that shown. I say the "most possible," because to overcome them entirely is not possible, for the reason that a complete correction of one defect would generally lead to the increase of others. As a conseqnence, the whole thing has to be a compromise. The errors are compromised in various ways; hence, various forms of lenses. The different forms are for the most part adaptable to different uses, becanse, in certain cases, some particular fault is less tolerable than in others, and may be allowed to exist in order to get rid of other faults which might be, in that particular case, entirely damning. To take an example. The requirements in a lens to take a portrait are quite different from those in one for landscapes. In the former case, if the instrument gives the head and the principal parts of the figure sharp, the rest may be more or less in poor definition, or blurred; bnt we require great rapidity of action. In the case of the latter, we need sharp definition everywhere, but rapidity is not of consequence. Again, in the case of architectural work, no distortiou is allowable, or straight lines will be shown as curved liues. In pure landscape work, where there are no straight lines, a little distortion is quite imperceptible, and a simple form of lens haviug certain advautages of its own may be used.

As photographic leuses are, in practice, constructed to compound for certain defects, so as to make each form of lens adaptable to certain uses, it is necessary, before going farther, to say a few words ou such defects, and to explain terms commonly used in speaking of lenses.

A lens is, strictly speaking, a single piece of a transparent substance fashioned into one of certain forms, as described in the last chapter; but in photography the term is used both in this sense and as describing an arrangement of several such leuscs—often four or eveu more—as will be presently illustrated. Indeed, the way in which this term and some others are used is very puzzling, and often leads to confusion. Thus we have the word used in the two senses just given. Then agaiu a "single lens" generally means two, sometimes three lenses cemented together. The same arraugement is often described as a "combinatiou," so that a "siugle lens" and a "combination" may mean the same thing. The word "combinati n" also describes any arrangement of lenses very close together in oue cell—whether they are cemented oue to the other or not. A more correct term is "element."

The focal length of a leus is, roughly speaking, the distance between the leus aud the plaue where a sharp image is obtained. More correctly speaking, it is the distance between the poiut through which pass lines joining points in a distant object, and corresponding points of the image of that object, and the plane where parallel rays are brought to a focus. Farther on, various ways will bc described of practically measuring the foci of lenses.

The terms "equivalent focus" and "back focus" are very frequently heard. Equivalent focus really simply means focal length. It is applied to compound lenses in which a direct measurement from one of the elements cannot be made. The idea conveyed is that this is the focal length of an "equivalent" lens—one giving the same size of image, &c.—of the form of a small double convex glass. In such a lens the measurement may be from the centre of the glass.

The term "back focus" means only the distance between the back combination or element and the ground glass when a distant object is focussed. It is scarcely ever of any moment to know it, and, indeed, it would almost seem as if the term had been invented by opticians for the sole purpose of hopelessly confusing the uninitiated, already sufferiug from quite sufficient confusion in the matter of lenses.

The optical centre of a lens is the point through which pass the axes of pencils of light. It is common to measure the focal length from this point, but the practice is not strictly correct.

The aperture of a lens is the diameter of the glasses, or of the smallest opening that light has to pass through in the lens. It is commonly stated in terms of the focal length thus—f, f, f, these terms meaning apertures $\frac{1}{4}$th, $\frac{1}{8}$th, and $\frac{1}{11}$th of the focal length, whatever that may be.

Diaphragms or Stops.—In many, or in fact most, lenses the light has to pass through an opeuing smaller in diameter than the lenses. This opening is termed the fixed stop. Most lenses have, and every lens should have, a series of moveable discs with round openings of varions diameters in them for reducing the diameter of the aperture when it is fonnd desirable so to do. These are called diaphragms or stops, although the first of the two terms is not a very correct one.

Spherical Aberration.—If it were possible to make a lens in which parallel rays of light were caused to meet at a mathematical poiut, such a lens would be devoid of spherical aberration. As a matter of fact, certain compound lenses—especially telescope objec'ives of a high class—come very near to perfection in this respect; but, in the case

of a simple lens with spherical surfaces, the rays by no means all meet at one point—those which impinge on the margin of the lens coming to a focus, or meeting, nearer the lens than those passing through points near the centre. Fig. 17 illustrates the condition we have described.

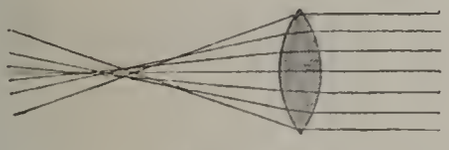


Fig. 17.

The practical result of the existence of spherical aberration to any marked extent in a lens is that it will not give a sharp image. One of the uses of stops or diaphragms is to reduce spherical aberration, most lenses showing a great amount of this defect if worked with the full aperture of the glass.

Chromatic Aberration has, to all intents and purposes, been defined in the last chapter. It is the defect in a lens which causes it to bring light of different colours to focus at different points. The method of correcting it has also been given. Chromatic aberration to quite a marked degree was a very common defect with the older forms of photographic objectives, and it was generally necessary with these to make an allowance for it by racking the camera a short distance after focussing, or by allowing for the defect in the position given to the focussing glass; but modern lenses seldom show the defect to any appreciable extent.

Roundness of Field and Flatness of Field.—In treating of the formation of an image at the beginning of the chapter, we assumed that a lens will bring rays or pencils of light to focus in a plane. As a matter of fact, however, no lens does so; but, on the contrary, every lens brings pencils to a focus on a field more or less curved. A small bi-convex lens will bring them to focus very nearly on a sphere having the lens as centre (see illustration).

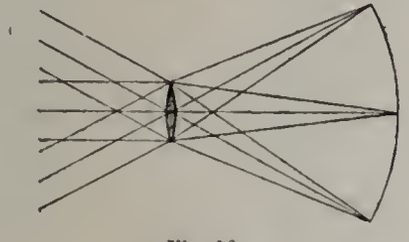


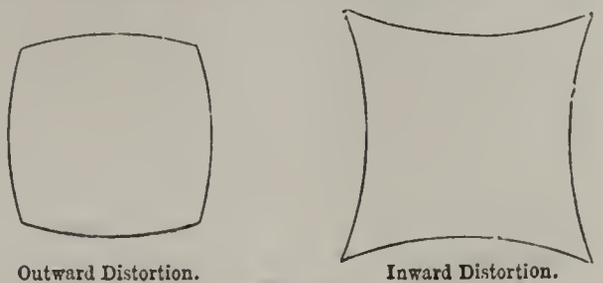
Fig. 18.

One of the objects of making compound lenses is to reduce this curvature as much as may be, to make the pencils of light—as we use a flat plate—come to a focus as nearly as possible in a plane. This is never entirely effected, but in some lenses there is a pretty close approach to it. The nearer the approach the greater the flatness of field.

Astigmatism is a curious defect that can best be explained by supposing a case. We will suppose an object having cross lines to be focussed—an old-fashioned window-frame, for example—the cross-bars near the centre of the ground-glass will be shown quite sharp; those near the edge will appear tolerably sharp in one direction, but not in another. For example, the vertical bars will appear sharp, the horizontal greatly blurred. This is on account of astigmatism, a defect to be found in a marked degree, particularly in portrait lenses, where an attempt has been made to get greater flatness of field than is attainable without producing the other defect.

Distortion.—There are some lenses which do not render the object of quite the correct shape. Any straight lines near the margin of the plate are shown as slightly curved lines, unless they are running in the direction of the centre of the image. There are two kinds of distortion, "outward" and "inward," or "barrel" and "pincushion." The cut illustrates in a greatly exaggerated way the two kinds of distortion, the lines showing the nature of image that will be got from a square object.

There is a greatly exaggerated idea in the minds of most photographers as to the evils of distortion. But few



Outward Distortion. Inward Distortion.

Fig. 19.

lenses distort to any appreciable extent—only the single achromatic and the orthoscopic, in fact, and then only when a considerable angle of view is included, and when there are long straight lines near the margin of the subject. The fact is that, as a rule, the exaggerated perspective due to including too wide an angle (to be treated of presently) has generally been put down to distortion, although it is not really such.

These remarks apply to general photography. There are cases—as, for example, in the copying of plans and maps—where even the smallest amount of distortion would be fatal.

(*To be continued.*)

A "WONDERFUL" DISCOVERY.

BY C. E. PEARCE.

It was quite by accident that one day this week I found myself present at a "demonstration" of M. Jean Baptiste Germeuil Bonuaud's "wonderful" process for the "development of permanent coloured pictures on china, glass, &c." The tickets of admission gave not the slightest idea as to what the process was, but the letter of invitation called it "wonderful," and I adopt the use of the adjective. The demonstration took place at Anderton's Hotel, and, previous to witnessing the manipulation, I was shown several specimens of the finished products. They were exceedingly good imitations of hand-painted china, and though I did not care particularly for some of the subjects, I have nothing to say in their disparagement as examples of imitative art. It was when I arrived at the "demonstration" that my troubles began.

On entering the room, an old familiar smell saluted my nostrils. It was that of the collodion of ancient days, and I began to sniff the battle afar off. On the table were a series of photographic dishes, sundry bottles, a couple of photographic frames. A young gentleman was holding up a glass on which was a portrait, and this he was colouring with powder colours, a whole host of which was ranged in front of him in a series of pill-boxes. "This," I exclaimed to myself, "is a photographic process, surely," and naturally I looked round for the representatives of the photographic press. Strange to say, not a man was to be seen. I saw the representatives of one or two evening journals, of several provincial papers, of nearly every financial paper, but not one from any paper dealing with science or art. A singular omission, truly, but it may be that the organizers thought their absence was fully compensated by the presence of a goodly number of business and advertisement representatives; if so, I have no desire to quarrel with M. Bonnaud and his friends, because, in matters of art, there is no accounting for taste.

To return to the demonstration, which I will try and describe from its very beginning. First I saw the glass cleaned with the whitening and water, which I knew so well. Then the glass was coated with what the demonstrator said was bichromate and sugar. "It is not

gelatine," said the young gentleman quietly, but confidently; "this is not a photographic process. We neither use gelatine nor nitrate of silver. No, it is not photography."

Notwithstanding, the coated plate, after drying, was placed in the printing frame, a waxed photographic print was made to do duty as the negative, and the frame was placed in the sun. After three minutes of exposure the frame was removed, the coated glass taken out, and the demonstrator began to dust with the dry colours. I rubbed my eyes. Surely I had seen or read something very much like this before. But I was quite willing to wait and see where the "wonderful" part came in. Of course the image appeared under the influence of the powder colours adhering to the "tacky" parts. I should have been disappointed if it had not. Then came the coat of varnish, more dusting-on of colour, and, finally, the pouring on of the collodion film. This was dried, and followed by the usual washing and decomposition of the film with caustic potash solution, and finally the floating off on to the porcelain. I utterly failed to see any novelty, but I am bound to say the result excited the utmost curiosity and admiration from the gentlemen of the press, who asked some intensely absurd questions with that air of profound interest in the acquisition of knowledge which only gentlemen of the press can assume. I need not quote these queries beyond saying that one gentleman gravely enquired whether the principle was not that in the dusting, the colours of the original picture naturally attracted those colours for which they had the most affinity—in other words, a tree being green would attract a green powder, and so on, and reject a red. This exquisite theory I am bound to say was received quite seriously by the demonstrator, and, though he gently refuted it, not a muscle of his face moved.

Up to this point I had been unable to discover the originality or wonder; but I was gratified at learning that the process had nothing to do with that of Mr. Mayall's "Photography in Colours," and that having been examined by experts, it had been pronounced to be totally distinct. With this information I went cheerfully down to luncheon.

After a good deal of experience I have come to a conclusion that a new invention, whether of a mechanical or an artistic kind, must be accompanied by a sumptuous luncheon. Probably the shock of finding out that there is something new in this world would be too much for the mind were it not sustained by lobster salad, chicken, and champagne. However this may be, I partook of the hospitality of somebody—I know not who—and listened to what might be said about M. Bonnaud's process.

Not much was said about the process, but I learned something about M. Bonnaud. He, it seems, has been familiar with the production of photographs on opal glass for many years. He it was who invented the opera glass camera, "used in Russia," said the speaker, "by the police in photographing criminals." This at any rate was undeniably news, and I commend the tidings to Mr. Warnerke. "But," continued the same gentleman, "of all M. Bonnaud's inventions, his process of decorating china was the most important, and he had spent many years in perfecting it. As to its genuineness, the fact of Mr. Bonnaud's name appearing some thirty times in the records at the Patent Office meant something." No doubt it did, but for the life of me I failed to see what it did mean.

Then a gentleman prosed for some time on the demolishing of the hand-painted china industry which M. Bonnaud's process was likely to bring about, and hinted at a projected company and the fortunes which were going to be made, all of which may be perfectly true if one could be satisfied on one or two points.

The points are these. Is M. Bonnaud the inventor of the process; or is he not? If he is, how comes it about that he has only just now been able to do that which was described by Herr Liesegang in 1883. In the PHOTOGRAPHIC NEWS ALMANAC for that year will be found details similar in every respect to those of M. Bonnaud's process. But so that there shall be no mistake, we will quote Herr Liesegang's description:—

"The six stages of the dusting method are as follows:—(1) A glass plate is coated with the sensitive mixture of organic matter (*i.e.* sugar) and bichromate; (2) the plate is, after drying, exposed under a positive; (3) after the shaded parts of the plate have absorbed sufficient moisture, it is dusted with a vitriable pigment in fine powder, the united action of the bichromate and light so modifying the deliquescent organic matter that it loses its property of absorbing moisture from the air, and the exposed parts of the plate consequently refuse to hold the vitrifiable pigment; (4) the powder picture is coated with collodion, and then soaked in a slightly alkaline solution (*i.e.*, caustic potash) in order to remove all traces of soluble materials; (5) the collodion film bearing the image is next floated off and laid on a tile or other suitable surface; (6) the image is vitrified or burnt on.".

So much for Dr. Liesegang's process. It may be that Dr. Liesegang described M. Bonnaud's process; if so, M. Bonnaud will be able to tell us. He may also like to explain why his assistants were so anxious to suppress all reference to photography—in fact, why they led the innocent gentlemen of the press to believe that it was not a photographic process, because neither gelatine nor nitrate of silver was employed. Perhaps also he will say how it came about that Professor C. V. Boys, A.R., S.M., F.R.S., was led to make such a report as that which was so freely distributed at the demonstration. Professor Boys has the reputation of being a scientific man, yet he commences his description of the process in this amateurist fashion:—"A clean glass plate is flooded with a liquid, and allowed to dry." Professor Boys is either very ignorant or very innocent. Anyone with the least smattering of science should have known that the "liquid" was a bichromate and organic compound. If Professor Boys did not know, he should have asked M. Bonnaud, who probably would have told him. But he prefers to use the term "liquid," thus concealing the very keystone of the process, and goes on to enumerate the various details without the slightest reference to the photographic action upon which the whole thing depends. Indeed, the report reads as if Professor Boys were as anxious to hide photography as are M. Bonnaud's assistants. From a scientific standpoint Professor Boys' report is simply laughable, and Mr. Barnum's or Professor Baldwin's opinion would have been quite as valuable.

I have nothing to say against the commercial value of the process, but it is impossible to approve altogether the way in which it has been brought before the public. In justice to Dr. Liesegang, M. Bonnaud should lose no time in answering these questions: Is the process one invented and worked out by M. Bonnaud? Has M. Bonnaud patented the process, or any part of it? If so, will he state definitely what these patents are? How does he explain the fact that in 1883 Dr. Liesegang described the process now said to be M. Bonnaud's?

FRENCH CORRESPONDENCE.

PARIS UNIVERSAL EXHIBITION—FIFTIETH ANNIVERSARY OF THE DISCOVERY OF PHOTOGRAPHY—PHOTOGRAPHIC CONGRESS—PRINTING IN FATTY INK—RETROSPECTIVE PHOTOGRAPHIC EXHIBITION.

Paris Universal Exhibition.—The very interesting articles by the Special Commissioner of the PHOTOGRAPHIC NEWS keep its readers informed concerning the photographic works sent to the Universal Exhibition; it would therefore be doing the thing a second time if we were to write our personal opinions on the exhibits; moreover, being a member of the international jury, our opinion must be held in reserve until the work of the jury shall be

entirely finished, and the list of the medallists is published. While on this subject, we will complete the list which we have already partially sent, by giving the names of the foreign members who assist in completing the bureau, which is constituted as follows:—President, M. Davanne; Vice-President, Mr. England (Great Britain); Reporter, M. Leon Vidal; Secretary, M. Prican (Switzerland). The other foreign members are Messrs. A. de Braam (Holland), Hastings (United States of America), and Buisset (Belgium). The jury is actively at work, but it is probable that its operations will continue for about three weeks longer. The foreign exhibits are about finished, but those of France yet remain to be dealt with, and this is much the most important collection, including as it includes the work of nearly three hundred exhibitors. In a general way, we are able to state that the photographic exhibition of 1889 does not include any important novelties. There are, in all parts, very beautiful photographs obtained by the processes in current use, but we find no striking inventions; no really new application; nothing, in a word, giving a special character to this display. It is true that progress has been greater than could have been hoped for in so short a time; marvellous results have excited our admiration, but we should have desired to see more serious applications of photography to the industrial arts. Photography might constitute one of the most artistic means of ceramic decoration, and we find but very few examples of efforts put forth in this direction. As a matter of course, we do not include in processes of commercial decoration those which require an exposure to light for the production of each separate specimen. To attain the desideratum which occupies our attention, we must have recourse to processes of printing by the aid of a prototype furnished by photography. We have pointed out this path, and sent examples to support our argument; but there does not appear to be any readiness to yield to our recommendations. As was inevitably to be expected, instantaneous photographs are much more numerous than ever, a condition of progress which we owe to the very great sensitiveness of gelatine films. We did not indulge in the hope of meeting amongst the exposure shutters with the ideal which is the subject of our dreams—that is to say, a shutter giving exposures of from the 800th part of a second up to one of several minutes' duration. It seems that the construction of such a shutter is a thing difficult of realisation, and that we may have to wait yet a long time for it. Note that the shutter desired must possess other good qualities: be very light, not occupy much space, be free from vibration, be interchangeable, &c., &c. What strikes us as most remarkable in this immense exhibition is the universal application that has been made of photography to the reproduction of documentary materials. Numerous collections of such have been made even in the most distant countries, and those in which the climate renders photography very difficult, in spite of all those improvements which in our temperate regions bring it within the reach of everybody. The almost complete abstention of nearly all the monarchical states is probably the cause of so much being left to be desired in this exhibition. The part played by Great Britain, however, as well the metropolis as the colonies, is remarkable; and this is a point upon which we have had to insist in our report.

Fête of the Fiftieth Anniversary of the Discovery of Photography.—The committee of the fête of the fiftieth anniversary of the publication of photography has decided to organize a banquet for the 19th of August next, the date of the communication to the Academy of Science of the processes of Nicephore Niepce and Daguerre; fifty years exactly will have elapsed. To give to this reunion all the unity and brilliancy possible, an understanding has been arrived at by the divers photographic societies in Paris. Moreover, the Minister of Public Instruction has commissioned the sculptor Soldi to prepare a commemorative medal, which on one of its faces will bear the profiles of Niepce and Daguerre. A reduced copy of this medal will be (according to the arrangements made by the committee of organization) distributed to all the persons who may participate in the fête of the 19th of August. A pamphlet, too, will be issued, reprinting documents relative to the occasion, verses, discourses, reproductions of the medals, &c. All this is rather feeble, doubtless, but what more can be done? The number of persons interested in photography, in spite of the ever increasing legion of amateurs, is very limited, especially when there is a question of expending one's money and time. The Universal Exhibition, too, is the cause of expenses and of exceptional sacrifices, and the charge of thirty francs made to each person joining in the fête is too high for many purses. In spite of everything, however, a sufficient number of subscribers has been obtained to ensure a brilliant manifestation. The banquet will occur just at the termination of the Congress, of which it will, so to say, be the crown, when to it is added the public Conference, to be opened by M. Janssen on the 20th of August. Whilst speaking of the Congress, we may add that the reports of the several committees of the Organisation Commission have been distributed as freely as possible, so that the projects for discussion may be elaborated as soon as may be. We do not know what will be the result of this useful experiment; it is, however, to be hoped, for the honour of those who have occupied themselves with so much zeal, and also for the interest of our art, that the results obtained will be as complete as possible. There are certain points upon which it appears easy to arrive at an accord. As for delicate points, on the subject of which it will perhaps be more difficult to arrive at an accordant decision, it is probable that the seeds sown in the course of the discussions will contribute to solutions which may not be long in arriving. We do not know what active part will be taken by foreigners in this congress, the success of which interests the whole world, but we fear that the number of participants will not be so important as might be desired, in order to give great authority to the decisions arrived at. In any case, something useful must result from this effort, and it will form a point of departure for the future.

Process for Printing in Fatty Ink by M. Fisch.—Amongst the recent works of our experimentalists, there is little to be gleaned. M. Fisch has endeavoured to form a practical printing process upon the property pointed out by Poitevin, that a compound into which a salt of the peroxide of iron enters, only takes ink in those parts where it has not been modified by the action of light. The process described by M. Fisch does not appear to be capable of being utilised without more complete explanation, and above all without candidly divulging the formula of the compound recommended; but it is certain that upon the effect noticed by Poitevin, a process may be based, analogous to that which has for its distinctive character the employment of a sheet of paper coated with bichromated gelatine. All this, however, comes to what we have known for a long time: that the salts of iron, like the chromic salts, constitute two series of sensitive compounds which photography may utilise in a similar manner.

Retrospective Photographic Exhibition.—We must not omit to mention the retrospective photographic exhibition organised under the direction of M. Davanne. It is not to be doubted that everything has been tried in order that this historical part of the exhibition may be as complete as possible. To this end a pressing appeal has been addressed to all those who might be able to bring their contingent of documents. It appears, however, that many things are still wanting to this collection before it can be considered at all complete; things which will show sufficiently the sequence of photographic facts from the days of Niepce and Daguerre to the present time. Perhaps further contributions may arrive before the close of the exhibition to add to the interest of this retrospective collection.

Leon Vidal.

THROUGH JAPAN WITH A CAMERA.

BY W. K. BURTON.

Chapter V.

Awamori—Lecture in the Theatre—Japanese Feast—Gaisha.

On the night of Saturday, August 8th, we were conducted by our entertainers of Hakodatte, each armed with a coloured paper lantern, to a police boat, in which we were rowed to a steamer to take us to Awamori, the northern town of the mainland. The steamer started at about midnight, and we arrived in Awamori at about eight o'clock on Sunday morning. Of Awamori itself I have nothing to say that would interest readers. It is a fishing village, not very picturesque, and smelling very badly of decomposed fish.

All the time of the day and a half that we stayed there was spent on business, including a lecture delivered in the theatre. A Japanese theatre is not, in general structure, very different from an English theatre, with only one gallery, the front of which, however, is not curved, but is rectangular. There are no seats, of course, but the eternal straw mats. A "front row box," in the place corresponding to the dress circle, is simply a portion of the floor partitioned off on the two sides and the front with boards about 9 inches high, the back being formed by the step (about the same height) which makes the difference of level of two tiers. Such a box will accommodate six Japanese, but only about two Europeans, as these latter are continually in trouble as to how to dispose of their legs. The stage has a large circle in the centre arranged to revolve, so that one "set piece" may be arranged at the back, and may, when it is desired, replace that in front by simply revolving the platform. The performance begins in the morning, and lasts till about eight or nine at night. The acting is often very good ; but still, some six or eight hours of a Japanese theatre is as large a dose as a Europern can stand, spite of the tea and bits of food which are served at intervals, apparently not at any fixed times, but just when the attendant thinks that the playgoer looks hungry. In the better theatres no actresses perform; but female parts are impersonated with wonderful correctness by men. I was rather surprised, after seeing all that I have described, to hear that it is considered here improper for young women to act on the stage. Perhaps the person who told me so was chaffing.

In Awamori the theatre was crowded—to "see a foreigner speak," I was told. It was a strange sight to look down into the pit. It was filled with a mass of squatting and sprawling humanity. A number of the people had brought out very young children (rather, I suppose, than leave them at home alone), and most of them lay sound asleep on the straw mats quite naked. The people who were awake were mostly smoking. Not that the smoking was confined to the pit ; we, who were on the stage, also relieved the monotony by cigarettes.

After we had left the theatre we went to an entertainment given to us by the chief officials of the town, and as this entertainment was in true Japanese style, something quite new to me, or rather new for the first time at Hakodatte, and as it was typical of various other entertainments that we had, I describe it here in some detail.

We assembled in a large room on the first floor of what was, I believe, a private house—a very large room, perhaps about 40ft. by 20ft. There were about twelve or thirteen of us, and we sat on the floor, in a circle, at one end of the room, or, more strictly speaking, in a sort of horse-shoe form, open towards the unoccupied end of the room. I had the place facing the empty end of the room. I don't know whether it was the place of honour or not. A thing that was much more to the point I do know : there was a post at my back, which made sitting on the floor for several hours possible.

A never-ceasing succession of little lacquered wooden bowls, with various kinds of food in them, was brought in. In front of each eater is placed a small square wooden tray, supported a few inches above the floor level on four short legs ; on this are placed the lacquer bowls. The food consisted of soup of various kinds, seaweed entering largely into the composition of this ; of fish, raw and also cooked in different ways; and of various dishes as to the composition of which I am unable to hazard even a guess. There is often chicken, but seldom any other kind of flesh meat. All have to be eaten with chopsticks, a thing not very difficult if one is once taught the right way, very difficult indeed if one is not. One stick is held quite rigidly between the fork of the thumb and first fingers. The other is held between the point of the thumb and those of the first and second finger. If the reader likes to try them—say with a couple of pencils—he will find that he can pick up small articles with greater ease than might be supposed. After a little practice, it is easy to pick up anything, from a pin to an orange.

Shortly after our supper had begun, a number of Gaisha appeared on the scene. Gaisha are singing and dancing girls, and take a prominent part in all purely Japanese entertainments, the Japanese holding the truly Eastern notion (with which I considerably sympathised) that it is very foolish for a man to dance and sing himself when he can pay girls to do it for him. Gaisha are, naturally, selected for their profession greatly on account of their beauty, and it is probable that many of the prettiest faces to be seen in Japan will be found amongst the professional singers. At the entertainment that I am writing about the Gaishas sat in an inner horse-shoe facing the guests, and began at once to make themselves agreeable, talking pleasantly, and helping the saké.

Saké, the national drink, is a sort of wine somewhat resembling very thin sherry. It is generally drank hot, and is far from unpleasant. It is drunk out of very small cups or bowls, and the drinking of it when several Japanese are together is accompanied with some ceremony. Thus, when one of my entertainers thought fit to honour me by drinking with me, he washed his own saké bowl in a small basin of water which was in front of him, and handed it over to me. It was filled by one of the Gaisha, and I, washing out my own bowl, handed it back to be also filled.

When the food was done, or nearly so, most of the Gaishas took themselves off to the clear part of the room, and there played, sang, and danced. The instrument used for playing is the samisen. It is more like a three-stringed banjo than any other instrument I know of, and the amount of noise that a skilful player is able to extract from a samisen is astonishing. I must confess that I have been unable, as yet at any rate, to cultivate a taste for either samisen playing or Japanese singing. The samisen makes a loud and harsh sound, and the singing appears like a sort of lamentable wailing in a minor key. The dancing is a few degrees better, although it is not dancing at all as we understand the word, but is a mixture of posturing and a sort of acting. Every dance tells a tale, I believe, and I am told that when one understands the tale told by the dancing and singing combined, it is all very amusing. I can believe this, for once being given the thread of the story contained in a dance, I followed it with considerable pleasure, a good deal of histrionic talent being exhibited. Moreover, some of the attitudes are very graceful. Still, whilst fully appreciating the charmingness of the Gaisha, I always felt that they would be still more charming if they were to leave their samisen at home, and to confine themselves to flirting, an art in which they are great adepts.

THE AMOUNT OF LIGHT FROM THE MOON.

Professor C. C. Hutchins, of the United States, has been attempting to obtain more exact measurements than heretofore of the lunar radiation ; he employed a single thermal junction, and condensed the rays upon it with a concave mirror. The

results obtained throw little or no light upon the relative photographic values of the solar and lunar radiations, the light of the moon being so poor in the rays of the more refrangible part of the spectrum. *Nature*, in summarising Professor Hutchins' results, says that "the two principal points to which attention was directed were the comparative intensity of radiation of the sun and moon, and the coefficient of transmission of our atmosphere for lunar radiations. The first point was determined by two methods: in one, but a very small fraction of the sun's rays was suffered to fall on the thermograph: whilst in the second method a resistance was interposed in the galvanometer. The two methods gave very fairly accordant results, the mean giving the solar radiation as 184,560 times the lunar. The experiments on the transmission of the lunar rays through our atmosphere gave a remarkably high value, for the deduced result showed that 89½ per cent. of the rays of the moon when vertical are transmitted by the air at standard pressure. Observations on the lunar eclipse of January 28th, 1888, agreed with those of Langley and Lord Rosse in their testimony as to the suddenness with which the heat received from the moon is cut off at totality. As to the quality of the lunar rays, it was found that but 31 per cent. were transmitted through a plate of quartz which allowed 93 per cent. of the sun's rays to pass. The radiations from a platinum coil placed in a Bunsen flame turned down as low as possible, suffered to about the same extent as the rays from the moon. From experiments upon the radiating powers of different rocks, a table of which has been formed, Professor Hutchins concludes that a very considerable portion—about half, indeed—of the incident rays are absorbed. The surface of the moon should therefore become strongly heated, but the evidence afforded by total lunar eclipses appear to show that scarcely any of this surface heat succeeds in passing through our atmosphere."

ORTHOCHROMATIC PHOTOGRAPHY.*

There are many ways of producing an orthochromatic effect; one is by the use of a glass tank placed behind or in front of the lens, in which tank a coloured solution is placed; this tank or cell is, however, only for use in the studio, as for out-door photography we have a coloured glass screen, so as to avoid carrying coloured solution.

The tank is constructed as follows: Procure two pieces of best white plate glass, about 6 inches square; between these place a piece of rubber of the same size square, and about ⅜ of an inch thick. In the centre of this rubber cut out a circle about 4 inches in diameter, and from one of the corners to the centre of the circle cut out a narrow strip ¼ inch wide; this serves as the mouth of the tank. The two pieces of glass and the rubber are fixed together with rubber cement; then, to hold them firmly together, two brass flanges are used as a clamp, with four screws at an equal distance apart; a thin sheet of rubber is on the glass side of the flanges to prevent direct contact with the glass, the centre remaining clear for the rays of light to pass through the solution and glass.

One of the best orthochromatic effects obtained with this tank is with a three-grains-to-the-ounce solution of bichromate of ammonia or bichromate of potassium. No preparation is applied to the plate. A common rapid dry plate is exposed through this solution; the exposure, however, is about twenty times longer than it would be if you removed the tank with the yellow solution, or, in other words, if a dry plate is exposed one minute without the yellow solution, it would have to be exposed twenty minutes through a three-grain solution of bichromate of potassium or ammonia. It produces wonderful results in photographing an oil painting or any highly coloured object.

Another method, and the one best adapted for landscapes, is to bathe the plate in erythrosin, and then expose through a yellow glass screen.

Plates are prepared for orthochromatic work as follows:—Take any ordinary rapid dry plate, place it in a bath containing

Distilled water	200 c.c.
Strong liquid ammonia	2 c.c.

Rock it for two minutes; work in as much darkness as you possibly can. Now take it out, and place it in the second bath for 1½ minutes, and keep it rocking. Have on hand for use a stock solution of

Distilled water	1,000 parts
Erythrosin "Y brand"	1 part

Prepare a second bath as follows:—

Erythrosin stock solution	25 c.c.
Distilled water	175 c.c.
Strong solution of ammonia	4 c. c.

After removing the plate, dip it again face down to rinse off any particles of scum that may get in the bath accidentally. This bath may be used for one dozen 8 by 10 plates; then it should be thrown away and fresh bath used.

After the plates come out of the last bath, they should be stood on clean blotting paper to absorb the excess of solution. I would also advise the use of clean fingers. Pyro or hypo on the fingers is a drawback to success.

After the plates have been drained, place them in a cleaned rack in an absolutely light-tight closet, with air-holes so constructed as to admit air, but no light; the plates will dry in from eight to twelve hours. They are best prepared in the evening, and, if the closet is good, will be dry in the morning.

After the plates are dry, they may be packed face to face with nothing between them, in a double-cover paper box, and put in a dark closet free from sulphuretted hydrogen gas, until ready for use. I have kept plates for three months in this way, and they were still in good condition. Great care should be used in developing these plates, as they are sensitive to the red; get used to developing in a dark part of the darkroom; occasionally you may look at the process of development in a stronger light.

The exposure through the yellow screen with an erythrosin plate is about the same as if you used no orthochromatic plate, provided you are not using too dark a yellow on your screen. This can only be determined by experience. Give to a common plate about four seconds, and to an orthochromatic plate under the same conditions five seconds.

The yellow glass screen is prepared as follows:—Take a piece of the best plate glass—common cannot be used—clean it nicely; take another large plate glass, or anything that is level and true, and level it with a small spirit-level. Now take the cleaned piece of glass and coat it with aurantia collodion:—

Ether	5 ozs
Alcohol	5 ,,
Cottou	60 grs.

The aurantia to be added to suit your judgment; it takes a very small quantity to make an intense yellowish-red collodion. Pour it on the centre of the glass, flow it to the edges; then place it on the level glass and allow it to set; when set, put it in a rack to dry.

Should it dry in ridges, the collodion may be too thick, and it must be thinned down with equal parts of alcohol and ether. A single piece of plate glass, about one-eighth of an inch thick, coated with aurantia collodion, is all that is required with an erythrosin plate. Or, after a piece has been successfully coated, another piece of the same plate glass, and of the same size, may be cemented to it with balsam, leaving the aurantia between the two glasses; the edges may then be bound with paper.

In using different coloured solutions, or collodion, I have found that one will change the focus and the other will not. With some screens you must focus with them in their positions; take away the screen, and the picture appears out of focus. I cannot fully explain why it is, and for this reason will not make the attempt.

Another thing that has been tried lately is to do away with the yellow screen by substituting a yellow coating direct on the plate. No doubt the focus of an object that requires absolute sharpness is somewhat affected by the use of a glass. We have been successful, on a small scale, by coating the plate with the following yellow solution:—Place in a tray enough of a saturated solution of tropæolin in wood alcohol to cover the plate; allow it to remain ten seconds. It is necessary that the plate should be bathed previously in erythrosin and dried. Before applying the tropæolin, which, being in alcohol, dries in a few minutes, have some blotting paper on hand, as the solution gathers in a pool and leaves bad marks on the end of the plate. The plate can be developed in the usual way:

* Abridgment of a paper read before the Photographic Association of Brooklyn, by Oscar O. Litzkow.

Notes.

We have to announce that Mr. Thomas Bolas has ceased the editorship of the Photographic News, though we hope still to receive contributions from him from time to time.

In Gmelin's *Chemistry*, Vol. XI., translated by the Cavendish Society, London, 1857, is something about quinol in conjunction with sulphur, a subject which has excited interest in photographic circles. Gmelin says that sulphuretted hydrogen gas passed through a saturated aqueous solution of quinol at 40° C. produces bibasic hydrosulphate of quinol in very long colourless prisms. Gmelin adds that sesquibasic hydrosulphate of quinol is formed when a cold solution of quinol is saturated with sulphuretted hydrogen. Small shining crystals immediately separate, which dissolve when heated if the stream of sulphuretted hydrogen be kept up, and on cooling separate in "transparent colourless rhombohedrons, which resemble those of calcspar, and after pressing between paper, and drying in vacuo, are inodorous and permanent in the air." The bibasic crystals consist of $2C_{12}H_6O_4,HS$, and the sesquibasic crystals of $3C_{12}H_6O_4.2HS$. Both kinds of crystals when melted *per se*, or moistened in contact with the air, or when their aqueous or alcoholic solution is boiled, give off sulphuretted hydrogen, and leave quinol.

It is said—we do not know with how much truth—that if the teller of a French bank has doubts as to the honesty of a person who presents a cheque, he gives a private signal to the proper official, and while the payment is being made, the latter brings a camera to bear upon the suspected person, and thus retains a record which may prove of immense service should the cheque prove to have been lost or stolen.

The idea is a very excellent one, but we doubt its practicability. However, it has fulfilled one purpose in finding a place in a gossiping journal for which possibly it was designed.

At the first annual exhibition of the Photographic Society of Chicago, prints by five British photographers were on view, and of their exhibits *The Beacon*, of Chicago, says:—"In noticing and admitting the truth of the freely expressed opinion that the foreign exhibits were superior to an equal number of the best of our home productions, we would direct attention to the fact that the four foreigners were picked men, head and shoulders above the average British photographer, and express our belief that, although we have frequent cause to mourn over the want of true art culture and training in many of even our own popular professional photographers, a fair comparison of the average every-day work of the two nations would not be very unfavourable to America. But to a go-ahead people, as we are, that ought not to be enough. We must not rest on our oars till we see our average rise to an equality with their best." The British exhibitors were Mr. and Mrs. Anckorn, of Arbroath (counted as one exhibitor by *The Beacon*), Mr. F. P. Gibson, of Hexham, Mr. F. M. Sutcliffe, of Whitby, and Mr. W. W. Winter, of Derby.

The amateurs who visited the ruins at Johnstown after the great flood had subsided appear to have had a bad time of it. They came, so it is said, in such numbers that they began to be quite a nuisance, and General Hastings, who was in command of the military, ordered them to be arrested. Accordingly the guards surrounded them, and made them go to work with the labourers for two hours, when they were released upon their promising to leave the town and not return.

The flash-light opens the way to the overcoming of difficulties hitherto unsurmountable. Its latest triumph is the photographing of fish in aquaria. This has been successfully accomplished by MM. Rombouts and Cohen in the Zoological Gardens at Amsterdam. There were many obstacles in the way, such as the rapid movement of the fish, the loss of light in transmission through water, and, chief of all, the reflections from the glass of the tank, which acted as a mirror. The last-named drawback was obviated by surrounding the camera with a black material, and the result was the production of several pictures, some of which figure in *La Nature* from last week. The fish photographed were sturgeon, Californian salmon, carp, and others, and the results were sufficiently sharp to bear enlargement one and a-half times. The reproductions in *La Nature* being woodcuts, we had no means of judging of the exact value of the photographs.

Great preparations are being made in America to celebrate the Jubilee, or, as our American friends prefer to call it, the "Grand Semi-Centennial Celebration of Photography." It is fully expected that on the 6th of August there will assemble in Boston the largest gathering of photographers ever seen in the United States. The exhibits will comprise every department in photography, and a large number of prizes will be competed for, including a "Grand Award," which, says an enthusiastic correspondent of the *American Journal of Photography*, "will be not only valuable intrinsically, but bring a small fortune to the lucky man." The display of apparatus is expected to be on a very extensive scale, and this we can readily believe, as in American Photographic Exhibitions apparatus occupies a much more prominent place than it does in the exhibitions in England. We understand that the whole of the main floor, comprising some thirty thousand square feet, has already been taken by apparatus exhibitors, and that extra provision will have to be made on a second floor. The progress made in America suggests that it would be interesting to know in what state are the preparations for the celebration in St. James's Hall.

The Bath Photographic Society was recently informed in a memoir read at one of its meetings that "electricity produces phosphorescent effects in the violet of the spectrum," a statement which seems to have required some elucidation before it was filed in its archives.

As a rule, photographers are rather slow in following up any little innovation which springs up so mysteriously in the way of fashion. A society journal, however, notes that they are moving with the times, and it having dawned upon them that albums are out of date, and that the popu-

lar mode of displaying a photograph is to stand it on any available article of furniture, from a grand piano to a five o'clock tea-table, they are now sending out their photographs mounted on ingenious self-supporting cards, which can either be made to stand up, or can be placed in an album.

M. Enjalbert's automatic camera, exhibited in the Paris Exhibition, must be rather an ordeal to the sitter. There are three dial plates in front which you first have to study before you start, or you will waste your money. Dial plate No. 1 is devoted to denoting the first interval of time—that is to say, the period occupied by the hand in completing an entire revolution is supposed to be sufficient, after you have dropped the coin into the slot, to allow you to get to the chair, collect your nerves, and fix your eyes on the required spot. When No. 1 has finished, No. 2 begins. At the word "*pose*," from which the hand starts, you begin to arrange yourself. When the hand reaches the word "*prepare*," about half way round the plate, you put on your pleasantest expression; at the word "*attention*," which, printed at about three quarters of the distance, you concentrate all your faculties upon your occupation; and the hand having gone all round, you take a long breath and hope for the best. Dial plate No. 3 is devoted to the indications of the development and fixing which are going on inside, and finally you receive for your money a full blown ferrotype.

There is quite a craze just now for expeditious in search of sunken or buried treasure. Thus, whilst a Limited Company has been floated to bring to the surface, if possible, the specie supposed to be locked up in the strong room of the French flagship *L'Orient*, which was sunk at the battle of the Nile, and now lies clearly visible at frequent intervals at the bottom of Aboukir Bay, a private band of "venturers" have contributed £100 a-piece to a joint purse, in order to go in quest of a rich store of doubloons and pillar dollars said to be buried near the mouth of a well-known South American river. Private enterprise, too, has undertaken to recover some £34,000 or more lost in a ship which was wrecked in Morecambe Bay some twenty years ago; whilst an exciting communication, hailing from America, is just now being circulated in this country with reference to a veritable pirate's hoard, the whereabouts of which is known to a certain enterprising Yankee mariner, whose account of the concomitant parts of the said treasure is worthy of Edgar Allan Poe, or of Mr. R. L. Stevenson himself. This New England sailor is evidently a practical man, too, for he makes quite a new departure as a treasure-seeker, by enclosing with his graphic circular letter an actual photograph, not of the buried treasure itself, exactly, but at all events a most realistic presentment seemingly of the spot where he asserts it will be unearthed as soon as the requisite cash is forthcoming; and certainly it was a very happy thought of his to send round the photographic view, for a look at it does more to promote one's faith in the expedition than pages of letter-press ever would.

COLOUR, ITS STUDY AND RELATION TO PHOTOGRAPHY; ALSO THE TAKING OF PICTURES ON OPAL CARDS.*

BY FRIESE GREENE.

The perception of colour by the eye tells us only of our impression of the thing, not at all the thing itself. When we speak of redness of a rose, we really mean that its petals have the property of reflecting certain rays of light, and that the light produces in us the sensation of colour we call redness. It was not, however, until Newton showed that ordinary white light can be split up into many colours that it was easy to comprehend that the red colour of the rose is due to the property which it has of selecting the red, and reflecting it, while the other colours are lost.

There are two very common errors on the subject of "primary colours": one is to suppose that Sir Isaac Newton discovered seven primary colours when he split up a beam of white light by means of a glass prism. The so-called seven colours are, as is well known, red orange, yellow, green, blue, violet, and indigo. The ordinary colour of indigo is not pure enough to rank among these. A more correct and complete list would be: violet, violet blue, blue, peacock blue, sea green, green, yellow green, yellow, orange yellow, orange, orange red, red, deep red; most apparently pure tints are a mixture of a group of these, or four of these colours. The green of a leaf contains a small amount of violet and blue, and a considerable quantity of deep red. The orange of a certain kind is nearly pure. These tints, however, are not more beautiful on account of their purity, for exactly the same apparent tint could be produced by a mixture of several colours. *Pure colours are very rare in nature.*

However, I am not going to detain you with the mixture of pigments; it would take too much time. When white light falls upon a piece of coloured glass, some of it is reflected at the surface, and the rest attempts to penetrate the glass—some of the rays succeed in getting through, and others are stopped; something, however, must become of them, for nothing is lost, *even in colour.* They are neither reflected nor transmitted, they are dissipated in the form of heat, &c. Those rays which get through have little difficulty in piercing another thickness; they have, as it were, a passport for that substance. Before the light passes through it meets with the second surface, and here some of it is reflected and retraverses the substance, a portion being again reflected at the first surface, the greater part of that which has not been absorbed passes through. In a mass of crushed glass the light will behave in this manner in passing through the first particle, and on striking the next some of it will be reflected and pass back through one of the upper pieces; some will strike deeper and be reflected through several layers; the general light reflected from the whole mass will be partly white light and partly coloured. This state of things exists in all coloured bodies—they are all more or less transparent. It will be noticed that the less transparent bodies have a whitish colour compared with those which are very transparent. It is now clear by this that in mixing paints we do not add the colours, but subtract them, for the light which has passed through the first particle has in all probability to return through another of a different kind, and only that light succeeds in traversing both which can pierce both substances.

Colours are said to be simple when they are to be found among those into which white light is split by the prism. There are a large number of tints which are composed of pure colours and white; one colour remains which is not a simple colour, nor a mixture with white and black: this is purple, which is a compound of blue, violet, and red. There is a popular error, and one which it is very difficult to explain: it is that there are three primary colours—red, yellow, and blue. This theory was supported by Sir David Brewster, whose optical discoveries gave him considerable claim to be heard. The common argument is, you cannot make either of the colours by any mixture of two or three colours, while any colour can be matched by a suitable mixture of them. The fact is, that this power of producing other colours by mixture of pigments is due to their not being simple, but compound colours, as I have already explained. There is, however, another colour theory: I mean three-colour theory, which is supported by the names of Young, Maxwell, and Helmholtz (no mean names, I can assure you), and this is founded not on paints—or, indeed, on any external colours—but on the structure of the eye. It has been almost indisputably proved that there are three sets of nerves, or three

* A communication to the Bath Photographic Society.

processes of sensation in the eye for red, green, and blue or violet. It is true that these three colours seem ill-suited to make by their combination all other colours, but that is because one is accustomed to think of mixtures of paints, not of colours proper. There are many ways, but they are beyond the scope of this paper, in which it may be plainly shown that blue and yellow, or green and purple, or red and blue-green, make white, as red and green make yellow. The red-seeing nerves take in the orange and yellow, and the green set takes in the yellow and blue, so that a yellow tint is known by its action on both red and green sets, in a proportion depending on the kind of yellow. When all three are equally excited, the effect of white is produced. If one of these sets of nerves is fatigued by dwelling for some time time on nothing but the colour which principally characterises it, it becomes less capable of being stimulated by it, and if all three sets are then given an equal chance, by looking at a white surface, the other two sets of nerves being, so to speak, fresher in the field, have it all their own way, and give the impression of a blue-green. An example of this is well known in the form of a popular advertisement. Another instance of the fatigue and repose of the different colour perceptions is to be noticed at night. Artificial light is generally rich in yellow and red rays, and deficient in blue and violet; in fact, after dark the blue-seeing nerves being, as a rule, so little used, the others warp the judgment of the mind, and a false standard of white—the standard is yellowish, but it is not as though we see through yellow glasses; the more the nerves are excited the whiter is the effect. The mind becomes accustomed to treat a full excitement of the red, a partial excitement of the green, and a feeble impression on the violet-seeing nerves as an equal stimulation of the three, that is, white; and when a more liberal proportion of blue rays is present the effect appears more as an excess of blue. Who has not heard of the blue and deathly appearance of the electric light, especially when they first see it? In time you get quite used to it, and do not notice that appearance; in fact, you like it. Many people are charmed with the electric light in my studio at Piccadilly. Lady Torrens, who was in Africa many years, said, "This is charming; exactly like the African sun." Nobody knows what a grand future there is for electricity, and nobody knows the troubles of the working of it at the present time which will make it more easy for the future workers. Well, the actual colour of the electric light is really a pale primrose when compared with the light of day, and the sun itself, which is, after all, our only ideal of white, is thought by some to be inferior to many stars in the whiteness of its colour.

Though nature is so full of colour, and it acts upon our senses with such force, and we may say it is inherent in all things, I believe the knowledge of the whole world will be found out by colour; I don't mean only the bright and brilliant colours, but the faint and dusty colours as well. I maintain, with our slight knowledge of the physical forces, it is impossible to give an explanation of colour, with its separation and contrast, union and reunion, augmentation and neutralisation, and goodness knows what. If the ox begins to rave at one colour, those who try to fathom it with its two million of tints may be excused if they begin to rave and get furious; nevertheless, let those that study colour for pleasure, let them only master one of the two million tints, and they will have accomplished something in the most complicated and beautiful subject. To others who are not so fond of minute detail, and take a broader view of the subject, let them take the relation of colour to the eye, its action upon that organ, and the action of colour on substances around in the evolution of nature; that is to say, the physical and chemical colours. The first is passing; the second may be made permanent for any length of time, and this is why, I believe, as time rolls on, the problem of obtaining permanent photographs which shall represent objects in their natural colours will be discovered. We are not going to master colour by reading a few paragraphs and doing a few experiments; it will be one continual game of chess: we shall snatch a pawn here and there, and by-and-by some genius will take a knight or bishop, but the grand difficulty will be checkmating—perhaps, after all, it will be a draw. A chemist looks upon colour as an indication by which he may detect the more secret properties of material things, but he finds much difficulty and inconvenience. Why? Because our knowledge of colour is very vague; but no doubt the very faintest tint has its chemical law, and I should say colour is rather calculated to bring to light the most delicate operations of nature. Of course, though I say this, you must consider that the ideas of men vary according to the way they approach a science or branch, for it depends upon which angle they begin at.

Now, the relation of colours to photography is like the relation of vitality to our bodies; it is the nucleus and harmony of everything connected with our beautiful art—which is the steady pioneer and truthful recorder of nature's secrets—encircling the whole world with speaking shadows of profound interest, and occasionally recording the poetry of motion of the whole universe. There will be more poetry still when we can catch animate and inanimate nature decked in their gaudiest dress of colours just as they are, without pale yellow coming out dark, and dark blue coming out light. Violet we naturally regard as a moderately dark colour, but photography has hitherto represented it as one of the lightest. To understand this, let us, for a moment, consider the relation of photography to the three great divisions of the spectrum, viz., chemical, visual, and heat rays. Photography is essentially a chemical process, the chemical and ultra-chemical rays affecting vigorously the sensitive plate; the visual rays have considerably less effect; the heat rays have comparatively none. Practically, no effect is produced when the sensitive plate is exposed to the dark-red rays. Now, the very important question which presents itself is, colour sensitisers, although some assert that the correct rendering of colour gradations is only a matter of exposure, and the so-called orthochromatic plates all rubbish. Well, I only smile at those remarks, and wish the persons who made them had done a little practice in that way; as long as only a few practise, we shall not make very great strides, but let it be practised by a lot, and their experience diffused among the many, then we shall have the links accumulating, and not until then shall we advance much. The brightest conquest of the human mind is finding out the truth. With our exceedingly limited faculties we cannot flatter ourselves we know the absolute truth of many things, and if we study nature as a whole, we must take in consideration the mind of the whole human race; so, in thinking, we must consider our mind is a very small portion of the minds of all the human race, we shall then comprehend how the various minds that study colour consider it under extremely different relations, when, in fact, that which strikes one individual particularly will not strike another at all, because it has not yet been permitted to an individual to make a complete analysis of any one subject, for the desire which leads us beyond our boundary is always our failure. I mean that each science is so dependant upon a lot of others that you cannot draw the line, and, as a rule, one is always trespassing.

Electricity produces phosphorescent effects in the violet end of the spectrum. It may be probable that from the infra red to the ultra violet, the molecules of different things have their electrical conductivity in proportion to their position in the spectrum, and the effect of electricity and light is brought about in unstable bodies much more quickly than in stable bodies, and perhaps chemical affinity will be traced very near the light effect and electrical conductivity of the molecules, because here you can bring in *time* to help you in your researches, and what can help us more in making these inquiries than making photographic emulsions? Here you have in testing the sensitiveness of an emulsion slow towards the red, quick towards the grey or blue; but what is going on between? The word *time*, which ought to be the most important word in any science; and here we have, according to the time you are heating the emulsion, so according to the proportion of time does it take to act when we expose the sensitive plate to light, and according to the electrical condition of the alkali and acid developer so is the effect (which you can prove by *time*) of the clearness or fogging of the sensitive film. I am under the impression that chemists, as time rolls on, will value photography much more than they do at present, for the relation of photography to colour is one of the most simple and yet marvellous of nature phenomena.

There is a light within us which cannot be decomposed to red, green, blue, &c., but a light which inspires and guides us in science to be always searching for facts and truth which only *time* can measure. Let us in the study of colour or anything else take the most simple things. If I take this ordinary wax match and strike it, what an immense study here! The friction you have is electricity (you must remember that is caused by the energy of my body); on striking the match then an explosion, during that time the top of the light is orange; when the flame is quiet you have yellow on the upper part, violet and blue at the lower. There are other colours if you look closely into it; for instance, there is a grey around the stem, besides the

stem is brown as it burns away, and red at the top, which is the heat rays. Here you have all the colours of the spectrum except green, but we can trace it. As this match burns, it absorbs oxygen and throws off carbon. Where does the oxygen come from, and where does the carbon go? Why the leaves of plants, &c., inhale the carbon and exhale oxygen, so this very wax of the match goes to form the green which absorbs certain of the sun's rays, so that life can live in the leaves, for the green acts as a shield which preserves life in the plant. I could talk for hours on a match, but I have tired you quite enough, so I'll conclude with saying photography is just the thing to give you the power of perception, and lead you closer to nature's secrets, for inside of us must be a *sense* by which we attract the fleeting scenes outside, and that *sense* has a great deal to do with dressing the outer scenes. The best element we have is the *ebb* and *flow* of reason; it sums up the history of all science which is coloured with curiosity, and you must have one to co-operate with another.

I'll now demonstrate before you a picture on my opal cards. I claim for it *simplicity*. You can print the pictures by match-light, gaslight, or candlelight in a few seconds; the less you wash the better; you require no paper, toning, or solution. You can turn them out quicker than by any other process, because there is no mounting, and they are as permanent as any process we have in photography, according to my testing up to the present time. I attribute that to the finding out of hydroquinone for the last clearing effect, which was purely by accident.

THE PRODUCTION OF PICTURES BY THE ACTION OF COLD.*

BY D. WINSTANLEY.

FIFTH ARTICLE.

I FIND it very tedious sometimes to wait for moisture pictures on the window panes. Unless the amount of moisture in the atmosphere of the room in which the experiment is performed approaches somewhere near the point of saturation, and unless the cold of the air outside is sufficiently reduced by radiation to a comparatively unclouded sky, of course no dewdrop pictures are produced. My reasons for persevering with the window pictures are two in number. In the first place, I like to see them, for they are very beautiful when they are successful; and, in the second, I want more facts, more exact facts whereon to theorise; facts as to the point of saturation of the air which yields the best results; facts as to the difference of temperature in the room and out; facts as to the clearness of the sky; and facts as to the quantity of moisture deposited in a given time, for if, with such a point of saturation and such differences of temperature, together with such a quantity of terrestrial radiation, one gets so much moisture deposited in such a time, then with such and such and such alterations, one should get so much more moisture deposited in a time which is so much less. And if one can command such and such a deposition of moisture in certain circumstances in such and such a time, one should be able to obtain such and such a deposit of any other volatile chemical body in such and such circumstances of a different kind and in a desired and given time. Then frigerography would become a process definitely practicable in kind. I have accordingly tried a modification of the window method and other methods quite distinct therefrom, with more or less encouraging results.

For the first of these I made a fairly strong solution of common alum, and sponged it on the window pane at night. I then placed stencils and masks in the proper places, and awaited the result. The theory of this experiment is that evaporation and consequent concentration of the solution would be differentiated by the pattern on the stencil or the mask, and that crystallisation would occur in the first place in a manner determined by the pattern on the screen; and in my early experiments—when the external temperature had sunk to 40° on Fahrenheit's scale—it did. The outlines were by no means sharp, but the results were unmistakable. I repeated the experiment with a solution of Epsom salts, and with results of a better kind. I also found that the relative definition—though not the actual—was improved by using larger screens.

These experiments I continued nightly for above a month in the windows of the room in which I sleep, and in one or two instances, when the whole surface was covered with the crystals in the morning, the pattern was still to be distinguished. The thing, however, gradually became a nightmare to me, and prevented sleep, and these experiments have, accordingly, become discontinued for a time.

Dewdrop Pictures Produced by Apparatus on the Table.—On the evening of December 5th I resorted to another method of experiment, by which I am much encouraged. I took an ordinary breakfast cup, nearly filled it with tepid water, covered it with a plate of glass, and on this placed a portion of a cigar box lid perforated with the figure of a cross, the lines of which measured two inches and a half in length by half an inch in width. The glass was warmed previous to being placed *in situ*. The theory of the experiment is, that underneath the wood the cooling would be slower than underneath the cross, and that the figure of the cross made by the glass beneath the hole would be "permanently" cooler than its ground, and so condense the moisture more.

In the first experiments, the presence of the figure amidst the general dew was rather a matter of faith for "them which" could believe, than one for observation by those whose credulous capacity was small. After each experiment the glass was wiped and replaced in its position above cooling water, and with the agreeable result that the figure of the cross became less and less a matter for belief, and more and more a phenomenon for easy observation, until at length the results were procured with ease, and, as dewdrop pictures, left little to be desired.

Dewdrop Pictures by Artificial Cold.—On the morning of December 6th I performed the experiment in another way. I nearly filled the cup with water from "the tap," covered it with a circular disc of glass, well cleaned, and covered this disc with a circular piece of blotting-paper, similar in size. The blotting-paper had previously been saturated with water, also from "the tap." On this the perforated wooden screen was placed, and the combination left for one hour's time in a room without a fire. In this case I expected that evaporation would take place beneath the cut-out figure, and where, consequently, the paper was exposed, and that the glass below, cooled by the evaporation, would condense the moisture of the air within the cup the most; and this the experiment proved to be the case. I repeated the operation on various succeeding days with excellent results. When the apparatus has been left so long together that the paper has completely dried and moisture been deposited on all the under surface of the glass, the picture is easily developed by gently waving in the air, and thus causing the evaporation of the thinnest film of dew. Of course it is not long before the picture gradually vanishes away.

By this experiment frigerography is removed entirely from the region of tradition and of scientific history, and made into a beautiful experiment for the parlour table, performable with the simplest of appliances in everybody's home. I have omitted, I see, to mention that when the wet blotting-paper is removed, the upper surface of the glass must rapidly be wiped—the ball of the hand will do—and then the figure of the wooden stencil is most elegantly revealed in an exquisite fabric of dew, which presents a pleasing succession of appearances as it gradually exhales.

As regards the iodine pictures as produced with the apparatus already depicted and described (page 235), I find the time required to get them is prolonged, some hours being needed to get vigorous results. The kind of paper used has evidently a deal to do with it, for on some sorts

* Continued from page 235.

of paper a feeble image in iodine is easily developed into a vigorous one by rubbing it with starch, prepared in the form of "paste"; and on other kinds—as, for instance, that on which I write—a comparatively vigorous iodine image, though rendered blue, actually becomes feebler when it is rubbed with starch. I have performed the experiment since commencing the present article. Vigorous a quarter of an hour ago, the picture now has almost disappeared. When producing these pictures in the mode I have described (page 235), the uncertainty of which I spoke is most annoying. I expected in the case of the picture just obtained to get a darkened image of the stencil on a ground of white, whilst the fact is, my result is exactly the reverse. When first I got these pictures in iodide of starch I had hoped they would be permanent in kind, but I find that they are not. However vigorous the results may be at first, by prolonged exposure to the light and air they gradually disappear. I have now before me a picture of some leaves made from a cardboard stencil just two months ago. Then the picture was extremely vigorous, and of something like a navy blue; now it is pale brown. Possibly it is some ingredient in the paper which has caused the change. With further experiment this is a matter for which I shall doubtless find a remedy. There are, however, plenty of other materials to try.

Pictures made in Camphor by the Evaporation of the same.—I have tried at least a score of times, and each time I have tried in vain, to make frigerograms in camphor by the means which have answered so excellently when water has been used. What camphor is like "everybody" knows. "When pure," says Fownes, "it forms a solid white crystalline and translucent mass, tough and difficult to powder, and having a powerful and familiar odour." After alluding to its melting point, he says, "It slowly sublimes at the temperature of the air, and often forms beautiful crystals on the sides of bottles or jars containing it exposed to light." It is this latter property which made me think it applicable for frigerograms in their experimental stage. I have put a couple of ounces of it in a tumbler glass, covered this with a glass plate and wooden stencil, and placed the whole in a dish of water at 100° Fahr., and left alone all night. A deposit copious enough took place, but it was disposed uniformly on the surface of the glass, and by slow evaporation, when the camphor was turned upwards, failed to develop an image of the stencil visible even to "them which were both ready and willing to believe." I have repeated this experiment over and over again with variations of a comparatively trivial kind; still the pictures do not come—at any rate, not the pictures of the kind I seek. Evaporograms are easily enough obtained, and are obtained with certainty as well, and this is the way to get them. Put a quantity of camphor into a tumbler or a cup, cover with a dry glass plate, and place in a dish of hot water for an hour. The camphor will evaporate in goodly quantity, and condense upon the glass. Turn this upside down—that is, with the camphor to the air—and cover with a wooden stencil.

Sooner or later—that is, in two or three hours in a comfortable room—the uncovered portion of the camphor will have gone away by process of evaporation, leaving a clear glass picture of the stencil on a camphor ground. I have such a picture on my table now, and a very pretty thing it is. It is a picture of a six-rayed star. Looked at towards the gas, the ground-work has a sort of would-be ice effect, which spangles in the light. Held so as to throw its shadow on a piece of paper fastened to the wall, the star appears in brightness on a darkened ground.

Though this result is not the thing I sought, the experiment is well worthy to be re-performed. Millions upon millions of evaporograms must in all ages have been produced in nature, and some of these must have left results which have lasted from antiquity till now, and which to-day are visible to the eye.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

BY W. M. ASHMAN.

TWENTY-SEVENTH ARTICLE.

CARBON printing is the name given to the process of producing photographic positives in a film of pigmented gelatine. It is dependent upon the behaviour of colloids and salts of chromium in the presence of light, and is considered to produce results which, when certain precautions are taken in the selection of the materials, are quite permanent as far as exposure to daylight is concerned. The chemical action which takes place when potassium dichromate is mixed with gelatine, dried, and exposed to light, is very simple. The salt represented by $K_2Cr_2O_7$ is converted into the lower chromate K_2CrO_4 and chromic acid CrO_3, setting free some oxygen, which, combining chemically with the gelatine, renders that substance insoluble in either hot or cold water. Therefore, if a film of this compound is exposed to light under a negative, and then treated with warm water, this insolubility will be recognized by the washing away entirely of part of the film representing the opaque portions of the negative, and by its partial removal elsewhere in proportion to the strength of the light, as it is modified by the various densities of the image. In this manner are the half tones produced. In practice it is found that the prolonged action of damp upon such a mixture has the same effect; a fact of great importance as affecting the details of the process, and very necessary to be remembered.

The title "carbon printing" arises from the fact that without the addition of some colouring matter, pictures in dichromated gelatine would be scarcely visible, and finely pulverized carbon was first added to the sensitive mixture as being an insoluble substance, quite unalterable by exposure to light. The resulting pictures were of course black and white. In the course of time other powders or pigments came to be added, until quite a variety of different tints were used, and now it is easy to obtain commercially any quantity of pigmented gelatine spread upon paper, capable of producing images in black, sepia, brown, purple, red, and so on.

The first attempts at what is now so reproductive a printing process were indicated in the published experiments of Mungo Ponton, who, in the year 1839, announced to the Scottish Society of Arts that potassium dichromate might be used to sensitize paper, the dark orange tints of the parts exposed to light remaining on the immersion of the picture in water, while the yellow portions were dissolved out. Becquerel discovered that the action of the light was more rapid upon a sized paper treated with the chromium salt, and thus he was led to introduce gums and gelatine. Alphonse Poitevin, in his experiments, as remote as 1855 found distinct advantages to accrue from the use of colloid bodies, and that if pigments were mixed with the gelatine the colour so introduced remained after exposure and subsequent washing. He thus succeeded in producing prints in pigmented gelatine, but he could only work on subjects in black and white. Pouncey's modification consisted in substituting gum arabic for the gelatine, which enabled him to print in half tone. Swan coated glass plates with collodion, and spread pigmented gelatine thereon. These two films were stripped from the glass, placed in contact, and the double film was called carbon tissue, a name which has stuck to pigmented gelatine tissue to this day. But it was not until 1864 that the first practical carbon printing process was published by J. W. Swan, in which an insoluble powder, black or tinted, was mixed with a soluble gelatine and spread upon paper. The technical difficulties to be overcome are easily explained. If a piece of such prepared paper is exposed behind a portrait negative, the light, acting with energy varied by the different densities through which it has to pass, penetrates the dark coloured gelatine to different depths, rendering it more or less insoluble, but rarely, if

ever, reaching the paper at the back by reason of the opacity of the pigment. If such a piece, after exposure, were to be placed in warm water, the action would be to float off the image which is on the face of the tissue, and thus it would be lost. It is the paper side of the tissue which requires removal only, with the gelatine adjoining it, leaving the image, formed of graduated thicknesses of insoluble coloured gelatine on some support. J. R. Johnson found that gelatine tissues would adhere to any smooth surface temporarily or permanently by mere atmospheric pressure if the air was squeegeed out thoroughly from between the two, and for the purpose he employed what is now called a squeegee. When exposed tissue is thus secured to a collodionized glass or to a suitably prepared wax paper, the back of the tissue can be attacked by hot water, and then removed along with all that gelatine which has not been affected by the light, leaving the image transferred to the prepared surface, and thus this difficulty is surmounted. The second obstacle to successful printing is to be found in the impossibility to see the result of the exposure upon the dark tissue. The method of practically overcoming this will be referred to presently.

The details of the manufacture of carbon tissue need not be entered into beyond stating that the pigmented coating is a mixture of gelatine, sugar, glycerine, and powders of impalpable fineness and of suitable tints ground in water. These are heated to a workable temperature and spread on long bands of paper by means of specially designed machinery. When dry it is ready for sensitizing. Several varieties of tissues can be purchased at most dealers in photographic goods, or from the Autotype Company, Ealing Dene. These pigmented gelatine papers may be had either sensitized or unsensitized by post, and if in the former condition they will keep perfectly for a week certainly, and often very much longer, provided they are stored in a dry place shielded from all light and air. In this form it is very convenient for users who work the process on a small scale, and, of course, saves the time, trouble, and risk of the sensitizing. The unsensitized tissue retains its qualities in that condition for many months, unless it be kept in a decidedly damp place. It is made sensitive by immersion in a half saturated solution of the above-named chromic salt, to which is added enough strong ammonia to make it neutral to litmus paper, and in summer time from two to five per cent. of methylated alcohol may be added, and a rather larger dilution with water. Upon immersion, pigment side down, the paper will curl inwards; then care must be taken to remove any air-bells from either side, and when the paper curls back until it assumes a position of flatness, it is ready to be removed. Having a clean piece of glass ready, the tissue is placed upon it face downwards, and all superfluous solution squeegeed out and blotted off, after which it can be hung up to dry by two corners in a dark room through which a current of air is freely circulating without dust, until it is dry. Rapid drying is the best preparation for printing on negatives with little contrast—over-exposed—and slow drying for rapidity, but under some circumstances it seems to bring about a flatness of image, weak lights, and even insolubility; especially is this likely to happen in the neighbourhood of a coke fire, or an imperfect combustion gas stove. Acidity of the sensitizer seems to act in much the same way. As a guide it may be said that tissue which takes five or six hours to dry will generally have twice the printing speed of that which is dry in two.

Carbon tissue in appearance presents a black, glossy surface on a stout white paper, and after sensitizing the back is of a primrose hue. In this condition it is extremely liable to become insoluble, either by lapse of time, damp, or by the action of light. Besides this the tissue, after printing upon for a short time and then being set aside in the dark, will go on gathering intensity as if the action of light were continuous. The reason for this is found in the fact we have already noticed, namely, that the least moisture is capable of bringing about insolubility in time, most probably by the setting up of the chemical decomposition that brings about the change, and which it is the province of the light to initiate. But when the light has once started that chemical action, the moisture natural to the atmosphere in any place is enough to continue it. Judging by many known instances of the energy of light being quite checked by absolute and maintained desiccation, we very much doubt if rapidly dried sensitized tissue would print at all if all moisture were perfectly removed from it, and the exposure took place *in vacuo*. Silver printing on albumenized paper may be cited as a well known instance of the necessity for a trace of dampness being requisite to enable the chemical change to be brought about by light. The same law seems to be indicated in platinum work, as we have seen. The fact that the action goes on in the dark is of considerable commercial importance to carbon printers, who are thus enabled to turn out a much larger quantity of work in winter than would otherwise be the case, and from some experiments made by E. W. Foxlee at the Autotype works, the amount of action so obtainable has been formulated with tolerable accuracy.

Practice has proved that it is better to sensitize the tissue as it is wanted, and that to avoid variation in its sensitiveness certain precautions must be taken against damp reaching it, or against its becoming chip dry.

An instructive experiment can be performed by opening one half of a printing frame soon after the tissue has been exposed to the light, and breathing several times upon the surface, taking care not to damp the negative. When the print is developed it will be very plain which part was so treated.

(*To be continued.*)

Patent Intelligence.

Applications for Patents.

10,307. George Clulow, 51, Belsize Avenue, Hampstead, "Photographic Plate and Film Holder."—June 25th.

10,319. H. J. Mansell and E. Frith, 55 and 56, Chancery Lane, London, "Folding Stands and Supports for Photographs."—June 25th.

10,393. J. S. Fairfax, 433, Strand, London (Frederick Crane, United States), "Films or Supports for Photographic Negatives or Prints."—June 26th.

10,418. H. J. Shawcross, 15, Water Street, Liverpool, "Photographic Printing Frames."—June 26th.

10,439. G. Cumberpatch, 6, Annette Road, Holloway, London. "Folding Chairs and Head Rests."—June 26th.

10,504. C. R. Crawford, 186, Fleet Street, London, "Indicating Correct Exposure in Platinotype Printing."—June 28th.

10,535. H. Bogaerts, 34, Southampton Buildings, London, "Reproduction of Photographs from Nature."—June 29th.

Specifications Published.

15,024. James Woon, 118, Northbrook Street, Liverpool, for "Apparatus for Washing and Drying Photographic Negatives, applicable also for Washing Photographic Prints."—Dated October 19th, 1888. Claims:—

1. An improved rack for holding photographic negatives or the like during washing, drying, or otherwise, consisting essentially of a preferably bottomless receptacle, provided with vertical corrugations upon the interior of its two opposite ends, and a vertical moveable partition, also corrugated, and devices for supporting the same in different positions, and having also means, such as strips, for retaining the said plates within the corrugations, whereby the rack may be adapted to hold plates of different sizes.

2. A washer adapted to contain a rack such as described, or photographic prints, or the like, having a bottom of semicircular or curved contour, and means, such as a pipe, for injecting a stream or streams of water therein, and the orifice of which is below the normal surface thereof, and having also a forked overflow pipe contained in an outer chamber, which allows the escape of the contaminated water from the bottom of said tank, while

maintaining a constant level therein, and which may also be transformed into a syphon for emptying, if desired.

3. In apparatus for washing photographic negatives, prints, or the like, the combination of a washing chamber with the water delivered under the normal surface, and a branched or forked overflow pipe drawing from the bottom, but allowing of overflow only when the water is at ordinary surface level, except when used as a syphon.

11,578. JULES DECOUDUN, 8, Rue Saint Quentin, Paris, Civil Engineer, for "Improvements in Photometers."—August 10th, 1888.

This invention relates to improvements in the photometer for photographic purposes, for which he obtained former Letters Patent, dated October 1st, 1887, No. 13,332, by which the intensity of the light focussed on the screen of the camera is estimated (in order to deduce therefrom the proper time of exposure) by means of translucent materials of varying thickness.

In the specification of the previous patent, it was stated that in order to estimate the intensity of light, it was necessary to view the luminous points which successively come opposite the small aperture, from a distance of about ten inches, which is inconvenient under some circumstances, and especially for outdoor work.

To avoid this he provides a small lens of suitable focal length, through which the luminous points can be accurately observed by applying the eye close to the instrument. In a modification of the instrument transparent letters form a substitute for the small perforations in the first arrangement, and they may also be formed of a series of small holes. Instead of employing letters or signs for comparison with a table, he may use figures denoting directly the proper time of exposure.

1,278. HENRY NORTON BUTLER GOOD, Shrewton Lodge, Devizes, for "Photographic Cameras."—January 23rd, 1889.

The invention relates more especially to photographic cameras in which pictures are taken (generally instantaneously) upon a film or strip of sensitized material, the position of which can be adjusted as and when required, so that after each picture has been taken a fresh part of the sensitized strip can be brought into the proper position to take a fresh picture, and so on until the whole of the sensitized strip or film has been utilized.

In such cameras, as heretofore used, the strip or film of sensitized material is wound upon a roller which is inserted into a separate slide or holder and attached to the camera, and is unwound from the said roller as required, and re-wound (after the pictures have been obtained upon its sensitized surface) upon another roller carried by the removable slide; and the present invention has for its objects novel methods of construction by which the camera and lens and the devices for carrying and moving the film as required are united in one instead of being separate; the rollers for holding the unused paper or other flexible sensitive film, and the receiving rollers for the same, are so placed as to occupy the smallest possible space, so that space is greatly economised, and the entire apparatus, the inventor states, is cheap, light, and portable; whilst the paper or other film is wound in such a manner, from one roller to the other, that the sensitive surface, which naturally curls inward, is kept flat by the glass or other rollers round which it passes, and is supported at its edges by guiding strips, against which it is pressed by a plate of vulcanite or other material, which is forced forward by a screw or cam at the back of the camera. When an exposure has been made the pressure of this cam is released, and the vulcanite plate is forced back by springs, leaving free space for another fresh surface of the film to pass over the rollers when wound off from the holding roller.

The cam or screw which presses the vulcanite against the back of the sensitive paper may first press forward a spring at the back of the plate, the end of which is bent forward and sharpened to a point, so that it makes a mark upon the paper between the end of the vulcanite plate and the glass-covered guiding roller, thus marking off in lengths the surfaces exposed.

A registering roller is also arranged, over or round which the paper passes on its way to the receiving roller. As the registering roller revolves it indicates upon an indicating device outside the camera when the proper quantity of paper has been wound off and the number of exposures made.

The invention is stated to be more especially applicable to small cameras in which a series of instantaneous pictures can be taken at any desired time.

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Correspondence.

CLAUSTHAL MINES PHOTOGRAPHS.

SIR,—In your "Answers to Correspondents" of the 14th inst., you express the belief that I am an official engaged in the Clausthal Mines, whereas I am an English student at the Mining School here, name moreover not E. J., but E. S. Padmore.

From the fact of my address being enquired for, I presume some of your readers wish to know my method of procedure, and therefore beg to send you an account of what I have done in this direction, which you are at liberty to use or not, as you think fit. For simply photographing ore-veins, as in the case of the photo enclosed, I found one lamp with magnesium wire amply sufficient; but when I came to photograph the miners in their working positions, I found that in the first place they could not stand still so long—about a minute—and in the second place that the effect was not good when the light simply came from behind; that is to say, from the place where the apparatus stood. Then I had two reflectors made of ordinary tin plate, one about 18 in. diameter, and one somewhat smaller, and burnt in front of the larger. This is an average case; 20 pieces of magnesium wire, 15 cm. long, and in front of the smaller 20 pieces 10 cm. long, the exposure—all forty pieces being ignited at the same time—lasting a few seconds. It is probable that two of Mr. England's flash-lamps, as described in the PHOTOGRAPHIC NEWS of March 15th, 1889, would give better results, as the light would then act instantaneously, and both lamps could be ignited at exactly the same time, the latter condition having caused a failure in one or two of my negatives. The larger reflector I used on one side of the apparatus, close to the lens, moving it up and down as long as the wire burned, and the smaller on the opposite side, at about right angles to the line joining the camera and object. Thus the larger reflector gave enough light to show up the detail in the shadows caused by the smaller reflector, the latter of course giving the effect. With respect to focussing, I simply put a lamp—here no safety lamps are used—in the place which I wished to be sharpest, and then photographed the flame as sharply as possible. In determining what sort of a picture I would have, I judged with the eye how much would be best to take in, and then placed lamps on the boundaries of the same, these being all visible when my apparatus was in the right position. Of course in many cases the limits of the space in which I could place my apparatus were somewhat confined, and thus I found the best lens to use—in fact, in most cases the only one possible—was a wide-angle. The lens used was a "Dallmeyer Wide Angle Rectilinear" with the largest stop, plates extra rapid (Sensitometer No. 25), and the amount of magnesium wire burnt varied from ½ a gramme to 6 grammes, according to subject. The developer, I should say, was a weak one.

Clausthal, Germany, June 22. F. S. PADMORE.

ILFORD PLATES.

SIR,—May we ask you to allow us to contradict, in a most unqualified manner, the rumour which is being so industriously circulated, with what object we do not venture to say, and which is alluded to in copy letter we annex.—Yours truly,

THE BRITANNIA WORKS COMPANY.

Ilford, London, E., July 1st.

(COPY.)

The Britannia Works Co.

DEAR SIRS,—Will you kindly inform me if you have decided not to make any more Ilford quarter-plates ordinary rapidity, as I have heard to that effect. Your reply by return will oblige.—Yours truly, F. D. F. NEWMAN.

Westbourne Avenue, Hull, June 28th.

Proceedings of Societies.

London and Provincial Photographic Association.

The annual meeting was held on the 27th inst., Mr. W. E. Debenham in the chair.

The Hon. Secretary read the annual report, after which the election of officers for the ensuing year took place, with the following result :—

Trustees—Mr. J. Traill Taylor, Mr. J. B. B. Wellington ; *Curator*—Mr. A. Haddon ; *Committee*—Messrs. J. Atkins, H. D. Atkinson, J. J. Briggingshaw, E. Clifton, W. E. Debenham, P. Everett, T. E Freshwater, and J. Moran ; *Hon. Sec.*—Mr. F. A. Bridge.

The subject for discussion before the meeting was the "Practical Testing of Lenses." Upon this subject Mr. J. Traill Taylor said the usual method adopted by opticians to test a lens was by a bulb of mercury illuminated by a lamp ; an artificial star of light was thus produced. The lens was focussed in this spot of light, and as it behaved in and out of focus, so was the adjudication of that lens. Lenses should be slightly under-corrected. The correction of a lens may be done by placing it so as to get an image of the flame of a candle or any other bright object. By drawing out the lens, a greenish tinge will be produced ; this will give place to a claret colour when the lens is returned in the reverse direction. Flatness of field, a desirable quality in a lens, could only be obtained by admitting a certain amount of astigmatism. Defects in the glass composing a lens may be readily detected by holding the lens in front of a bright light, so that the whole of the surface is illuminated with a flood of light. The slightest waviness of the glass can in this way be detected at once. A ready test for degradation of colour was to simply lay the lens on a sheet of white paper.

The Chairman said Voigtlander thought it advantageous to over-correct a lens. Absolute flatness of field was not to be expected ; it was, however, a valuable quality, and to obtain it astigmatism had to be put up with as the lesser evil of the two. By focussing a newspaper placed obliquely to the lens it could readily be seen how much of this quality the lens possessed.

Hackney Photographic Society.

Dr. Gerard Smith, the President, gave his paper on "Compounds Sensitive to Light," on Thursday last. He spoke of several plates and papers used in photography. He stated that he was in favour of isochromatic plates, as he got proper gradation. He used two separate developers : the first stopped down with bromide for contrasts, and he afterwards finished with a second and stronger solution. He said that he used a deep dish, and let the plate stand in the first solution without rocking, as it helped to build up the high-lights.

In answer to a question from the question box, "How to print a broken negative," Mr. Dean said he thought if Canada balsam in benzole were used as an adhesive and backed with another plate, it might answer.

Liverpool Amateur Photographic Association.

The usual monthly meeting was held at the Society's rooms, 3, Lord Street, on Thursday, 27th inst., Mr. A. W. Beer in the chair. There was a good attendance of members.

The President spoke of the loss the Society had sustained in parting with the services of Mr. W. A. Watts, their Honorary Secretary, and said that a more capable officer it would be difficult to find. He added that it was his pleasurable duty to submit the Council's nomination of Mr. W. A. Watts as an honorary member. This was carried unanimously. The Council had elected Mr. W. Hughes, Honorary Secretary as successor to Mr. Watts.

Mr. G. R. Johnson was elected a member of the Association.

The House Committee's statement of expenditure incurred in the alteration, fitting up, and furnishing their rooms amounted to £149 5s. 4d.

The President hoped it would be satisfactory to the members, and, judging from their present comfortable quarters, he thought the money had been advisedly spent.

The leaders of the excursion on June 1st to Burton and Ness, and of the excursion on June 15th to Speke Hall, Old Hutte, and Hale, gave particulars of their respective trips. Fifteen joined the former, and were fortunate in the weather; 102 exposures were made, and good results secured. The latter party numbered 49 ; two large wagonettes were requisitioned for the occasion, and a day was pleasantly spent, during which 229 exposures were made.

Mr. Paul Lange gave his demonstration of "Enlarging," using the Society's enlarging camera, recently purchased for the use of members, and proceeded to make an enlargement from a half-plate positive to a negative 15 by 12. He found that the most satisfactory results were obtained by first securing a good small-sized positive by contact, from which the desired negative could be obtained, and from which any number of prints could be supplied. Enlarging direct on bromide paper was not certain, and only one copy could be made ; whereas a good negative once secured, was always ready, and the results uniform. For enlarging purposes, he preferred a tinted positive, such as the colour produced by soda development, the effect of the colour tending to soften the shadows. The formula he used was—

No. 1.—Pyro	... ...	3 grains
Water	... ...	2 ounces
No. 2.—Washing soda	... ...	2 ounces
Amm. bromide	... ...	40 grains
Water	... ...	16 ounces

The lens he used was a 9-inch doublet worked at $\frac{f}{16}$; he gave thirty seconds' exposure at 6 p.m., bright sunlight, and obtained a satisfactory negative.

Pictures were exhibited on the screen for the inspection of members, taken at the recent excursions, by Messrs. Beer, Tomkinson, Timmins, Tunstall, Mackrell, Thomas, Wilkinson, and others.

Photographic Society of Philadelphia.

A meeting of the Society was held June 5, with President Graff in the chair.

The Secretary reported the death of Mr. Charles F. Butler, a member of the Society, who was lost in the disastrous flood at Johnstown, Pa., on May 31st. Mr. Butler held the position of Assistant Treasurer in the Cambria Iron Co., having removed his residence from Philadelphia to Johnstown within a recent period.

The Committee on Joint Exhibition presented a report, from which the following is extracted :—

"Your committee believes that critics generally recognized a marked improvement in the quality of the pictures exhibited by all participants. The increased proportion of bromide and platinum prints was noticeable over former exhibitions, and indicate a change of taste from the warm tones and glossy surface of the albumen print to something more permanent and more pleasing to the eye of the artist. An even greater revolution may be expected within the next year, owing to the introduction of the cold process in platinotype printing, and in the new toning of plain silver prints with platinum salt. The aristotype and prints made from negatives on orthochromatic dry plates, and prints from celluloid films, were among the newer features of the exhibition. The exhibits of pictures made with the detective cameras were interesting in many respects, and no doubt furnish valuable studies for an artist ; but in close comparison with larger and direct prints from negatives made with time exposure, they suffer in respect to technical qualities and the careful composition so important to a photographic picture. It is to be hoped that the ease and fascination of hand camera work will not induce photographers to neglect the use of the larger plates or films, which, though entailing more cost, care, and labour, repay it all in more satisfactory and pleasing results. We are informed by one of our foreign exhibitors that among landscape photographers of England who aspire to pre-eminence in their art, larger plates are now in use than ever before."

Bath Photographic Society.

The third excursion of the season took place on the 29th ultimo. A four-in hand brake left the city about noon for Great Chalfield Old Manor House, Trowbridge, journeying by way of Batheaston and Box. The day was very fine, and cameras were already on the ground, some members having previously arrived in private carriages.

Old Chalfield is the property of Mr. G. P. Fuller, M.P., and is most unique. The church, old manor house, farm buildings—in fact, the entire village—is built within the moat, and must have been a formidable stronghold in bygone times ; it dates back at least four hundred years, parts being still older. The whole village, easily taken with a wide-angled lens from within the moat, was soon attacked by two dozen cameras. While the party were reclining in the cool shade afforded by the surrounding elm trees, Canon Williams exposed one of the new celluloid films on the assembled guests as a memento of the occasion, but

as the Canon was not himself included in the group another camera was quickly brought into play by Mr. Perren. A pleasant drive of a few miles took the party to the Old Manor House, South Wraxall, the property of Mr. Walter Long, M.P., and preserved by him exclusively for inspection by visitors. The place is of great historical interest, and abounds in subjects for the camera, the majority of which received attention.

Next outing, July 27th, to Chepstow and Tintern.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE June excursion meeting of the above Association was held at Bradford-on-Avon on Saturday, the 22nd inst., the weather turning out so bright and clear as to be eminently adapted for good photographic work. There was a fair attendance of members. On arriving at Bradford, the river scenery below the town was first visited, a reach below the fourteenth century bridge affording good work. The quaint town bridge, with the curious building formerly an oratory, corbelled out on one of its abutments, made also an excellent subject. After lunch the members worked for a time among the various old-fashioned byways of the town, where many admirable subjects for the camera exist. The party then drove to South Wraxall Manor House, an ancient place, now much decayed, full of the greatest interest to artist and antiquarian. The exterior is partly Tudor and partly Elizabethan, and, from its quaintness, very suitable for photographic work. Several hours were profitably spent here before the time came to return home.

The July meeting will take place on July 20th, Wells being chosen as the spot to be visited. Glastonbury is within easy reach, and affords abundant material for exposures.

Talk in the Studio.

RESISTANCE TO LIGHT OF COLOURING-MATTERS WHEN FIXED ON TISSUES (Jules Joffre).—The author examines the part in the action of light which may be due to oxygen. Chevreul found, in 1837, that dyed tissues are not discharged if exposed to the action of light in a vacuum, turmeric and prussian blue forming exceptions. The author, in resuming these experiments, placed the dyed swatches, not in a vacuum, but in pure nitrogen gas. Under these a great number of colouring-matters remained unaffected. Among these rank the shades dyed with cyanine, which disappear in a few hours' exposure to the sun in the air, but retain all their intensity in the absence of oxygen. The shades obtained with picric acid turn to an orange in nitrogen gas just as in air. The action of atmospheric oxygen may be eliminated by coating the dyed swatches with paraffin or with gum-arabic.—*Chemical News.*

PHOTOGRAPHY AND CHIROMANCY.—M. Bué, the leading professor of chiromancy in Paris, does not confine his practice to the personal examination of the hands of those who can call on him, but is said to be making a large income from a careful examination of photographs of the open palm and extended fingers of their left hands, and the fee for such an examination ranges from 25 francs all the way to three figures, depending on the elaboration of the written opinion. Those who may be silly enough to pay even five dollars, the lowest fee, will not grudge at least half as much for the good photograph on which the opinion is to be founded.—*The Beacon.*

MESSRS. PERKEN, SON, AND RAYMENT send us a copy of a letter received by them from Dr. Fridtjof Nausen, who has just made his appearance in London after his celebrated and dangerous journey across Greenland. Writing from Christiania, the doctor states that time not allowing of the verification of the aneroids at the Kew Observatory, he had this done at the Meteorological Institute at Christiania with the most satisfactory results as to the correctness of these instruments.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—On Thursday, July 11th, Mr. T. Scotton will give a demonstration on "Various Processes for Copying Line Drawings."

THE well-known gelatine maker, Herr C. W. Heinrichs, is retiring from commercial pursuits, and the manufacture will be carried on by a company called the Deutsche Gelatine-Fabriken.

MESSRS. J. B. HANNAN & Co. have sent us some specimens of new styles of cardboard mounts with delicately tinted margins.

PHOTOGRAPHIC CLUB.—The subject for discussion on July 10 will be "Photographing Lightning." Saturday outing at Loughton.

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Piper and Carter, 5, Furnival Street, London, E.C.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

A. B.—Thin aluminium leaf can now be procured of Mr. Stickley, 194, High Holborn. It remains untarnished for any length of time.

CRYSTOLEUM.—The speciality resides only in the pigments and varnishes; any silver prints on thin paper will do, provided the subjects are suitable.

J. G. N. (Wolverhampton).—Addresses of photo-block makers were sent by post. Additional names can be furnished if wanted. Thanks for your second letter.

T. EVENS.—A letter addressed to Mr. E. S. Padmore, Mining School, Claustbal, a/Harz, Germany, would find; but meanwhile see that gentleman's letter in the Correspondence column this week, which contains most interesting details of his mode of working, and encloses another photograph of the ore-vein in section (near view).

PELLICLE.—The weight of a dozen half-plate sensitive pellicle films is 4 ozs. only, against 3lbs. for glass; and the packet occupies about one-fifth the thickness of the ordinary gelatine plates.

METALLURGIST.—There is no good portrait to be had of the late Dr. Percy, but a very striking crayon sketch was taken a few years ago by Mr. Edward Best, of the Royal School of Mines, Jermyn Street, and this has lately been photographed.

W. M. A.—Thanks for your letter; we envy you the opportunity of going over the classic ground. Our views upon the subject of print washing appear to be now in fairly close agreement.

W. K. (West Kensington).—A good process is to transfer carbon prints on to the opal glass. This is best done by wetting the exposed carbon tissue, laying it down upon the opal glass (also wet), passing the squeegee, and then developing the print upon the glass. The negative may have to be reversed.

M. M. and Co.—Answered by post. Write again if not suited.

J. G. G.—You cannot do better than study the regulations of the Richmond Photographic Exhibition. We will endeavour to find the prospectus and send it on to you.

W. L.—We learn on enquiry that it was a Dallastype.

S. V. W.—The article does not seem to be any longer procurable. It could be imitated by stirring up chloride of lime with warm water, adding carbonate of soda in slight excess, and filtering. Be careful not to use the solution too strong.

WM. DANMAR (Brooklyn).—Thanks for your pamphlet; but we fail to see in "The Tail of the Earth" any reference to matters photographic; only a few facts and frauds relating to spiritualism, in which we do not feel interested. The speed of travel of the "zeroids" at eighty years of age is, we see, put down at about 1,000 miles an hour, or much faster for the younger spirits, and as they are said to be "located in the shadow of the earth," there is little chance of our ever getting to photograph them.

GIL BLAS.—It is immaterial whether you build up the collotype rollers from sheet rubber or tubing, so that you make them of the requisite degree of compactness. The first lends itself better to purpose, we should think, for it would allow of the winding process being conducted under a certain amount of tension.

TRAVELLER.—Use a Kodak, or some kind of detective camera, covered with brown paper, and you will not want a permit. See answer to "T. A. W." in the NEWS of 14th ult.

MOUNTER.—Glue a sheet of flour-emery cloth O on to a piece of flat board, and give the knife a few strokes occasionally when its edge appears to be blunted. The hone and strop are useful at times to restore a keen cutting edge.

E. DE R.—The *Pall Mall Budget* of last week gave four plates of lightning flashes taken at Ilford, Croydon, and Cambridge on the night of June 6-7, and some of these show points of structural agreement.

PHOTOS.—The Society of Chemical Industry holds its annual meeting in London on July 10th, 11th, and 12th, beginning with a general meeting of its members at the Royal Institution, and proceeding afterwards to visit Doulton's Art Pottery Works at Lambeth, the Manbré Saccharine Company's Works, Messrs. Cowan's Sugar Refinery, Trueman Hanbury's Brewery, and Brin's Oxygen Works. There is to be a reception at the Grosvenor Gallery on the 10th, and dinner at the "Star and Garter," Richmond, on the 11th July.

S. H. (Redcar).—It would be as well to advertise; but meanwhile we are making enquiries about a large hand-cutting machine for cardboard.

J. S. wants to know who took the photo. of group assembled on the orchestra at rehearsal for the State concert at Buckingham Palace last week.

Several correspondents in our next.

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THE PHOTOGRAPHIC NEWS.

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PHOTOGRAPHY IN BELGIUM.

PRACTICALLY there is but one photographic society in Belgium ; it consists of four sections, one of which meets in Antwerp, another in Brussels, the third in Ghent, and the fourth in Liege. The society is named the Association Belge de Photographie, and its committee of administration meets once a month in Brussels. This committee consists of Messrs. J. Maes, president ; Alex. de Blochouse and Massange de Louvrex, vice-presidents ; Dr. E. Candèze, H. Colard, Alf. Géruzet, Herry, Alb. Lunden, Ch. Puttemans, A. Rutot, V. Selb, and R. Storms, councillors ; and O. Campo, general secretary. Mr. Maes, the president, is also president of the Antwerp section ; he has large photo-mechanical works in that city, and carried off the chief prize at the Antwerp Exhibition for proficiency in that branch of photography. Mr. A. de Blochouse, a retired engineering photographer, was long president of the Brussels section, and is highly popular ; no public movement connected with photography in Belgium is considered complete without him. Mr. O. Campo is an Italian amateur of ability and wide experience ; he has travelled much in the tropics and elsewhere. Mr. Raymond Storms is a Belgian amateur, some of whose work at the Antwerp Exhibition was gratifyingly recognised by the King of Portugal. Mr. A. Géruzet studied the art-science in London, and is partner in a large firm of professional photographers in Brussels, which is in the honourable position of being able to say that for the last ten or fifteen years it has not turned out a single photograph liable to fade, for all its work has been produced by the carbon process, such small pictures as cartes-de-visite included.

The monthly *Bulletin* of the Belgian Association is produced at more expense and is more elegantly got up than any other photographic periodical in continental Europe ; it is ably edited ; its pages are entirely free from abusive matter and personal attacks. In one thing it is lacking, namely, in records of original experimental photographic research indigenous to Belgium ; for that prosperous little nation has not yet succeeded in evolving an Eder, a Becquerel, an Abney, or a Vogel. Dr. Van Heurck, the director of the Botanical Gardens at Antwerp, has, however, done some pioneer work in photomicrography. Captain Abney is the London correspondent of the *Bulletin Belge*. All the four sections of the Belgian Photographic Association concentrate their energies on the production of one good *Bulletin*, instead of frittering away their strength over four small ones.

The Belgians intend to hold an International Photographic Exhibition in 1891, so that plenty of time is before them to evolve it on an efficient scale. At a recent meeting of the committee of administration it was resolved that—1. "The Association, to maintain the rank it occupies among the photographic societies of Europe, and above all to establish relations of good brotherhood with those societies, has decided that—without committing its individual members—it will take part in every international exhibition of photography of which its committee of administration recognizes the importance." 2. "The Association, in pursuance of these ideas, has decided to hold before long—that is to say, in two years—an international exhibition of photography, of which the organization will begin in the coming winter."

In order to more closely bind the members of the Association together, it has been decided that the committee of administration will hold an extraordinary-general meeting once a year, but never two years following in the same city ; at these meetings papers will be read and discussed. The next meeting will be held on the the third Sunday in November, at Brussels.

Belgium, as the records in the English photographic journals prove, is a popular country for short holiday outings by British photographers, perhaps because the military and other restrictions in France make tourists hesitate to take a camera there at all, and they have not time or inclination to go through long correspondence, and comply with various formalities, to get the necessary permission, or to ascertain where they may or may not photograph. One often hears of photographic tours from England to Antwerp southwards, but never of photographic excursions to picturesque Boulogne-sur-Mer and thereabouts. Moreover, the tax put upon each Briton who lands in France, though small, awakens feelings of irritation ; visitors should not be treated as natural enemies, to be squeezed at every turn, and of all this Belgium deservedly gets the advantage. Our photographic brethren in France have nothing to do with this, but they might memorialise their own authorities to make such arrangements that visitors to Paris for the Exhibition need not be afraid to take their cameras with them. Neither need the half-way refreshment room at Amiens be a hot-bed of shameless extortion. An individual declared at a recent photographic meeting in London, that he had been charged a franc (9½d.) at Amiens station for a glass of soda water out of a siphon. Visitors to Paris should make such arrangements as to have to purchase nothing at Amiens railway refreshment-room.

A convenient way of reaching Belgium from London is *via* Harwich and Antwerp, because the voyage is made during the night in large deep-sea boats. The open sea traversed is mostly sheltered from the great rollers of the broad Atlantic by the mainland of England ; this, coupled with the large size of the boats, gives good average immunity from sea-sickness, so that a long comfortable night's rest is usually obtainable on the journey. Every night but Sunday night the boat train leaves Liverpool Street at eight o'clock, and Antwerp is reached at eight or ten o'clock next morning, according to the direction of the

tide in the Scheldt. All the paddle boats have been taken off this route and put on that to Rotterdam; the boats running to Antwerp are of the twin-screw description. The peculiarity of twin-screw boats is that they are very swift; that if one screw becomes disabled, the ship can go ahead with the other screw; also, that if the two screws be turned in opposite directions, the ship will rotate upon its vertical axis, hence, can turn in a narrow river; all which nautical information, and more, we gained some years ago, on the trial trip of the twin-screw gun-boat *Bolivar*, which was afterwards bought by the Brazilian Government to chase river pirates.

COLLOIDAL CELLULOSE.

A PAPER has been read recently before the French Academy of Sciences, by M. Ch. E. Guignet, upon a form of cellulose which may be of use in photography, and which has already pressed so many of the colloids into important portions of its service. M. Guignet's memoir sets forth that he begins with pure cellulose—preferably the filtering paper prepared by cleansing with hydrochloric and hydrofluoric acids, for use in analysis; the finest carded cotton wool will also answer, but the final products obtained have then a slightly grey colour. He dries the selected cellulose, and then soaks it in sulphuric acid of the strength 50° B., which transforms it into a transparent gelatinous mass, which keeps indefinitely in that condition, even in the presence of excess of acid, when the temperature is not allowed to rise. At 100° C., or even less, the transformation into dextrine is very rapid.

Treated with water and thoroughly washed, the colloid cellulose will dissolve in *pure* water. To readily remove the last traces of acid, it is advantageous to wash it with ordinary alcohol, and then to dry it by a gentle heat almost to the total evaporation of the residue of spirit. On again treating it with water, a slightly milky liquid is obtained, which deposits nothing, even when allowed to stand for several days. The liquid is not altered by being boiled, and the colloid cellulose is slightly more soluble in hot than in cold water. By transmitted light the solution has an almost pure orange colour.

As is the case with several colloid substances, colloidal cellulose is precipitated from its solution by the addition of very small quantities of foreign matters, such as sulphuric acid, nitric acid, chloride of sodium, sulphate of soda, and acetate of lead. A sufficient quantity of alcohol also determines the precipitation. It is not thrown down by the tartrate of copper and soda; it is not coloured by iodine, and differs completely from those dextrines which are not thrown down by acetate of lead and small quantities of foreign salts.

When dried on a clean marble slab previously rubbed over with vaseline, colloid cellulose gives a brilliant semi-transparent pellicle, which first swells slightly in cold water, and then dissolves completely. A milky liquid like the original is thus again obtained. If dipped for a few instants in sulphuric acid of 60° B., or even of 55° B., if the immersion be more prolonged, the colloid cellulose becomes insoluble in water; at the same time a small quantity of dextrine is formed. Well dried colloid cellulose is changed by nitric acid in the same way that ordinary cotton is changed.

M. Guignet adds, that the properties of colloid cellulose furnish an explanation of several peculiarities appertaining to parchment paper. Some very thin varieties of the latter give up colloidal cellulose to boiling water. On the other hand, stronger papers are not attacked under the same conditions, no doubt because a stronger acid was employed in the manufacture, rendering the colloidal cellulose insoluble. Parchment paper represents to some extent ordinary paper with its pores filled with colloidal cellulose. This can easily be proved by coating ordinary filtering paper on both sides with colloidal cellulose, allowing it to dry slowly, and then rolling it under pressure between two sheets of polished zinc, as in satining paper. The product exactly resembles vegetable parchment similarly rolled. M. Guignet says that among the natural products previously studied, none resembles colloidal cellulose; pectic substances, gelose, and others differ from it in most essential characteristics; for instance, solutions of these substances are not precipitated by small additions of foreign matters.

From the chemical constitution of the substance made by M. Guignet, it may be expected to resist the action of damp much better than gelatine and colloids at present in use in photography, assuming it to be, as he says, but cellulose in an unfamiliar form. Its manufacture on a large scale is manifestly cheap, because the only dear substance used is alcohol, which, for the most part, can be recovered by distillation. Films of the colloidal cellulose have the property of being easily made soluble or insoluble at the will of the operator, and it is a substance likely to be as inert as pure filtering paper to the action of salts of silver. Altogether, this new discovery seems likely enough to have a more important bearing upon some photographic processes of the future than can at present be seen.

PHOTOGRAPHIC OPTICS.*

BY W. K. BURTON.

CHAPTER IV. (*continued.*)

Angle of View.—This is the angle subtended by the view which the lens throws on to the plate. It would appear to be a simple enough matter to consider, but there are few subjects concerning which there is such inextricable confusion in the minds of most as of this one of angle of view; and, indeed, the writer finds some difficulty in making the matter plain.

The reason of the confusion is that, whilst it may be said that angle of view is entirely a function of the size of the plate, and of the focal length of the lens, there are "wide angle" and "narrow angle" lenses which may be of the same focus. The following facts may first be stated.—(*a*) All lenses of the same focal length include the same angle† on plates of the same size (if they will cover the plates); (*b*) the size of plate remaining the same, different angles are included only by lenses of different foci, the shorter the focus ‡ the wider the angle included; (*c*) the focal length remaining the same, the amount of angle included by different lenses can vary only by the use of different sized plates—the larger the plate the greater the angle included.

Perhaps I shall make myself clear by taking definite examples. We may say, then (*a*), all lenses of 10 inches focal length include the same angle on a plate 10 × 8 inches, whether they be called wide or narrow angle, so long as they will cover the plate at all; (*b*) with a plate 10 × 8 we can only take in greater or less angle by using lenses of less or greater focal length—a lens of 8 inches focus taking in, for example, a larger angle than one of 12 inches, even although the latter might be called a "wide-angle lens;" (*c*) with all lenses of 10 inches length we can vary the angle only by using larger or smaller plates, the larger the plate the greater the angle—thus, a lens of 10 inches focus includes a wider angle on a 12 × 10 inch plate than one on a 10 × 8 inch plate.

What, then, it may be asked, is the meaning of a "wide angle lens?" If the question is one purely of focal length and size of plate, a lens is wide or narrow angle entirely according as it is used. This is quite true in so much that any lens includes a wider or narrower angle according to the size of plate that it is used with; but there are many lenses which will not cover a plate large in

* Continued from page 433.

† This statement is not mathematically correct if lenses which give distortion be considered. It is, however, very nearly so even with them.

‡ Strictly speaking, a focus is a point; but the word is so frequently used to denote "focal length"—already described—that I use it in this sense.

proportion to their focal length at all, so that they cannot be used to include a wide angle. A wide angle lens is, then, simply one that may be used with a plate large in proportion to its focal length. To take a definite example, a portrait lens of 7 inches focal length will probably not cover a plate $6\frac{1}{2} \times 4\frac{3}{4}$. If the attempt be made with it, it will be found that the corners of the plate are not covered at all; or, at the best, that the definition at the corners is very poor. There are, on the other hand, some lenses of 7 inches focus which will cover, quite sharply, a plate 12 × 10 inches. The former is a narrow angle lens, the latter a wide angle. It is impossible to draw any sharp line between narrow and wide angle lenses, but, as a rule, it may be said that a lens which will cover a plate whose diagonal is equal to the focal length is a lens of moderate angle; one which will, if required, cover a larger plate is one of wide angle; one which will not cover a plate so large is one of narrow angle.

Wide angle lenses are very useful when it is impossible to get far away from the object to be photographed—as, for example, in much architectural work. They must, of course, for such work, be used with a plate large in proportion to the focal length, or—the size of the plate being fixed—a lens of comparatively short focus must be used, otherwise, although the lens is of the wide angle form, it will not include a wide augle.

When opticians first gave photagraphers wide angle lenses, these latter inclined to make continual use of them on plates as large as they would cover, thereby including very wide angles of view; but the results were not satisfactory. A sort of exaggerated perspective was produced, objects in the picture not appearing to bear proper proportion to one another, especially those in the foreground appearing to be very large. The defect is not really distortion, but is due to taking a picture which, to be seen as a correct representation of the subject, would have to be viewed from a point closer to it than any one would naturally select.

It is now becoming daily more evident that it is desirable to include only a moderate angle—except in those cases already meutioned, where it is not possible to get far enough away from the object to do so without losing much that we desire to have in the picture. General opinion appears to be in favour of lenses of about the focal length of the diagonal of the plate for geueral landscape work, about $1\frac{1}{2}$ times the diagonal for portrait work.

Depth of Focus.—In discussing the property, or various properties, of lenses to which the above name has been given, we get on a subject which has perhaps led to more discussion and difference of opiuion than has almost any other which relates to photographic optics. No quite satisfactory definition has ever been given of depth of focus, and perhaps none such is to be found. I shall, therefore, explain generally what is meant by the term.

The very first time that the photographer focuses any object at a moderate distance from the camera he will perceive—if the opening of his lens is tolerably large—that when he adjusts the distance between the lens and the ground glass so that one particular object produces an image quite sharp, objects farther from or uearer to the camera produce images which are not sharp. It will be found that if different lenses are used, or if different diameters of stops be tried, the result will be that the lack of sharpness of the different objects nearer aud farther from the camera than that which is sharpest varies, till, with a very small stop, we may have all objects apparently quite sharp. This property of making objects at different distances from the camera appear equally sharp is called depth of focus. The difficulties in the way of accepting the term as one having any precise scientific meaning are as follows:—It is, in the first place, impossible to make objects at different distances from the lens mathematically equally sharp. There is always some object which is in the sharpest definition, or some position in which, were there an object, it would be in the sharpest definition—and objects at all different distances, however near the first-mentioned, will be less sharply defined. The manner in which the reduction of the size of a stop increases the sharpness of the image of objects before or in front of the distance of best definition is shown in the accompanying cut. A here is a

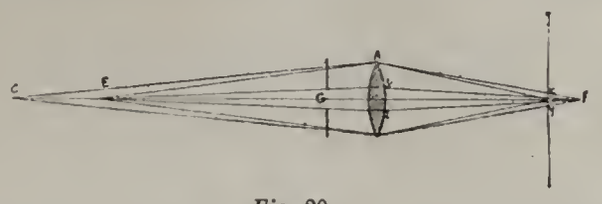


Fig. 20.

lens, C is a point of an object which will be focussed on the plane B D, representiug the surface of the ground glass when we focus for C. E is the position of a point of an object nearer the lens. This point being nearer will throw off light which comes to a focus behind the plane B D,* say F. On the plane of the ground glass the point E will, therefore, be represented by a disc of the diameter of the whole pencil of light which has passed through the lens, as that pencil strikes the ground glass—that is to say, of the diameter represented by $x\ y$ on the sketch. It is evident that by introducing a stop as shown at G we reduce the diameter of the whole pencil of light which passes through the lens, both at the lens aud anywhere on its course behind the stop. We therefore notice it at the plane B D. The reduced pencil is shown by the lines k F, l F. We therefore reduce the diameter of the disc that represeuts the point E on the ground glass. It is, however, quite evident that we cannot reduce it to a mathematical point unless we have a stop of no diameter at all, which is impossible. We can, however, so far reduce it that it (the disc representing the point E) will appear to the eye no larger than the point (an actual mathematical point, if we leave spherical and chromatic aberration out of the question) representing the point C.

All the arguments that apply to the point E will also apply to a point further from the lens than C. For this reason, then—that although it is impossible to have objects at different distances from the lens in equally good focus† we may so far reduce the difference that it is not perceptible to the eye—it has been proposed to substitute the term depth of definition for that of depth of focus. The substitutiou would be an improvement, but the latter term has become so geuerally used, and in a loose sort of way understood, that I retain it here.

Depth of focus varies inversely as the focal length of lenses, and inversely as the aperture. It is therefore less the greater the focal length, and the greater the aperture.

Diffusion of focus is a term closely allied to *depth of focus*. There is a vast amount of uncertainty as to the precise meaning, or rather, perhaps, we should say, application of the term, mostly arising from the lack of precision in the term depth of focus. Again we shall try to get at a general idea of the meaning by explaiuing rather than attempting to defiue. Turuing again to the last cut (fig. 20), and considering that whereas the point C is represented by an actual point (the concessions mentioned above being for the time granted), and the point E being represented by a disc of cousiderable magnitude—in other words, an object at C being shown as perfectly sharp, one at E as considerably lacking sharpness—it will be evident that the two must be in very great coutrast. If, however, we deduct a certain amount from the sharpness of *both*, although we will reduce the definition of both, we shall also reduce the *contrast*, and the image of an

* It is unnecessary to give all details as to why this is so. Those who have understood the explanations about prisms will readily understand how it is. Those who have not understood these explanations can certainly not be made to understand the question at present being treated by any further explanation that the writer can give.

† I here leave out of the question the case of two objects, one at such distance behind, the other at such distance in front, of the plane of best definition, that they have both the same amounts of sharpness.

object at E will (although actually worse defined than before) look sharper, because there is nowhere any absolutely sharp definition to show the want up by strong contrast. If the lens A possess *spherical aberration*, neither of the points C or E will be absolutely defined; and therefore the condition will be satisfied, for the point which is in worst definition not being thrown into strong contrast with another which is in excellent definition. An arrangement whereby spherical aberration could be produced at will in a lens was, I believe, first suggested by my esteemed friend, J. Traill Taylor, and the idea was first put into practice by the famous optician Dallmeyer. It is said of a lens in which it is possible to produce spherical aberration at will that it possesses a *diffusion* of focus arrangement. Such an arrangement is of use only in the cases where it is not possible to get depth of focus by the introduction of a small stop, as in the case of portrait lenses, where the small stop would, in certain circumstances, prolong the exposure to too great an extent.

The dispute about diffusion of focus is as to whether it does or does not actually increase depth of focus. It does not actually make any part of an image sharper; on the contrary, it makes every part less sharp; it therefore, say some, produces no increase in depth of focus. The opponents of these, on the other hand, argue that as there *is* no actual depth of focus, as the whole question is one of definition as judged by the eye, an arrangement which makes the definition of objects at different distances *apparently* more equal does actually increase the depth of focus. The question is in reality purely one of terms, and where the terms cannot be strictly defined it is idle to argue one way or the other. I leave the reader free to take what view of the question he likes, a thing which he would probably do whether he were left free or not.

The rapidity of a lens is the measure of the time of exposure needed when it is used. Other things being equal, the rapidity is inverse as the exposure required. It is directly as the amount of light which the lens allows to pass through it. I shall have more to say on this subject in another chapter.

ON THE BEARING OF THE POSSIBLE INTRODUCTION OF SPHERICAL ABERRATION IN PHOTOGRAPHIC LENSES.*

BY T. R. DALLMEYER, F.R.A.S.

AT very brief notice I was asked by our Secretary to contribute a short paper, adding something further to the remarks contained in the paper I read to the Society at our last Ordinary Meeting. The only point in dispute had a bearing on this subject.

I have fully demonstrated, on theoretical grounds, the advantages that are derived by the introduction of positive spherical aberration (when produced at will) in a portrait element. The claim has not been disputed as regards the improvement of definition for planes in the object *beyond those focussed for*. The use and employment of a photographic lens, without "begging the question," only requires improvement in those planes beyond the main object focussed for, viz., that of most interest; and any improvement that can be derived from an optical construction to benefit the resulting image in this direction is a distinct gain. The drawback would occur if an equal amount of foreground were desired to be depicted; but this is not the case in practice. The small amount of foreground necessary to be in sufficiently good focus, nearer than the point focussed for, is always considerably less than that beyond the point focussed for; moreover, the slight softening of the image arrived at in this way produces that artistic effect that has been acknowledged by many of our oldest and distinguished members of this Society for many years, and latterly has given rise to so much inquiry. The broad and courageous views advanced by Dr. H. P. Emerson of the advantages pictorially to be derived from such a power has recently taken a large portion of the photographic world by storm, and they are standing as though "adjusting their consciousness to this new idea," like people "who hear some news that will require them to re-adjust their conceptions of the past."*

The controversies bearing on the relation of art and photography have called forth the opinions of many eminent authorities in science, photography, and of painters in art. At the late Camera Club Conference a great deal was said on this subject. The time allotted was short for discussion upon such important papers as were read, and as any opinion I might advance myself would be rather accepted as a student in Optics than as one in Art, I preferred to listen to authorities who gave their opinions on that occasion, and not to advance any views of my own. I was forcibly struck with the extreme schools that met, and the force of their antagonism, and it had a most important bearing upon what the efforts of the optician should be to satisfy both extremes in a single instrument. I thought then that one side had grasped the sentiment of an expression I once came across that by the aid of photography we should soon discover everything about the violet but its scent. One school is desirous of depicting the form and structure of the plant in its most minute detail, and this would appeal to them as the flower itself, whereas, the other school would prefer to indicate the flower in such a manner that it would appeal more to the senses, and suggest even its familiar smell.

I remember Major Knott insisted emphatically that if a butterfly should appear in a picture it would be far more artistic or valuable, from his point of view, that not one iota of its plume or natural beauty of structure should be missing. He, therefore, was not in sympathy with the other school when they represented children in a hayfield, with artistic surroundings, chasing a butterfly that was hardly more defined than its mere indication of position in a pretty picture. Photography, on the one hand, owes a debt of gratitude to men like Major Knott, who have worked hard to give us all that detail in their studies of the animal and insect world; and, on the other hand, we are indebted to many of our members whose works have been so much admired from an artistic standpoint, and have been honoured by this Society in its awards, and by the eulogy of an appreciative and discerning public.

The one school demands that fineness of definition produced only by optical instruments perfectly corrected from a scientific point of view, and, moreover, a scientific triumph as regards the exactitude of mathematical calculation and mechanical skill. They prefer an instrument used at its best from this point of view only, where the most exact and sharp images are desired in the result, valuable in every sense as records and aids in research.

To cope with the desires of the other school, in which the soft rendering of pictures of well-known subjects is desired, the optician has again resource in his science by the introduction at will of positive spherical aberration in lenses to produce that softness and delicacy that is only arrived at by this uncorrected error. It must be borne in mind that this does not necessarily mean a bad instrument; but when a lens, such as that previously described, can be made at will to answer both purposes, the problem is solved. In single combination lenses, this has hitherto been arrived at by employing larger apertures that entirely cut off outstanding aberration; but, in the portrait lens, this problem was first and finally solved by my late father in his patent portrait lens, and I am sure that I shall have your forgiveness for the pride I feel in mentioning this again, as it is only latterly that it has become to be widely appreciated, although had it not been for some of the pioneers of this Society—and I must mention the names of Messrs. Robinson, Blanchard, England, and the late T. R. Williams—this lens would probably never have been produced. It is the endeavours and success, moreover, of photography, when properly employed, to be a true art that has recently called for so much attention to the powers that may be given to photographic lenses to compete in this direction.

"The study of art possesses this great and peculiar charm, that it is absolutely unconnected with the struggles and contests of ordinary life. By private interests, by political questions, men are deeply divided and set at variance; but, beyond and above all such party strifes, they are attracted and united by a taste for the beautiful in art. It is a taste at once engrossing and unselfish, which may be indulged without effort, and yet has the power of exciting the deepest emotions, a taste able to exercise and to gratify both the nobler and softer parts of our nature, the imagination and the judgment, love of emotion and power of reflection, the enthusiasm and the critical faculty, the senses, and the reason."—*Guizot.*

* A Communication to the Photographic Society of Great Britain.

* George Eliot, *Mill on the Floss.*

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.*

BY W. M. ASHMAN.

TWENTY-SEVENTH ARTICLE (*continued*).

TISSUE that has become partly insoluble after sensitising is, of course, useless, but it can be easily tested by placing a small piece in warm water. If complete solution of the gelatine takes place it is still serviceable, but if the outer surface leaves as a skin it must be rejected as defective. There are two kinds of carbon prints, known respectively as single and double transfer. The first is produced from the printed tissue in one operation, but the picture has the drawback of being reversed when printed from an ordinary *glass* negative. With stripping films or translucent paper negatives this difficulty does not occur, as either side of such can be placed next to the tissue, and the reversal done in that manner. Negatives may be taken on ordinary glass plates, reversed as to position by the simple expedient of cleaning the back of the glass well before placing into the dark slide for exposure in the camera, and presenting that side to the lens instead of the bromide of silver film. The sensitive surface then requires protecting with cardboard to prevent injury by scratching or abrasion by the spring, and the focussing screen also requires turning, or some other modification must be adopted to suit the change in the position of the sensitive surface. In large practice a mirror is used in front of the lens, and the camera placed at a right angle to the usual position. In many cases, however, the reversal of a portrait, right side for left, is of very little importance; indeed, the Daguerreotype and most positives by the collodion process were finished so.

With these explanations we can proceed to the more simple details of the manipulation of the paper. First we must put an opaque band around the margin of the subject, but on the back of the negative; brown paper does, but a neater plan is to paint a band of black varnish about a quarter of an inch wide inside, which will be without that amount of the negative we wish to print. This we term a safe edge, and its use is to ensure adhesion to the support during development, and to prevent frilling up or breaking away of a portion of the picture. There is a danger of the tissue, if at all damp, sticking to the negative when under pressure for any considerable time in the printing frame; so, to obviate this, the negative, now provided with a safe edge, should be dusted over freely with powdered talc, and the excess removed with a brush, when the tissue, cut to the outside size of the safe edge, may be adjusted in the dark room as in other contact printing methods. Plenty of yellow light, as that coming through golden fabric, is what is required to work with in comfort. When the frame is placed in diffused daylight the printing will commence, and here comes in the necessity for some guide by which to judge of the exposure, as the tissue shows nothing of the change except a transient faint image when the surface is breathed upon; a fact only of use to experts.

J. R. Johnson introduced an actinometer designed to register the effectiveness of daylight in a given time. The instrument contains a narrow band of silver chloride paper in a closed chamber, and in action a short strip is withdrawn and darkened in the light until it assumes the depth of a standard colour painted on the outside. This is termed one tint; two or three of such tints are requisite when the actinometer is used as a guide to printing carbon tissue under a negative of moderate density. H. J. Burton, of Ealing, whose experience in carbon printing stands unrivalled, has lately introduced the most reliable instrument the writer has seen, and by its means accuracy of exposure may be made. Roughly, it may be stated that a negative requires about three-fifths the exposure for a carbon print that it would to produce one in silver on albumen paper.

* Continued from page 441.

In the absence of an instrument such as that referred to, the next best plan is to choose a second negative of the same printing power, and to use this as a guide. Put a strip of silver paper on the one negative, and the tissue on the other, putting both out into the light at the same time. When the silver strip is judged to be about three-fifths printed, the carbon tissue will most probably have received enough. Development may be proceeded with at once, or deferred for some hours if the tissue is placed out of the reach of light and damp, previously referred to when treating of continuing action.

In the case of single transfer, a special paper is sold for this process, called single transfer paper, and a piece of this rather larger than the tissue must be placed in a dish of cold water together with the latter, and as soon as the tissue has become flat, the two surfaces are brought together under water; then remove carefully, and lay them on a flat board provided with a piece of American cloth nailed to one edge, so that the cloth covers them. Then apply the squeegee smartly from the centre to each edge and corner to ensure contact and expel air-bells. Fifteen or twenty minutes may elapse before developing, during which the sheets of tissue and transfer paper may with advantage be laid in blotting pads under pressure. Each print with its backing must then be placed in a flat and deep dish of warm water, at a temperature of about 100° F., and in a short time some of the colour bearing gelatine will be seen to exude from between the two papers, and the corners will separate, when they may be pulled carefully asunder, and the original support thrown away. The transfer now requires bathing by throwing handfulls of the heated water upon it as it lies, or by agitating the dish and so causing the water to dash across in waves until the picture, at first hardly distinguishable, appears clear and brilliant. A last rinse with slightly warmed water, and a flood of cold gently administered, will make it ready for the alum or fixing bath, usually made of water with four or five grains of chrome alum in it. A strong solution of common ammonia alum is sometimes used, strength, one pound of the salt in two gallons of water; in either case the object is to harden the film and so preserve from injury; a good washing to remove the alum completes the process.

The double transfer process is the same up to this point, except in the preparation of the support, which has to be so arranged that the picture can be removed from it on to a third or permanent one, where it is unreversed. Either solid or flexible supports can be employed. Zinc plates, opal, or glass, are treated with a resinous mixture, which is rubbed on and then polished off, or the surface chosen as a support may be rubbed with powdered talc. The formula given in the Autotype Manual for the waxing compound is:—

Yellow resin	6 drams
Pure beeswax	2 „
Turps	1 pint

A paper prepared with an impermeable coating that will stand hot water is sold under the name of "Sawyer's flexible support," and can be treated with the waxing solution as above. Upon either of these being employed instead of the single transfer paper as just described, the picture can be removed by a very simple process. There are two kinds of double transfer paper sold, the most convenient of which is that made of insoluble gelatine. Sometimes it is double coated to produce the highest possible gloss in the finished picture. The carbon print being dry upon the zinc, glass, or flexible support, a piece of this double transfer paper a trifle larger than the picture is soaked in cold water for a short time, and then placed in warm water until it becomes somewhat slimy to the touch; it is laid upon the wetted print and squeegeed down; it is then left to get quite dry, when a corner can be raised, and it will leave the support with the picture, presenting more or less of gloss according to the nature of the surface of the sup-

port, collodionized and talced glass producing the most brilliant. The other description of "final transfer paper" requires to be soaked in a solution of common alum, four ounces of the salt to each gallon of water; it is then rinsed in clean water, and applied to the print on its temporary support; when dry, stripped as above.

The ordinary surface of a carbon print—unglazed—is peculiarly adapted to the purposes of working upon in water colour or crayon. A very old method of abrading certain portions of a print with a cutting medium lends considerable assistance, and is much practised. The plan has more than once been the subject of a patent, but is free at the present time, and those who give attention to finishing their photographs in monochrome are especially advised to test the efficiency of the carbon process in the manner indicated. The method of obtaining a high gloss is only suitable for small work, and was for this purpose patented under the title of "Lambertype." The patent has lapsed; so, also, has the process, probably from an injudicious selection of pigments to incorporate with the gelatine, for the prints most assuredly did not retain their original beauty, as was expected of them; further, the manipulation is more tedious than that of silver prints, which they were intended to supplant.

Some remarks on carbon opals and transparencies will appear in the next chapter.

MR. CAREY LEA'S RESEARCHES ON SILVER.

THE following summary of some discoveries Mr. Carey Lea has just made in relation to silver, is from that skilfully edited journal, *Anthony's Photographic Bulletin*:—

Mr. M. Carey Lea, of Philadelphia, has obtained some new facts about the metal silver, a simple statement of which will appear almost startling. In a very exhaustive paper sent to the *American Journal of Science*, Mr. Lea tells us of three forms of metallic silver, that are almost entirely different from the ordinary metal. One of these new forms of the metal is soluble in water. Another is insoluble in water, but readily dissolves in presence of some neutral substance that does not act upon it chemically. Yet another form of the metal has the colour and lustre of gold. From what has been learned of the new forms of metallic silver just discovered, it appears that this metal can exist in several conditions, which are probably the basis of the various photo-salts of silver formerly described by Mr. Lea, and are possibly molecular combinations of the metal that lead to new and hitherto unknown haloid compounds, and may untimately serve to solve that knotty problem, the nature of the latent photographic image.

In the paper kindly sent us by Mr. Lea, and accompanied by a set of specimens that fully illustrate every fact described by the author, we note the following:—These new forms of silver can be classed under three heads. First, the soluble variety, which gives a deep red solution, and when separated gives a mat surface of lilac, blue or green when moist, and becomes bluish-green and metallic when dry. Second, the insoluble variety derived from the first, which is dark reddish-brown while moist, resembling the first variety when dry. Third, the gold-coloured variety, dark brouze whilst wet, and resembling burnished gold when dry. Another modification of this third variety is copper-coloured.

Of these strange forms of silver there are several properties totally unlike the ordinary metal, and yet common to all. Thus, by drying the particles of in optical contact upon glass plates, metallic mirrors are formed, and when spread on paper the lustre is as perfect as that of gold leaf. Again, by spreading these new forms of silver upon paper and then acting upon them with some haloid compound, such as perchloride of iron or iodine dissolved in potassic iodide, beautiful prismatic colours are obtained, resembling the colours of a peacock's tail. Another peculiarity of these new substances is that they pass instantly into ordinary gray metallic silver under the action of acids, even such weak acids as acetic. And lastly, all these new forms of silver can be readily reduced to powder by trituration.

The soluble variety is obtained by adding a mixture of ferrous sulphate and sodium citrate (really ferrous citrate) to a solution of silver nitrate. This gives a lilac-blue precipitate which is soluble in pure water to a deep blood red colour, and by analysis this soluble substance contains over ninety-seven per cent. of silver, the rest being ferric citrate, which it is almost impossible to separate from it by washing. It was further found that the proportion of citric acid in the new substances is variable, therefore they are not compounds of silver with this acid. Furthermore, these new bodies all amalgamate readily with mercury by simple friction.

The insoluble variety is obtained from the solution of the soluble variety by adding almost any neutral substance. Thus the sulphates of sodium and magnesium produce this result, nitrates and citrates can also be used, and even gum arabic answers the purpose. The analysis of the insoluble variety gives almost the same results as were obtained with the soluble substance.

In the case of the gold-coloured variety, a solution of silver nitrate is precipitated with ferrous tartrate. This substance has a slightly higher percentage of silver than the two former modifications, viz., ninety-eight and seventy-five hundredths of the metal.

The specimens kindly sent by Mr. Lea are very interesting. The colour of the materials is totally unlike ordinary silver; the glass plates coated with the new substances are very perfect mirrors, and the papers showing the action of haloid reagents give a most beautiful display of iridescent colours.

PHOTOGRAPHIC PREJUDICES.

THE *Photographitcheski Westnik*, of St. Petersburg, in a leading article, says that in life we often discover prejudices which have become rules of action. In photography are a number of rules without reason which are scrupulously observed both in the laboratory and in the open air.

No prejudice is more rooted, perhaps, than the idea that it is necessary to keep the dish in constant motion during development; to do this is tiring work. Special apparatus has been made, which proves that the operation is considered indispensable; in reality, the idea is without foundation. Not that we consider agitation of the dish entirely useless, but in many cases the continual motion of the bath is objectionable, for it occasions the formation of bubbles of air which adhere to the negatives and produce spots. A gentle motion every half-minute or minute is quite sufficient.

Another rule: People say that development renders the negative insensitive to light. Nothing is more false. It is astonishing that faith in this idea exists, when its erroneous nature can be so easily proved by experiment. But people do not experiment, and, on faith in this blindly accepted idea, many negatives are deteriorated by submission to the action of a feeble light.

It is easy to trace out the source of this opinion. When the negative has been a certain time in the developer, the latter assumes a pronounced yellow tint and forms a layer which protects the negative from the action of actinic rays, so that diffused daylight may be admitted without producing unfavourable results; it is not that the plate is insensitive, but that the liquid cuts off the rays which would do damage. If any among our readers refuses to believe us, we are willing to personally convince him. Leave the negative in the developer one or two minutes, take it out and shade half of it with anything which intercepts light, and expose the other half to actinic rays, re-plunge it in the bath, and you will easily see the effect of the supplementary action of light upon the uncovered half.

People erroneously believe in the existence of a photographically neutral light. It is true that certain screens act better than others, but to try to invent a glass or other screen which shall completely cut off actinic rays is as vain as trying to square a circle, for any light is sure to act after a certain time, varying with its intensity and its distance. In the collodion days actinic rays were more harmless than now, for a wet plate would resist their action more than a modern gelatine plate; but it should not be forgotten that even the most feeble light will produce an effect if you but allow it sufficient time.

Two celebrations at least of the fiftieth anniversary of photography have already been held; one in Italy, on May 26th, and another in Christiana, Norway, on June 11th.

M. ALBERT LONDE, director of the photographic service at La Salpétrière Hospital at Paris, has written, and is about to publish, a treatise on development, an operation which he thinks should be more scientifically and less automatically conducted than he believes to be generally the case at present.

A MUSEUM OF PHOTOGRAPHY.

With reference to the letter of Dr. Lindsay Johnson, published in the *Journal* of last March, suggesting the formation of a Museum of Photography, a sub-committee was appointed by the council to discuss the question.

The council have considered the report of the sub-committee, and are of opinion that it would be very suitable to form a museum on the lines suggested by Dr. Johnson. They therefore invite members who may be willing to do so, to send subscriptions for this purpose to the hon. treasurer, Mr. W. S. Bird, at 74, New Oxford Street, W.C. Subscriptions will be acknowledged in the *Journal*, and the further steps taken with regard to the museum will also be published.

The president and those members of the council who were present at the meeting on June 11th have subscribed £15 13s. 6d., and the offer of £10 10s. made by the originator, on the condition that a similar amount be guaranteed by other members, has been accepted.

A sum of £26 has thus been obtained as the nucleus of a museum fund, which, it is hoped, will be widely supported by members of the Society.

A form is enclosed with this number of the *Journal*, and may be filled in and sent to the hon. treasurer with a remittance. Members are also invited to bequeath, give, or lend to the Society photographic objects of interest of all kinds, with a view to their being exhibited in the museum.—*Journal of the Photographic Society.*

A SIMPLY MADE BROMIDE EMULSION.*

The method of preparing gelatine emulsion here described has the advantage that greater part of the operations may be conducted in weak daylight, and, from its simplicity, it is especially adapted for amateurs.

When a solution of nitrate of silver is added to one of a soluble bromide, a flocculent precipitate of bromide of silver is formed. The form and properties of this precipitate differ according to the circumstances in which it is produced; it is possible to secure a precipitate which, by its low sensitiveness, permits working in ordinary light. If the bromide of silver is thrown down in the presence of gelatine, it forms with this an emulsion. If the temperature of the solution is raised, so is its sensitiveness to light; but by the addition of a strong oxidizer, such as bichromate of potash, the action of light may be suspended. The emulsion may then be spread on the plates, and the soluble bichromate and nitrate salts removed by careful washing, which must be done in the dark. Finally, the plates so prepared are soaked for a day in alcohol, whereby their normal sensitiveness is restored, and then dried.

Now as to particulars of the process. In a wide-mouthed flask, placed in a water-bath heated to 114° F., is poured this solution:

Bromide of ammonium	10 grammes
Gelatine	12 „
Water	150 c.cm.

After complete solution, to this is added—

Nitrate of silver	16 grammes
Water	100 c.cm.

The latter should be added all at once, and the flask strongly shaken. The bromide of silver thus produced builds up an emulsion. The shaking should be kept up for at least a minute. There should be a slight excess of bromide of ammonium present during the formation of the bromide of silver, as otherwise fog is liable to occur. Now is added to this—

Gelatine ... ... 12 grammes

The gelatine should previously be soaked in water, as quick solution is aided thus. The temperature of the water-bath is now raised to the boiling-point, and kept there for fifteen to thirty minutes. It is then allowed to cool down again to 114°, and once more is added—

Gelatine ... ... 12 grammes

The emulsion is continually shaken until entire solution. Ten drops of a saturated solution of bichromate of potash are now added, well mixed; the solution strained through muslin into a flask, which is kept in a water-bath at the uniform temperature, 114°. The plates may then be coated. This operation is easy. A level horizontal support should first be provided, such as a drawing-board, which is supported on three small levelling screws, and by the help of a spirit-level made perfectly horizontal. In winter the well-cleaned glass plates must be slightly warmed, as the emulsion will otherwise stiffen before it is evenly spread upon the plate. The emulsion may be poured on the plate, and the surplus drained off into the jar; or it may be spread with the aid of a glass rod. A rather thick film gives the best results.

As soon as the plate is coated it is laid on the levelled drawing-board, and any plates not coated by the emulsion covered by aid of a glass rod. The emulsion soon stiffens; the plates are then taken from the board and laid in a washing tray, which is filled with water. Up to this the work has been carried on in ordinary daylight, not too strong; but hereafter all actinic light must be excluded. The plates are washed from three to five hours in flowing or often-changed water. This is for the purpose of freeing the emulsion film from bichromate and other soluble salts, which would interfere with their sensitiveness. After the washing, the plates have poured over them ordinary alcohol, sufficient to cover them; in this they must remain for eight days. The tray should be air and light-tight.

This method is advantageous in allowing plate making without making necessary an extensive dark room. If the preparation of the emulsion is begun toward evening, the first series of operations can be finished the same night. The washing vessel can then be so arranged that it can be filled and emptied without the entrance of light. After the eight days' soaking in alcohol, the plates can be taken out at evening, dried, and put in the holders.

The best washing apparatus of this sort is a metal box with wooden racks, which last should hold two plates back to back in each division. The washing goes on much faster when the plates are upright and the water runs off underneath. The flow of water should be so arranged that the box is always full. To this end an opening is made in the side near the bottom; to this is soldered a small lead pipe, which is bent, almost at the top of the box, in a bow, and carried downward again. The water then must escape from below, and inside the box will always stand as high as the bend in the pipe.

* From Liesegang's *Amateur Photograph*, translated for *Wilson's Photographic Magazine.*

Stains and Fog on Bromide Paper.—Those who have used bromide paper, either to print by contact or for the purpose of making enlargements, know how at times stains and irregular marks will make their appearance in a most unaccountable manner. These are difficult to get rid of, and many a sheet of paper has had to be consigned to oblivion, amid bitter regrets, in consequence. A member of an American firm of photographers has recounted his experience in dealing with a batch of 500 bromide prints, all more or less damaged by irregular stains and markings, and the information he gives is worthy of preservation for reference. After various experiments he tried a solution of cyanide of potassium, to which had been previously added a few grains of iodine, which is readily taken up by the cyanide solution. This accomplished the end sought, and the prints were saved. His *modus operandi* is best given in his own words, as follows:—"This solution suggested itself as a means of reclaiming them. We proceeded to make up a strong solution for stock, diluting it as required for use. We selected one of the worst prints and immersed it in water until thoroughly wet. We then placed it in the bottom of a porcelain dish, and then by means of a tuft of absorbent cotton we applied the cyanide solution to the margin of the print. When lo! 'it washed it white as snow,' cutting away the yellow stain, leaving not a trace of it behind. We went over the margin carefully, taking care to avoid encroaching on the picture itself. After this we washed the print well, and then, placing it back in the dish once more, we covered the print for a moment with a weak solution of the cyanide. Its action was carefully watched, and the moment the high-lights cleared up it was whisked out and thrown into a tray of running water. The result was most pleasing, so much so that we treated the whole 500 in a like manner and saved 95 per cent. Subsequently we used this method on some enlargements which were a trifle over-exposed, with most excellent results. It does not in any way impair the surface or texture of the paper. Of course it must be thoroughly washed after the operation. It is possible that some of the many workers in bromide paper may find this hint useful to them in their daily practice. But let me caution them not to use too great a proportion of the iodine in the cyanide solution. There is no necessity for measuring the amounts. Simply add a few grains of the iodine at a time to the cyanide solution. The proper strength can be determined by testing it on any old bromide print.—*The Photographic Record.*

Notes.

There is a confusing multiplicity of Vogels. In addition to the Vogels, father and son, of Germany, there is a third there; moreover, we have a celebrated Bird, or Vogel, in London. Dr. H. W. Vogel thus plaintively writes to a photographic journal about the third Vogel:—"I received from Washington an index of literature, and this has induced me to say a few words about the confusion between the names of H. C. Vogel, director of the Potsdam Observatory, and H. W. Vogel, correspondent of this paper, and director of the photo-chemical laboratory of the Royal High School, Charlottenburg. This confusion is all the more easy, as both gentlemen work in photography and spectrum analysis, and have published articles about the same. Even Abney ascribes, in his "Treatise on Photography of the Ultra-Red Spectrum," part of the discovery of the colour sensitive process not to H. W. Vogel, but to *H. C. Vogel*. A correction which was furnished to him was disregarded. The confusion is greatest in the index of literature of the spectroscope, by A. Tuckermann (Washington, 1888). H. W. Vogel's work about the hydrogen spectrum (Berlin Academy, 1879), further about oxygen and nitrogen spectra (Annals Ch. and Ph. 146, and reports of the German Chemical Society, XII., 532), is here erroneously ascribed to H. C. Vogel. Another work of H. W. Vogel, about relation between the absorption of light and chemism, is ascribed to H. V. Vogel. The work of H. C. Vogel about spectrum investigation with the large Vienna refractor is, on the contrary, ascribed to H. W. Vogel. This is only an example of the many and increasing confusions. This could probably be avoided if both authors would add the address to their names."

We leave our readers to guess the source of the following little anecdote:—A professional beauty, well known in society, and admittedly one of the most photographed women of her day, after being engaged for over three years to the younger son of an Irish peer, "broke it off," and it was mutually agreed that "all letters and photographs should be returned." It was not, however, until he had paid the bill for the hire of the large sized furniture removal van with the aid of which he had complied with the above condition to the letter— and more especially to the photograph—that that jilted younger son found out "what it really cost him" to free his rooms from all photographic traces of his fair though false Hermione.

"As the London County Council, or at least a portion of its members," writes a correspondent, "is in favour of the establishment of an official metropolitan brass band, it is surely not unreasonable to hope that before going in for what is so obviously a County Council luxury, and an expensive one at that, our new Council will first treat themselves to what has become a positive necessity in these days—I mean an official photographer. This operator, for whose appointment you have often asked, Mr. Editor, would, I am sure, find no lack of suitable employment. But if ut-of-door work should run short at any time, why, it is obvious that he could then make a point of attending the Council meetings, where he could always keep himself fully prepared, if needs were, to "'take' the chair at a moment's notice." Though we print the above, it is only in order that we may protest against the sending of such communications whilst Parliament still sits. We do not expect such epistles until the "silly season" has set in with its usual virulence; for then we make the necessary preparation for dealing with our increased correspondence by buying a new and more roomy waste-paper basket.

It is an open secret that the photographing of the inmates of our convict prisons is carried out, as a rule, by one of the warders, whose technical skill in the use of the camera is often only notable by its absence. The fact may help to account to some extent for the many cases of mistaken identity, involving the apprehension of innocent persons, which have from time to time been made public since the photographing of every convict has become a recognised item in his prison experience. How, therefore, the Home Secretary, in the face of the repeated mistakes made by policemen and prison warders, thanks to misleading photographs, can have assured the House of Commons that "the present system for the identification of criminals in this country is sufficient for all purposes," it is indeed difficult to understand. For, as a matter of fact, the present system, owing in a great measure to the slovenly and inaccurate way in which it is carried out, is notoriously insufficient either to secure the punishment of the guilty, or to protect the innocent. Under the present system, on the other hand, though the prison albums now contain 50,000 cartes and cabinets, in no single instance has there been a case of mistaken identity. This photographic registration of criminals is clearly, therefore, one of the many things they do manage better in France. For the French system ensures not only the taking of an accurate and artistic portrait of every convicted criminal, but, as a supplement to this "negative" evidence, the positive evidence which is furnished by a careful registration of the exact position of every mark about the features, limbs, and body of each prisoner. Thus identification by means of comparison with the official photographic portrait can, in France, be always confirmed or corrected, as the case may be, by duly checking minute personal details written on the back of the said photograph. How many more times, we wonder, must our inefficient method break down before the Home Office consents to adopt the admirable and virtually safe system which M. Bertillon originated, and which M. Herbette now carries out across the Channel?

The *Journal de l'Industrie Photographique* states that the German *Photographische Mittheilungen*, after publishing the address of M. Janssen inviting foreign *savants* to attend the International Photographic Congress at Paris, gives reasons why a visit to France cannot be anything but dangerous to Germans, and says that it terminates its article by saying, "In any case we recommend any of our countrymen who visit Paris to be prudent." *L'Industrie* criticises this article adversely, and we think with reason.

About the time of the opening of the Paris Exhibition there were great numbers of Germans in the city, and they were everywhere courteously treated. Anything which tends to keep the peace between the two great nations will have the sympathy of disinterested spectators, and anything which tends to increase the divergence will have the sympathy of none; those Frenchmen and Germans who are in the same state of mind as these spectators, are the most sensible and the most patriotic.

Criticising the portraits in an album is always a risky business. Fortunately, the family album is no longer trotted out as an enlivener to dull tea parties; when it was the fashion so to do, some very awkward remarks used to be made. The work of the ambitious amateur sometimes takes the place now-a-days of the family album, but criticism is equally dangerous, especially when the ambition of the amateur takes the form of producing "studies." The popular notion of a "study" as apart from an orthodox portrait, is to put a little drapery over the head if the sitter be a lady, or on the bare shoulders if the sitter be a gentleman, and the study is done. An amateur showed a "study" of this kind the other day to a friend, and asked him what he thought of it. "Oh! charming as to execution, but how did you come to get hold of such an ugly model?" "Well," said the amateur, trying to look pleasant, "it happens to be my sister." "Your sister," murmured the unlucky critic, "pray pardon me. It was exceedingly stupid, for I ought to have seen the likeness to yourself." On thinking over the matter afterwards, it occurred to him that he had not improved matters much.

Some of the "Rejected" have been sold. The top price was £4. Neither the title of the picture nor the name of the fortunate artist is mentioned. A good deal depends upon this. Some of the pictures would be dear at four shillings.

Apropos of the Olympia Exhibition, is it not "playing low down" for a modeller and a water-colour painter of reputation to make a show of themselves—the first-named for nothing, and the second at a charge of a shilling a-head—before a gaping public? Leaving good taste out of the question, we should doubt whether, as a commercial speculation on the part of the painter, the game was worth the candle.

We were always under the impression that artists were rather sensitive as regards their working hours. Their studios, it is generally supposed, are open only to intimate friends. We know an instance where intrusion was deeply resented; but in this case the workers were wood engravers, who perhaps do not count, as some people deny that engravers are artists. However, the story is instructive, and worth telling. The incident is connected with the engraving staff of a well-known illustrated paper, who were much incensed at a habit the proprietor had of trotting visitors round the establishment, and showing off the various departments in full work. The way in which visitors ask all kind of questions, and their patronising manner, are intensely irritating, and the engravers especially chafed under the sensation of being exhibited as show lions. One day the proprietor introduced a large party of ladies, and was about to go into the details of wood-engraving, with special reference to the samples in operation in the room, when, to his astonishment, he saw the whole staff cutting and slashing away at their blocks like a number of lunatics. A second glance revealed the truth. Every engraver had turned his block bottom upwards, and was frantically cutting what a printer would understand as "pye." The proprietor, like a wise man, took in the situation, hurried his visitors away, and henceforward the engravers were left in peace.

Photography in the cricket field may be very interesting to the teams, but is decidedly tiresome to the spectators. One is continually reading, as was the case last week with the great match of Gentleman *v.* Players, that the interval for luncheon was prolonged half-an-hour in order that the teams might be photographed. The question naturally arises, why perpetuate the stiff stereotyped method of photographing teams, wherein each man looks exactly like the rest? Excepting the pictures of the University boating crews, no photographs are so uninteresting as those of cricketing teams. What the public would really like and would buy would be photographs of incidents in play: the great W. G., for instance, in the act of skying a ball to the boundary, or Lohmann upsetting the wickets with one of his unerring balls. Why should not every county club have its own photographer, who, supplied with the best instantaneous lens and plates that money can buy, should do nothing but take, not the features of the team, but the features of the game? There is quite an unworked field here.

Artists who draw for illustrated papers owe much to photographs where portraits are concerned. The photograph saves them an infinite deal of trouble. Instead of wasting half a day in searching out and sketching the person whose portrait is to appear, all they have to do is to sit comfortably in their work room and copy the photograph which is sent to them by post. But there are cases when the photograph even does not make them happy. To receive a photograph taken full face makes them inclined to tear their hair, because in a full face all salient lines are obliterated, and the whole thing is simply light and shade. Now to reproduce a tint in lines, and lines which will print clearly in an ordinary periodical, is no easy matter. In fact, a success cannot be hoped for. Hence the artist always likes the three-quarter view, and the head turned so as to conceal the nostril on the farther side of the nose. By this means he gets bold, decided lines, which he can easily reproduce. Photographers who take portraits which have to be copied for publication will, we trust, bear the poor artist in mind for the future.

Chambers' Journal says that every day cloud photographs are to be taken from the highest platform of the Eiffel Tower, with a view to the systematic study of cloud-forms over a wider area than has before been possible.

M. GERMEUIL-BONNAUD'S PATENT AND MR. C. V. BOYS' REPORT.

Appended is the full text of the complete specification of M. Germeuil-Bonnaud's English patent, No. 1,751, Feb. 6, 1888; his French patent is numbered 195,780, and dated Jan. 29th, 1889. Mr. Pearce's article last week—which, as will be seen from our "Correspondence" column, has evoked adverse criticism—furnishes the reason for our publication of the specification to-day, together with the report of Mr. Boys. From a perusal of these our readers will be able to form their own judgment of Mr. Pearce's criticisms. The process may or may not be a good one commercially, for aught we know to the contrary. Mr. C. V. Boys is demonstrator to the Physical Society, and an exceedingly able one. Here is the specification :—

The object of this invention is to produce plain or coloured pictures and designs on china, earthenware, and glass, at a considerable less cost than painting by hand, as at present. According to this invention, I take a sheet of glass and, after having thoroughly cleaned the same, I, for the purpose of sensitizing it, coat it with a solution of organic matter; that which I prefer is composed of about 100 cubic centimetres of water, to which I add about 20 grammes of treacle, or other like substance, and from about 5 to 20 grammes of bichromate of potash (according to the state of the atmosphere), and about 10 grammes of borate of soda. The glass thus prepared, after having been left to dry, is placed on a positive photographic print, engraving, or other suitable picture or design (rendered transparent by suitable means, such as waxing for example, unless such photographic print or other picture or design is on glass, which I prefer) which it is desired to reproduce, with the sensitized surface next the print, and after having exposed the same to the action of the light according to the usual manner of printing from a negative for a sufficient length of time (sufficient for the light to traverse the whole of the picture), the luminous rays will have acted on the sensitized glass so as to allow of the development in the succeeding process (by degrees) of the picture by dusting on powdered metallic colours as follows.

I commence by dusting on the coloured powder to represent the general shade of the design or picture to be produced, and then I proceed in the same manner with all the necessary tones of colour. This done, I fix the colours by means of a fatty composition, thus placing these colours in the same condition as those which are put on by hand in the ordinary way. This composition consists of—

Essence of lavender ...	about	100 cubic centimetres
Fatty essence of Venice	,,	10 grammes
Powdered resin... ...	,,	5 ,,

This picture, which by the ordinary processes would be lost after half-an-hour, may be kept by this treatment for a day or two before completing. After complete desiccation, this composition presents a slightly tacky coating which retains the powdered colours, or to print my picture entirely I dust on with a dusting brush the large surfaces, and I complete the small surfaces and the details with a small paint brush in flat tints, using with the colours the above-named fatty solution. This finished, it is evident that on turning it over a fine painting with all the light and shade, in fact with all the tones, is entirely completed and ready to be transferred on to the porcelain or other similar material to be decorated at one operation. The transfer from the provisional support can be effected a few minutes after the colouring, whether such colouring has been effected by dusting only, or by dusting and painting combined.

In order to effect this transfer, I coat the picture with a fatty composition of collodion so that no cracking may take place by the desiccation; the following is the composition I employ :—

Collodion at 2 per cent. about		100 cubic centimetres
Fatty essence of Venice	,,	10 grammes
Powdered resin ...	,,	5 ,,

The picture, thus possessing a provisional support, I put in a bath of tepid water, where I leave it until the organic matter is entirely dissolved, after which I plunge it in a bath containing about ten per cent. of caustic potash, then wash it in clean water and place it in another bath of water containing ten per cent. of borax and five per cent. of sugar, when the collodion film with the complete picture on it will leave the glass, and I am thus enabled to transfer it to the china or other like material as desired, which china or other material has been previously placed in the bath ready to receive the film when it has left the glass, and when this is fired in the ordinary way, an absolutely permanent design or picture, coloured or toned as aforesaid, is produced.

I thus obtain a picture with all the colours which will melt in in the one firing, and give a very fine picture.

I would remark in conclusion that I am the inventor of a previous process for which Letters Patent were granted on my behalf to Emile Andreoli, dated the 30th day of August, 1880, and numbered 3,511, for "An improved process for ornamenting fictile wares, glass, and metallic surfaces," consisting of two distinct operations, viz, one for the colours, and another for the impression of the shades of these colours. This process gave very beautiful results in some cases, but was defective, inasmuch as it was found to be impracticable, especially with complicated subjects, on account of being obliged to transfer a photograph on to a painted "silhouette," and this mode of proceeding necessitated much work, as the "silhouette" painted on the object to be decorated had to be mathematically correct and correctly registered on to the picture, which was impossible on curved surfaces; moreover, the second coat of colour only covered the first coat already fired, and, consequently, they would not mix in the second firing, but by my present invention I dispense entirely with the use of a "silhouette" process, and thereby avoid the difficulties of register, and the single firing makes a complete union of the colours.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is :—

1st. The process of producing on a provisional support a complete picture or design in colours or tones, with all the light and shade, so that the same may be transferred to the china or other like material at one operation, substantially as herein described.

2nd. In combination with this process, the employment of fatty bodies throughout, substantially as herein described.

3rd. The process of producing pictures and designs in colours or tones on china, earthenware, and glass, substantially as herein described.

The following is forwarded to us as the "Report on Jean Baptiste Germeuil Bonnaud's process for the development of permanent coloured pictures on china, glass, &c., by C. V. Boys, A.R.S.M., F.R.S., assistant professor of physics at the Normal School of Science and Royal School of Mines, South Kensington and Jermyn Street, and demonstrator to the Physical Society of London" :—

I have examined M. Bonnaud's method of producing coloured pictures on china, and have satisfied myself as to its merits. The process consists of a few simple operations which may be described shortly as follows :—

A clean glass plate is flooded with a liquid and allowed to dry. An ordinary photographic print on paper, of which a coloured copy is required, is laid upon the glass plate, and the two are exposed to daylight for about ten minutes. The glass plate is then removed, and coloured powders are dusted over it with ordinary camel hair brushes. The powders are found to adhere to the plate where the light has had least effect, and not to adhere where it has altered the film on the plate; also the quantity of powder and the depth of shade produced is determined by the depth of shade in the original photograph. It is here that the most remarkable part of the whole process is to be seen. The colours do not appear to adhere indiscriminately, but to fall into their proper places as if directed by an unseen hand. For instance, in a landscape that I saw copied by this process the blue powder was first dusted on and then a suitable shade of green. On examination it was found that the sky was blue and the leaves of the nearer trees green, while the more distant trees were of a slightly different shade, giving the effect of distance perfectly. This part of the process is one which clearly requires considerable skill; but it can be performed in a very few minutes.

When the dusting is complete the plate is flooded with a varnish to fix the colours, and allowed to dry, after which it may be touched up, if necessary, with flat washes of colour. This operation is one which can be performed very rapidly, and which requires but little skill, as the shading is already perfect.

When dry, the plate is flooded with a specially prepared collodion, and before it is hard immersed in water, where it is left until the water has worked its way under the film, and washed away the original coating. It is then immersed for a short time in

weak potash, which leaves the film in a fit state to be floated off the glass and transferred under water to the surface of the china where it is required. It can here be made to slide about a little, until it is in the exact place that is desired, and is then, after drying, ready to be burnt.

Each picture requires from five to ten minutes of the time of a skilled operator, and perhaps another five minutes from an assistant. Of the excellence of the result it is hardly my province to speak, but I can imagine nothing more perfect, either in shade or colour, than some of the examples which were shown to me.

As to the expense of the materials, that is practically nothing, while the time that the skilled operator has to bestow is as nothing in comparison with that which would be necessary to paint the same thing by hand.

The process I know to be genuine, for not only have I seen it carried through from beginning to end, but I have myself performed all the essential operations with success.

The part of the process which is most to be admired, for the discovery of which M. Bonnaud is to be congratulated, is the possibility of making the film select the colour which is required in any particular part of the picture. When the process is shown to anyone, the film appears to have greater selective properties than I believe it really possesses. In the particular case that has been mentioned, the trees were darker than the sky in the original photograph, and, therefore, the part of the film covered by the trees was less acted on by the light, and was therefore more "tacky." In consequence of this, the sky was unable to take up so much colour as the trees. The operator knew from experience when that part of the plate representing the sky had taken up all the colour that it would take, and then he applied green, which still adhered where the trees had partly protected the plate. The whole of the shading and a large part of the colouring is obtained by the dusting process.

When the film is transferred to the china, it is sufficiently elastic to adapt itself to such curved surfaces as the rims of plates or the sides of vases, on which paper could not be made to lie without creases.

The skin of the operator does not appear to be damaged in any way by the chemicals, but the fingers may be slightly stained.

There is one source of danger in the process, which would only be of importance to those continually at work, and that is the fine dust which floats in the air, and which would find its way into the lungs during the dusting operation; but if this were performed near the mouth of a pipe connected with a good exhaust, the danger would be at an end.

The whole process, from beginning to end, is one of the most simple and beautiful that I have ever had the good fortune to witness. C. V. Boys.

11, *Alexander Square, South Kensington, S.W., June* 25, 1889.

Photographers in the Johnstown Catastrophe.—Our letters of inquiry, says *Wilson's Photographic Magazine* for this month, brought first a postal card from Mr. Wesley Greene, long a photographer in the doomed city. It said: "I am alive with wife and daughter. Our residence was saved, with my family and some friends on the third floor. The gallery was flooded, and a great loss has come to us. All the other galleries are either flooded or washed away. None of the photographers are drowned so far as I now know." Mr. G. M. Greene writes: "My life has been spared; my gallery and all I had are gone; I am homeless and penniless. It is awful. No tongue can tell, no pen can write it. Thank God for Hope. I hear its sweet voice singing Courage! As soon as our city is cleared up I trust to try again. I need help." But the saddest tale comes from the veteran photographer, Mr. George Statler. He says: "Alas! I am one of the sufferers. I lost my dear wife, oldest daughter, and youngest son. My youngest daughter was saved—taken from the water through a garret window, just before the house she was in was washed away. I was taken from the drift by the help of four men; both legs badly hurt, and a crushed thumb, and badly bruised all over. House, gallery, and all we had in the world are gone with the terrible flood. I have not been able to find out about the others of our fraternity as yet. I do not know how I am to start again." We learned from a telegraphic report that Mrs. Statler was taken from the wreck of a house in the drift some distance away, five days after the flood. When found she was in a cavity beneath a pile of beams. She was unconscious, but still breathing. She was removed to the hospital, and noble efforts made to keep her alive; but, alas! without success.

PHOSPHORESCENCE AND PHOTOGRAPHY.

BY D. WINSTANLEY.

The subject of phosphorescence and photography is obviously not so well understood amongst photographers as it ought to be. On the 27th of November last (see page 764, vol. 1888), we had the Photographic Society of Great Britain discussing the subject in a hazy way, and on the 19th of April, in the present year (page 269), we have the curious phenomenon of a gentleman who has been awarded a medal for his photographic discoveries, holding another one up to ridicule for stating a remarkable fact in connection with the subject, which was published in the *Comptes Rendus* of the Academy of Sciences of Paris more than thirty years ago.

Since the appearance of Mr. Ives' unusual sort of letter, I have re-performed the engraving experiment of Niepce with success, and can, consequently, now affirm from personal knowledge that, if printed matter on white cardboard be exposed to sunlight for some time, it is capable of producing its impression subsequently, when placed in contact with chloride of silver paper in the dark. Here are the details of the experiment.

April 22nd, 9 a.m.—Salted a sheet of writing paper on a seventy-grain bath of common salt. Dried and silvered on a forty-grain nitrate bath.

10 a.m.—Exposed in a window to the best available light a sheet of white cardboard, on the surface of which were the printed impressions of various letters in black and red.

11.15 a.m.—Placed the dried silvered paper in contact with the exposed and lettered card, and so gummed the two together that the silvered paper could be easily inspected and replaced. The light had been extremely variable, alternating between bright sunshine and the gloom of heavy clouds.

April 23rd, 10 p.m.—Examined by moderate gaslight, and found the silvered paper slightly tinted, excepting where it had been opposite the printed letters, in which parts it remained apparently quite white. A reversed copy of the printed letters, both black and red, was easily distinguishable in white upon a tinted ground.

April 28th.—Paper decidedly brown in tint, and letters very distinct. Of course there is nothing new in this experiment, but it certainly is true, and I enclose a portion of the result for the editor's use, together with the part of the printed cardboard by which it was produced and to which it is still gummed. He will see that it is a negative and reversed impression of the printed matter on the card, similar to that which would have been obtained had the card been printed through in the light of day. The fact, however, is that the card is thick enough to be quite opaque, and since the silvered paper has been gummed thereto, it has been kept in darkness in a bound volume of the Photographic News.

Another experiment commenced on April 24th presents a singular result. In this case, a carte-de-visite mount which had been thickly coated several months ago with Baldwin's paint (of which the solid ingredient is one of the luminous sulphides) was exposed for an hour to the light, then over it was fastened another carte-de-visite mount from which the figure of a cross had been cut out (two and a-half inches long and with lines one-third of an inch in width), and over this was gummed (so as to be capable of inspection) a piece of silvered paper prepared in the same way as before, and the whole was enclosed within a book. In four-and-twenty hours a tinted figure of the cross upon a ground of white was somewhat pluckily produced. Now (April 28th) all this is changed. The ground is of a rosy hue, and the figure of the cross approximately white when looked at from behind. When seen from the front, however, the ground is a sort of drab, the body of the cross is of a pale and yellow cast, but its outline is very strongly marked in a tint approximately black, and having something of that metallic lustre sug-

gestive of argentic sulphide. Doubtless, argentic sulphide has been formed, and its formation bleached out the darkened cross and made it light; but why the margin of the cut-out figure should be so strongly marked, I don't at present see. There is, of course, no conclusive evidence here that the results obtained are due to the radiation of energy which had by insolation been absorbed, but that evidence shall be furnished in my next.

As in the case of visible radiescence, it is probable that the phenomenon we are now considering is not only by no means rare, but, in fact, extremely common. Niepce himself noticed it long ago in connection with uranium nitrate, tartaric acid, porcelain, marble, wood, linen, and other bodies, and, since his time, this list of substances has been considerably increased, and that, let it be remarked, by the printing of a visible image on a material so insensitive and dull as chloride of silver paper, and not by the production of a "latent image" subsequently rendered visible by development. A rapid gelatine plate will probably yield an image on development with some thousands of times less exposure than chloride of silver paper will without, and it is to experiments of this kind that I intend to devote some time. I have a feeling—whatever it may be worth—that I shall find few substances which are not phosphorescent after insolation, and that those which are will include the insides of cameras, the doors of dark slides, the glass of lenses, the gelatine of films, and the garments which one wears; whilst those which do not radiate actinic energy will very likely consist exclusively of substances which are themselves acted on by "light."

I think I am entitled to ask Mr. Ives, of Philadelphia, to re-perform Niepce's experiment for himself, and when he finds the statement I have made to be correct, to withdraw whatever imputation he intended to convey in the seemingly uncivil sentence, "Winstanley is the man who once asserted that a newspaper exposed to sunlight and then removed to the dark room would emit enough phosphorescent light to print out a picture on chloride of silver paper."

THE PYRO DEVELOPER WITH METABISULPHITE.

BY DR. J. M. EDER.

Lately I called attention to the metabisulphite of potassium as an addition to the pyro solution for development, and can give now some of my experiences with this salt.

The metabisulphite of potassium, which was introduced into the market by Dr. Schuchardt, and whose correct analysis is not known yet, is a white crystal, which in a solid condition, as well as in an aqueous solution, has a strong smell of sulphurous acid. An aqueous 2 per cent. solution of this salt dissolves pyrogallic acid to a weak yellowish colour, being distinguished from the more light brown solution of sulphite of soda and pyro. The solution kept very well for four weeks in half-filled bottles, and showed a better preservation than the usual solution of pyro and sulphite of soda. More than 2 per cent. of the metabisulphite of potassium is without any advantage. If this solution is mixed with soda, a picture will develop rapidly, but the same will show a strongly yellow coloration in the gelatine film. Sulphite of soda has to be added to the soda solution, to obtain an agreeable brownish or black tone in the negatives.

If the contents of metabisulphite and pyro-soda developer are increased, it will act very slowly; larger quantities of the metabisulphite of potassium, therefore, act like a strong retarder. In small quantities there is no injurious retarding action, but it will have the effect that the plates obtain very clear shadows in this developer, and that the picture appears slower, and will strengthen more slowly. The strongly retarding action of larger quantities of metabisulphite might be accounted for in that the bisulphite will give, with the carbonate of soda, monosulphite and soda bicarbonate, which latter is not a strong enough alkali to develop the bromide of silver strongly with pyro. An increase of soda compensates this retarding action of the metabisulphite of potassium.

Good results were obtained by me with this salt after several tests, by producing the following solutions:

A.

Pyrogallic acid	4 grams
Metabisulphite of potassium ...	1½ „
Water	100 c.c.

This solution keeps for weeks in corked bottles.

B.

Crystallized soda	10 grains
Neutral sulphite of soda	15 „
Water	100 c.c.

Before using mix—

Pyro solution A	20 c.c.
Soda solution B	20 „
Water	20 „

The developer acts about one and a half times slower than the ordinary pyro soda developer, approaching to the latter pretty nearly, and gives to the negatives an agreeable colour and softness, with clear shadows. If the negatives are to be thinner, more water, say 30 to 40 c. c., is taken. If denser, then the soda is increased, and the water in the developer is reduced. An alum bath before fixing is to be recommended.

An advantage of this development is the great durability of the pyro-meta sulphite solution. The cost price is about the same as that of the ordinary pyro developer. At all events, it is worth while to make further investigation with the metabisulphite of potassium, the same being also a good preservative for hydroquinone solutions.—*Photographische Correspondenz.*

Patent Intelligence.

Applications for Patents.

10,584. L. G. Strangman, 8, Ardenza Terrace, Dublin, for "Camera Stand."—July 1st.

10,594. J. Kershaw, St. Mary's Gate, Manchester, for "Photographic Shutters."—July 1st.

10,602. J. Brownlow, 186, Fleet Street, London, for "Photographic Shutters."—July 1st.

10,853. M. W. and W. E. Kerslake, 4, Clayton Square, Liverpool, for "Photographic Cameras."—July 5th.

10,885. J. G. Harris, 45, Southamptou Buildings, Loudon, for "Grained Surfaces on Lithographic Plates."—July 5th.

10,930. R. Krugener, 45, Southampton Buildings, London, for "Photographic Objectives."—July 5th.

Specifications Published.

10,460.—*July 19th*, 1888. "A Horizontal Condensation Bar in Combiuatiou with an Improved Metallic Sash-Bar for Glass Roofs." William Clark, 60, Oxford Road, Reading, Horticultural Engineer.

The inventor claims:—

1. A metal sash-bar formed of one piece of sheet metal, shaped in section like the letter OC, but with a centre space between the two vertical curves, which have their summits connected by a fold of the metal.

2. In a system of glazing by means of metal sash-bars, with or without putty, the peculiarly formed metal condensation bar or purlin capping for collecting the condensation water, sustaining the glass and protecting the wood purlin.

3. In a system of glazing, with or without putty, the combiuation of the special condensatiou bar and purliu cap with a wood purliu having a rabbetted upper surface and the metal sash-bar.

10,865.—*July 27th*, 1888. "Supports for Photographic Pictures, Plates, or Films." William Harding Warner, St. Augustine's Chambers, Unity Street, College Green, Bristol, says:—

The object of my invention is to manufacture improved supports for sustaining one, two, or more photographic pictures, plates, or films, when aluming, fixing, washing or otherwise manipulating the same. My invention consists of solid or hollow

articles formed of vulcanite, india rubber, glass, porcelain, stoneware, wood, or other suitable material.

The supports are used in pairs, each one being preferably in form of a right angled triangle with the hypothenuse uppermost. When made of vulcanite or similarly firm material, two of the angles only are sufficient, viz., the hypothennse and perpendicular formed of thin material, the sides and bottom being left open. In some cases the hypothenuse and two sides may be so formed, leaving the end and bottom open. The rests or supports are placed in position in one or more pairs with their slanting surfaces towards each other, the photographic pictures, plates, or films being supported upon the slanting surfaces. Plates of various sizes may thus be supported during manipulation, the larger plates above, and the smaller below, and smaller supports and plates may be superposed over and upon the larger ones.

The plates are used in the washing tray or vessel with the film sides downwards, or in other positions as required.

I do not confine myself to any particular angle in forming my improved supports, as any form which furnishes an angle of repose may be used.

11,134.—*August 1st*, 1888. "Holders, Clips, or Easels for Photographs." Harry Whitfield, 68, Broad Street, Birmingham, says:—

My invention is primarily a metal holder or clip constructed to hold or clip a glass plate, behind which is held a photograph, picture, or card. It is also constructed to hold or clip a mirror, photograph, card, or other article. My holder, clip, or easel is composed of three arms of flat or round strips of metal or other suitable material, which are rivetted or in some other way loosely fastened together at the end of each arm. The other end of each arm is formed as a hook. These hooks are meant to clip or hold the article it is desired to hold.

To two of the three said arms of my clip is attached a spring, which exerts an outward pressure.

Now when it is required to clip or hold a glass plate or other article by my invention, the one of the arms of my clip to which the spring is not attached is extended in one direction, and the hook hooked over the edge, or otherwise, while the two arms to which the spring is attached are extended in an opposite direction like the arms of a letter Y, and the spring being compressed, the two arms of my clip attached to it, approaching one another, lengthen the clip, and the hooks are hooked over the edge or otherwise of the article it is required to hold; the spring being released, the clip shortens, and thus holds or clips the article in the manner desired. Thus, when it is required to release the article held, it is only necessary to compress the spring, and the two arms attached to it approaching one another, the clip lengthening looses the hooks from the article held.

Any kind of spring exerting an outward pressure will actuate my clip in the manner desired.

Correspondence.

A "WONDERFUL" DISCOVERY.

Sir,—In the current number of the News, Mr. C. E. Pearce makes some very depreciatory remarks about Professor C. V. Boys, in connection with a report of his on a process brought forward by M. Bonnaud. I think, sir, in fairness to Mr. Boys, that the report in question should have the same publicity afforded it as Mr. Pearce's remarks upon it. Chapman Jones.

[Mr. C. V. Boys' report, in conjunction with M. Bonnaud's specification, will be found on page 458.—Ed.]

Sir,—Mr. Bonnaud has requested us to reply to the article which appeared in your issue of the 5th inst., written by a Mr. C. E. Pearce, as he is not sufficiently conversant with the English language to do so himself.

We are astonished that Mr. Pearce should have approached the subject of Mr. Bonnaud's invention in the manner that he has done, and especially that he should have written such an article without even reading the specification. If Mr. Pearce did not understand the invention as being different from that described by Herr Leisegang, why did he not ask Mr. Bonnaud for an explanation when he attended the demonstration, or when he made his speech after the luncheon? It does appear to us that rushing into print without taking this precaution, and condemning the invention, is, to say the least of it, treating Mr. Bonnaud most unfairly.

A gentleman of Mr. Pearce's experience must know that what Dr. Liesegang describes is an old process for producing pictures in black and white or in one colour only upon enamels, and not china, and he must also know that if that process were used for china it would not glaze, and is therefore absolutely useless.

As will be seen from the process described by Mr. Bonnaud in the specification of his patent, his invention relates to the production of coloured pictures upon china, and he claims that such process is entirely new, and that no patent or process for producing such pictures is in existence except the process invented by him and the patents taken out by him therefor; and this we can confirm, as we have made an exhaustive search at the Patent Office, and have been unable to find any process of any kind in any way similar to his.

If the results of Mr. Bonnaud's process are, as Mr. Pearce states, "exceedingly good imitations of hand-painted china," it is tolerable evidence that the process is new, because if not new, why has it not been done before, and why is it that the china trade have not availed themselves of the opportunity of producing for a few pence what they have to pay pounds for now? Surely the photographers would have adopted the process for the production of portraits on china which they could sell at a moderate rate, and which would have an enormous sale, inasmuch as it absolutely solves the question of how to produce a portrait that is absolutely permanent. Mr. Bonnaud has already had applications from some of the leading photographers to reproduce their portraits on china in colours, and he hopes shortly to be in a position to execute work for every photographer in the United Kingdom.

We think the above explanation, coupled with the perusal of the specification, a copy of which we enclose, will be sufficient to show to Mr. Pearce that he has done Mr. Bonnaud an injustice, and we look to him to admit that he was mistaken.

We do not propose to discuss the question whether this is a photographic process or not. Mr. Bonnaud simply says the result is not a photograph, and your readers, from a perusal of the specification, can form their own opinions as to whether he or Mr. Pearce is right.

There are two other subjects upon which Mr. Pearce is wrong. He says, referring to Mr. Bonnaud, "He, it seems, has been familiar with the production of photographs on opal glass for many years, and he it was who invented the opera glass camera used in Russia for photographing criminals." Mr. Bonnaud never produced a photograph on opal glass in his life; neither is he the inventor of the opera glass camera referred to, nor did any person in the room say so, as we are aware, being present. What was said, and what is the fact is, that Mr. Bonnaud in the year 1879 invented and patented an opera glass which could be used either as a photographic camera for photographing moving objects, or as an ordinary opera glass. This patent he sold to M. Michel Chevallier, of Paris, and it is now being sold by him. We suppose Mr. Pearce mistook the words opera glass for opal glass.

In conclusion, we would suggest, if Mr. Pearce is still dissatisfied, that he should take the process described by Dr. Liesegang and endeavour to produce a picture on china containing, say, seven or eight colours. If he produce such a picture as will stand the fire in the presence, say, of Professor Crooks, Mr. Bonnaud will admit that his process is of no use; but if Mr. Pearce cannot do this, he must admit that he has done Mr. Bonnaud a serious injustice in an article which has very little seriousness in it.—Yours truly, Browne and Co.,

(Patent Agents for Mr. J. B. G. Bonnaud.)

9 *and* 10, *Southampton Buildings, and* 59 *and* 60, *Chancery Lane. London, W.C., July* 10*th.*

Proceedings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE adjourned annual meeting was held on the 4th inst., Mr. W. E. DEBENHAM in the chair.

The HON. SEC. presented the annual financial statement, showing a balance in favour of the Society. The accounts being duly audited, were passed.

Upon the subject of the proposed introduction of the metric system, Mr. A. COWAN attributed much of the present confusion to the difference between the grain and minim.

Mr. A. PRINGLE said although so much had been written and said as to the method of preparing ten per cent. solutions, yet they were not always correctly made up.

Mr. A. R. DRESSER thought when all the solutions were mixed it made but little difference in the development, ordinary care being used.

Mr. A. PRINGLE said the rule of thumb might answer well enough in some cases of development, but it was a different matter when emulsions had to be mixed.

With reference to combination printing, Mr. J. TRAILL TAYLOR said Mr. A. Johnston, of Wick, of clearing a portion of the image on a collodion film, and superimposing a stripped film, from the same negative, some very pretty effects were obtained in this way.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

JULY 5th.—76, Peckham Rye, London, Mr. DOWLING in the chair.

Mr. F. W. Edwards was unanimously elected President of the Society.

The SECRETARY distributed among the members copies of *The Optical Magic Lantern Journal*, "Eames's Exposure Tables," and "The Principles of a Lens Action." The latter was by Messrs. Taylor, Taylor, and Hobson, of Leicester.

A discussion took place on the patent water-developing plates.

In reply to a question, the SECRETARY read extracts from the prospectus, but said he was not able to give further information.

The following were elected members of the Society:—Messrs. Edwards, Fellows, and Homewood.

THE PHYSICAL SOCIETY.

JUNE 22nd.—Prof. Reinold, F.R.S., President, in the chair.

Major P. Cardew, R.E., and Mr. A. W. Ward, M.A., were elected members.

The following communication was made:—"Note on some Photographs of Lightning and of Black Electric Sparks," by Mr. A. W. CLAYDEN. The lightning photographs, three in number, were obtained during the storm on the 6th inst. Two flashes seen on one plate show a complicated and beautiful structure. One of them is a multiple flash, and flame-like appendages point upwards from every angle. The other is a broad ribbon, and although the plate shows signs of movement, the displacement is not in a direction such as would produce a ribbon-like effect from a simple flash. The second plate shows four flashes, none of which are ribbon-like, though the camera had moved considerably. The third plate was exposed to six flashes, one of which was believed to pass down the middle of the plate, but, on development, only a triple flash in one corner of the plate was seen. Careful search, however, revealed the central flash as a dark one with a white core, and other dark flashes were subsequently found. The plate was very much over-exposed, and this suggested that black flashes might be due to a sort of cumulative action, caused by the superposition of the glare from a white cloud upon the normal image of the flash. To test this, sparks from a Wimshurst machine were photographed, and, before development, the plates were exposed to diffused gaslight for a short time. The bright sparks yielded normal images with reversed margins, and the faint ones were completely reversed. Other experiments showed the reversal to spread inwards as the time of exposure to gaslight increased. Finally, reversal was effected by placing a white screen behind the spark to represent a white cloud, the only illumination being that of the spark itself. In the discussion which followed, Mr. W. N. SHAW exhibited a photograph taken during the same storm, which is particularly rich in dark flashes branching outwards from an intensely bright one. In some places the bright line has dark edges, and in one part a thin bright line runs along the middle of an otherwise dark portion of the flash.

In answer to Mr. Inwards, Mr. SHAW said the plate was exposed about half a minute, and the former thought that, under those conditions, the appearance of the plate did not contradict Mr. Clayden's hypothesis.

Speaking of the same photograph, Prof. PERRY considered that Mr. Clayden's observations would explain the result, for a bright flash required more exposure to diffused light to reverse it than a faint one did.

Prof. RAMSAY reminded the meeting that Prof. Stokes's "oxides of nitrogen" explanation of dark flashes was still a possible one; and

Mr. C. V. BURTON asked whether they may be due to faint sparks cutting off light from brightly illuminated clouds, just as a gas-flame absorbs light from a brighter source.

In reply, Mr. CLAYDEN thought the "oxides of nitrogen" hypothesis improbable, and said his experiments did not enable him to answer Mr. Burton's question. As regards Mr. Shaw's plate, he believed the diffused light from the clouds would be sufficient to reverse the fainter tributary flashes, although it was insufficient to reverse the primary one. From data obtained when the ribbon flash was taken, he had made some calculations which gave the height of the clouds about 1,000 yards, and the ribbon flash 1,300 yards long and 100 yards wide.—*Chemical News.*

LEEDS PHOTOGRAPHIC SOCIETY.

JUNE 26th.—Meeting held in the Library of the Philosophical Hall, the PRESIDENT in the chair.

Mr. J. W. Ramsden was elected a member of the Society.

The question of the Society holding a Photographic Exhibition in connection with the Municipal Fine Art Exhibition, in the autumn, was discussed, and it was desided that the Hon. Secretary should write the Fine Art Committee and ascertain what arrangements had been made.

Mr. W. DENHAM read a paper on "Various Methods of Photographic Printing," of which the following is an abstract:—

"My experience is that most amateurs have little difficulty in getting a good negative, but fail in getting a satisfactory print. This, I am sure, in a great many instances is want of care and cleanliness in the different processes, but in other cases where every care is used they fail to get the desired result, and it certainly does not tend to improve one's temper, after getting a few good negatives and printing a number of prints off them, to find them all spoilt in the finishing operations. The process that still holds the field, notwithstanding the many attempts to lower its standard, is undoubtedly the ordinary albumenized silver print. Personally I have been tempted to forsake it for some of the new ones, and for a time have thought that I liked them better, but only for a time, and I have been glad to get back to the old process again. Of course a great deal depends on the character of the negative as to what print you get. Every amateur, so soon as he manages to get a negative, must of course take a silver print from it. At one time this was not such a convenient process, as you had first to buy the ordinary albumenized paper and sensitize it yourself. I can remember the time when it was not possible to buy the ready sensitized paper, and I have many times floated my own. Now, of course, there is no occasion for this. Floating your own paper had its advantages and disadvantages. Amongst the latter may be mentioned the dirty state you got your fingers into, also the difficulty in keeping it, as you were almost obliged to float, print, and tone the same day. The chief advantage it had was, I think, that the prints were finer, the paper having to be sensitized on a much stronger bath, ranging from sixty to eighty grains to the ounce. There are many professional photographers who still prepare there own paper because the results are finer, and I have here some prints done on paper floated on a sixty-grain bath and toned with acetate of soda. I will pass round two lots of prints, one on the ready sensitized paper, and the other on some floated on the sixty-grain bath, and both toned in the same bath, consisting of

Acetate soda	30 grains
Chloride gold	1 grain
Water	8 ounces

I think the floated paper is the best, but I hardly think the difference is great enough to compensate for the extra trouble. The acetate bath is perhaps the oldest of toning baths, and is, no doubt, the one most used. It has one disadvantage, and that is that it must be made twenty-four hours before using, and for amateurs who hardly know when they are going to tone it is inconvenient at times. As a rule, for ready-sensitized paper, this bath requires neutralising, for the paper itself contains a good deal of acid to make it keep, but the paper floated on a simple

solution of nitrate of silver does not require it. The way I mix it is to take the amount of gold solution I am going to use, and add a little chalk to it, and allow it to stand for about half-an-hour before adding it to the acetate and water, which I have previously mixed, then decant off into the acetate solution, and allow it to stand for about twenty-four hours. I never find the slightest difficulty in toning with this. I also find that the best and most economical method is to mix the quantity you want, and when you have finished with it to throw it away. As a rule, I reckon a grain-and-a-half of gold to a sheet of paper; it is said that a grain is sufficient, but I like a little more. The next lot of prints I will pass round were toned in a borax bath consisting of—

Borax	60 grains
Gold	1 grain
Water	12 ounces

This bath is very convenient, as you can mix it and use it immediately, which is very handy when you have only a few prints to tone. The results, too, I think, are equal to the acetate. It also tones very readily, but it will not keep.

"The next was toned in the phosphate of soda bath, consisting of—

Phosphate soda	20 grains
Water	12 ounces
Gold	1 grain

This, like the borax, must be mixed and used at once, and, I think, gives equally good results; personally, I can see little difference in any of them. I might say here, before leaving silver printing, that before toning I wash till the milkiness has gone off the water, also again between the toning and fixing for about fifteen minutes; I fix in a bath consisting of 2½oz. of hypo to the pint, and I never touch the hypo till I have all my prints ready to go into it, where I allow them to remain for ten minutes. I think many of the failures that amateurs have are caused by toning prints with their fingers covered with hypo, the least trace of which is fatal to good results. With regard to the final washing, where you can have a good running stream of water, it is best to wash them in this way; but where you cannot have this, the best thing is to soak them well, and change the water every twenty or thirty minutes.

"The next prints that I pass round are printed on ordinary matt surface paper and toned in the acetate bath mixed in the same way as that for the silver paper. One great advantage of this paper is the readiness with which it tones. They change colour immediately on being put into the bath, and do not take longer than from two to three minutes to tone. In every respect it is treated in the same way as the silver paper; the results, I think, will also compare favourably with the other matt surface process.

"The next on the list is Aristotype printing, and it is one of the newest methods. Liesegang, a name well known in the photographic world, claims to be the inventor. It is a chloride of silver paper, and has a gelatine surface. The results to be got on this paper are certainly very fine, and detail can be got with it which is impossible with any other method. Very thin negatives which would be useless if printed with the ordinary silver paper, can be made to give very nice results with this. It requires much more delicate treatment than the previous processes, though it can be toned in any of the ordinary baths; but I think the best results are to be got on what is called the sulphocyanide bath, which is composed of

Sulphocyanide am.	1 ounce
Phosphate soda	1 „
Water	25 ounces

The gold to be added as required a few hours before using. They want to be printed rather deeply, as they lose a great deal in toning and fixing. They also require the ordinary washing before toning, and in addition to this it is better to soak them in a solution of alum; this is important, especially this hot weather. Almost immediately in going into the toning bath they turn a nasty pale yellow colour, and look as if they were going to disappear altogether, and I have known some amateurs get rather frightened, thinking something has gone wrong, and take them out as spoilt; but in a short time they gradually begin to change colour, until you get them similar to those before you. After this, they may be washed, or taken direct out of the toning into the fixing, and allow to remain from ten to fifteen minutes, and then thoroughly washed. The next thing to be done to get the high surface on is to squeegee them down on to a piece of glass, and this is where a great many of the prints are spoiled, for, after using every care to get the glass clean, they sometimes will persist in sticking to the surface, and when once this occurs, it is all up with the print. The way I do is to give the glass a good washing in clean water, into which I add a little nitric acid, then polish with a clean cloth, and finish off with a little powdered talc, and even after all this they sometimes will not come off clean. The difficulty of mounting comes next, and I never attempt to paste them all over, for if you do, you lose the surface at once. I think the best plan is just to stick them at the corners, and put them under heavy pressure, so that they keep flat. This, I think, is quite sufficient. Perhaps the simplest printing method is the platinum one, first put in the market by Pizzighelli, and called by his name, but since its introduction Liesegang, of Germany, has manufactured the same paper. I have here several prints done on the latter paper; they are simply printed in the ordinary way to nearly the depth you want them, and then steamed over some boiling water, which slightly increases the density and brings out the detail; after this they are placed in a bath of hydrochloric acid and water, 1 : 80, for about five minutes, and then have a final washing of fifteen minutes.

"Perhaps one of the best known names in connection with photography is that of Blanchard, and he lately has brought out a new platinum paper which is printed in the ordinary way and toned with solutions which he sends out with it. The results, he says, are equal to platinotype prints, and claims also for it that it is much simpler to work. This I can endorse, and with regard to the results, if they are not equal they certainly run it very close.

"With regard to the last item mentioned, that of window transparencies, this is of course the same as lantern transparencies, and anyone who can make the latter will have no difficulty in managing the former. It is certainly a very nice way of looking at a photograph, as the detail brought out far exceeds that of any ordinary printing process.

"In conclusion, I would say that the results I have put before you to-night have not been done with any formula of my own. I have simply tried to work out the different ones that can be found in any book on photography; I have done this to show that when failures occur the fault does not lie in the book, but with the operator. I would not close without mentioning the mounting of photos, for I see so many good things spoilt with slovenly mounting. You may ruin a good print in the mounting, while, on the other hand, you may greatly improve a bad one. A print should be nicely trimmed and put straight on the card, and, where there is a red line on it, not let the print overlap on two or three sides of the line, and as far as possible keep dirty finger marks off the front. I do not think there is anything better than good stiff starch for this process. It ought to be made with boiling water and used cold."

The committee have arranged with the Municipal Art Gallery Committee to hold an exhibition of members' work in the Municipal Fine Art Gallery during the months of October, November, and December next. Further particulars will be published in due course.

Sheffield Camera Club.

The first excursion of this Society was to Miller's Dale, on Wednesday, June 26th. The party consisted of the President (Dr. T. H. Morton), Dr. T. A. Manton, Messrs. Harry Rawson, G. T. W. Newsholme, M.P.S., and Wm. Slater. Several friends also availed themselves of the opportunity to visit this favourite locality. Although the Dale does not possess the grandeur of some others in Derbyshire, it presents most charming views, as well adapted for the camera as for the pencil. The course of the river Wye in the direction of Buxton is particularly interesting, and the weather, being fine and still, was favourable to the pursuit of photography. A large number of successful views was taken.

An ordinary meeting of the Club was held at Whiteley's Institute on July 5th, Dr. Morton presiding.

There was a good attendance, and the subject of the evening was a lecture on "Lantern Slide Making and Colouring," by T. A. Manton, L.R.C.P. Lond., M.R.C.S. Eng. He recommended negatives of quarter-plate size, and contact printing, using a suitable rapid rectilinear lens, and found most convenient an outfit consisting of a detective camera with time shutter. The speaker gave a description of the different methods of development and toning, and afterwards a demonstration of hand painting with water-colour and oil. The latter method he adopts, and had found a satisfactory medium

in a preparation known as "Rowney's oleo-excelsior." The brush, charged with colour, was dipped in the medium and diluted with a little turpentine applied to the slide, and then softened down with the finger. Clouds were picked out with clean cotton or linen rag. When the desired effect was produced, the slide was subjected to gentle heat, which caused the paint to become hard and brilliant. The colours most in request were prussian blue, burnt sienna, yellow, and red. The aniline dyes were not permanent, nor was "rose madder" a safe pigment. Great care was necessary to avoid dust of any kind, and the colours had to be artistically applied, not too thickly. The covering glass, when stained a light brown or other tint, gave a remarkable beauty to the slides. The process of painting a slide being completed, it was with others tested in the lantern.

In the discussion which followed, the PRESIDENT said he had hitherto been rather sceptical as to the utility of colouring photographic lantern slides; perhaps it was due to the recollection of the crudities of the past. The lecturer had, however, shown examples which proved the efficacy of careful tinting, and no doubt the practice would become more general.

Mr. H. RAWSON thought the toning by chemical means, as in the use of gold and platinum, assisted much the ordinary developers, and that some subjects were not so adapted for colour as others.

A series of slides of various subjects and by various methods was projected on the screen. The members who contributed were Messrs. G. E. Maleham, Nowell, B. W. Winder, J. O. Arnold, Whittaker, Harrop, and the Rev. C. Clementson.

The limelight lantern was lent by Mr. Newsholme, M.P.S. Mr. Winder exhibited a useful hand-camera of French make lent by Mr. Preston.

The Secretary, Mr. HARDY, distributed notices of the forthcoming exhibition of the Photographic Society of Great Britain to be holden in September.

Talk in the Studio.

OBITUARY.—We hear with regret of the death of Mr. W. D. Winstanley, an article by whom on "Phosphorescence and Photography" appears on page 459. We hold another of the late gentleman's articles on "Pictures by the Action of Cold," which will probably be printed in our next.

WE have received the June number of Fallowfield's *Monthly Photographic Remembrancer*, a trade catalogue containing an extensive variety of information.

THE "MYSTIC CAMERA CLUB," of Medford, Mass., U.S.A., sends us information that it was formed on June 4th, with Geo. L. Stone, *President*; Geo. E. Davenport, *Vice-President*; and J. F. Johnson, *Secretary and Treasurer*.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Thursday, July 18th, subject for discussion, "The Right to the Negative."

MESSRS. SAMUEL FRY & Co. send us sample of developer in stoppered bottle, which they are working under Barrett's patent. By this method air is completely excluded from contents, and Messrs. Fry inform us that all their solutions in future will be sent out in this form.

DURING a recent meeting at Florence of the Italian Photographic Society, the following telegram on behalf of the members was sent by the president, Senator Mantegazza, to the Mayor of Châlon-sur-Saône, the town in which Nicephore Niépce was born:—"The Italian Photographic Society, at its first general annual meeting, sends to the country of the immortal Niépce a fraternal greeting."

AN ELASTIC MUCILAGE.—The following is a recipe for an elastic mucilage which will keep well, remain quite elastic after drying, and yet never crack or peel off: Prepare a mucilage with 93 parts of good gum arabic and 180 parts of hot water, and then strain it into a liquid mixture of 1 part salicylic acid dissolved in 20 parts alcohol (overproof), 3 parts soft soap, and 3 parts glycerine, which have been thoroughly well shaken together.—*Fancy Trades' Register*.

PHOTOGRAPHIC CLUB.—At the meeting on July 17th, the subject for discussion will be "Making Lantern Slides from Engravings and other Pictures." Saturday outing at Chorleywood; trains from Baker Street at 2.29.

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Piper and Carter, 5, Furnival Street, London, E.C.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

H. E. W.—Your Waterhouse diaphragms are numbered in reversed order as compared with those supplied to us with Dallmeyer's whole-plate rapid rectilinear lens, nor do yours correspond with our own in actual size or diminishing ratios. Without knowing the focal length of your lens we cannot possibly say which of the stops is *f*-8, *f*-16, &c., but you have only to divide the length of extreme focus, when ascertained, by the diameters of your several diaphragms, to get this information at once. Supposing your drawings to be accurate, they measure respectively—

No. 5 (full aperture)	... ...	1·20 inch diameter
No. 4	... ...	·94 ,,
No. 3	... ...	·70 ,,
No. 2	... ...	·47 ,,
No. 1	... ...	·26 ,,

Remembering that "circles are to each other as the squares of their diameters," the relative exposures ought to be arrived at by a very simple calculation. Your lens would be a trifle slow, but could be used for small portraits as well as landscapes. For groups there is no better lens. No. 2 stop, being exactly half the diameter of No. 4, will require four times the length of exposure of the latter.

A. B.—If you mean by "metallic salts" those ordinarily used in the preparation of sensitive plates, their number is few, being silver only as the heavy metal used in conjunction with the haloid salts of the alkali metals—the latter taking no actual photographic part in the reaction. But mercury, lead, cadmium, and uranium have each special functions, the first stopping all action, and the last apparently quickening it. Generally speaking, the character of the haloid and mode of preparation have most to do with the quality of the sensitive layer.

ELECTRIC.—So far as we are aware, the illuminated table set out by Messrs. Graham and Biddle at the recent Botanic Fête was a distinct novelty. Electric lighting from below appears to be a new departure, and excited much interest on the occasion mentioned. The effect might not be so good in a well-lighted room as in the dark tent of that exhibition.

FIELD CLUB.—Major Russell's pamphlet is dated 1866. It was of a controversial character, and referred to events occurring in the previous year. "The Life and Work of the late Colonel Russell," which formed the subject of a lecture by Professor R. Meldola, is not yet published, but may be expected to appear shortly in the *Essex Naturalist*.

M. A. (Brighton).—We do not know the address of the gentleman named.

COLLOID.—Probably the first mention of the use of gelatine as a photographic vehicle is in the letter signed "E.R.", Tavistock, and dated March 1854, in vol. i., p. 203, of the *Photographic Journal*. It was proposed to be iodized and used instead of collodion or albumen for coating the plate, which, when dry, was immersed in a silver dipping bath. If only the writer had chanced to mix in the nitrate of silver, and changed over to bromide, as advocated by Sir John Herschel a few months earlier, we should have been in possession of the gelatino-bromido process and reliable dry plates some twenty years before they became a practical reality in the hands of Messrs. Kennett and Bennett.

W. M. P. (Southampton).—Both plates show unmistakable marble stains, formed, no doubt, in the last stage of drying. Was the emulsion thoroughly well washed, or your water supply so hard as to give a precipitate with ammonia? Try the use of distilled water for finishing off one batch.

AMATEUR.—The platinum black prints are not guaranteed to be permanent like the unassailable platinotypes, for they are silver prints toned with a superficial layer of metallic platinum. They may, however, be expected to last longer than the ordinary albumen silver prints.

F. A. D.—The addition of sugar to the silver bath is useful in hot weather, for although it does not seem to prevent the sensitized paper turning a little yellow by keeping, all this colour washes out in the fixing bath, and the finished prints show great purity in the whites. There is no doubt that a laxity of practice in preventing exposure to light often tends to deteriorate a really good sensitive preparation.

PRINTER.—A weak solution of iodine in iodide of potassium is much safer for removing silver stains from the fingers than the repeated use of cyanide, which may give rise to troublesome sores.

SUBSCRIBER.—The French litre is a pint and three quarters, or more exactly 1·76 pint. See table at the end of YEAR-BOOK.

S. H.—Answered by post. Thanks for reply letter.

THE PHOTOGRAPHIC NEWS.

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PRIORITY IN CERAMIC PHOTOGRAPHY.

THE claims made by M. Germeuil-Bonnaud in his patent connected with a ceramic "dusting-on" process, as recently published in these columns, are three in number. In the first one he claims the producing of a picture on a provisional support, so that the same may be transferred to china or other material. This, however, has been one of the characteristics of the dusting-on process for half a generation. His second claim is, "in combination with this process, the employment of fatty bodies throughout." The only fatty body he mentions is "fatty essence of Venice"—a substance which, so far as we are aware, is unknown by that name either to British chemists, or to the British public. If he means Venice turpentine, then he is not speaking of a fatty, but of a resinous body, mixed in its natural state with a proportion of essential oil: when genuine, it is obtained from the larch of southern Europe. In Lieut. Pavloffski's modification of the old dusting-on process, among the substances incorporated with an easily fusible glaze is "thickened essence of turpentine"; this may be guessed to mean essential oil of turpentine which has become partially oxidised by exposure to the air; a resinous substance is formed by the oxygen, which dissolves in the remaining oil, so that the liquid becomes more viscous. Russian oil of turpentine is specially liable to rapid oxidation. The third claim is that of producing pictures on china and other materials, "substantially as herein described," leaving the reader free to wander over the whole specification.

The patent agent for M. Germeuil-Bonnaud, in his letter last week in this journal, put forth as a strong point that the patent included the application of the process to producing burnt-in pictures on china. In the autumn of 1886, M. Theophil D'Hañw, of the School of Civil Engineering of Ghent University, conducted us over that establishment, and in the chemical laboratory there drew attention to a white teacup, on the side of which Professor Donny had the day before burnt his own likeness in the presence of his class; the picture had been produced by the dusting-on photographic process, and the formulæ used by Professor Donny were that morning still on the blackboard, facing the empty benches which the day before had been occupied by his pupils. In the earlier days the photographic ceramic processes were all more or less of the nature of trade secrets. Among the earlier examples of the wide-spread publication of the essential details of the dusting-on process is a little book entitled *Emaux Photographiques*, by Geymet and Alker (Leiber, 13, Rue de Seine-Saint-Germain, Paris, 1868), and M. D'Hañw stated that Professor Donny had, practically speaking, used those formulæ, plus some small modifications of his own, in producing the likeness on the teacup. Professor Donny, it may be remarked in passing, is a veteran amateur photographer; a letter from him describing his method of turning collodion positives into negatives was published in 1854 in the *Journal* of the Photographic Society of Great Britain.

The specification now under notice seems to describe the old dusting-on process, with, perhaps, some modifications of formulæ, or materials, or manipulations, but which of these includes anything of prominent merit its admirers have not yet succeeded in pointing out in these pages. This is regrettable, because it is always more pleasing to call attention to the strong rather than to the weak points of an invention. The most "wonderful" part of the whole matter, so far, seems to be the endorsement of the process by a Fellow of the Royal Society, so perhaps he may give the public some clearer scientific insight into the merits of the case. As matters now stand, Mr. Pearce appears to have fully sustained his original position, and to have rendered good service to the public.

Mr. Boys and others speak of "M. Bonnaud." In the specification the name of the inventor is given as "Germeuil-Bonnaud." On the Continent it is not unusual in such compound names for the second name to be that of the wife; thus the full Belgian name of the late Dr. Monckhoven was "Monckhoven-Tackels;" therefore, in giving as briefly as possible the name of the inventor now under notice, it is probably more accurate to say "M. Germeuil" than "M. Bonnaud."

Mr. W. E. Debenham having drawn attention to the method used by Joubert de la Ferté nearly thirty years ago, to produce burnt-in pictures on china, the specification thereof, No. 149, Jan. 20th, 1860, is appended, for he also claimed the use of treacle as the organic substance to be acted upon by a bichromate under the influence of light.

FERDINAND JEAN JOUBERT DE LA FERTE, of 36, Porchester Terrace, in the County of Middlesex. Partly a communication from abroad by Henry Garnier, residing at 71, Rue Notre Dame Deschamps, Paris.

This invention has for its object improvements in reproducing photographic and other pictures, engravings, prints, devices, and designs, on the surfaces of glass, ceramic, and other substances requiring to be fired, to fix the same thereon. For this purpose I proceed in the following way:—If glass be the surface to be ornamented, a piece of crown or flatted or plate-glass, being firstly well cleaned and perfectly free from dust, is taken and held horizontally, and a solution, the composition of which is hereafter detailed, is poured gently over so as to cover the whole upper surface equally. It is necessary to do this rapidly, and to avoid the glare of the daylight on the solution while it is being spread, therefore it is well to select a room rather dark to operate in. The glass is then exposed over a gentle fire or gas stove, but protected from the light of the gas until the solution is perfectly dried; it is then ready to receive the image to be copied. The next process is this: a photographic or other picture on glass or on paper, showing as a positive by transmitted light, is placed in an ordinary photographic

pressure printing frame, the face towards the operator, and the piece of glass prepared with the solution is carefully placed on the photograph or picture, the solution or prepared side downwards; the frame is then shut up, fastened, and exposed to the light out of doors or in a photographic glass room, if perfectly light, for a space of time varying from fifteen to sixty seconds, or sometimes much more, according to the state of the daylight. When the glass is removed (with care), the image ought to he indicated very visibly and sharply in a negative form. The whole surface of the glass on the image side is then ruhhed gently up and down with a camel hair hrush of a large size charged with well divided enamel or vitreous colour of the tint required, and such as is ordinarily prepared and sold for painting on glass and articles of ceramic ware, until the image has become a distinct and perfect positive on looking at it hy transmitted light. Then some pure spirits of wiue, with which it is couvenient to mix a few drops of acetic or nitric acid (ahout six minims of Beaufoy's acid to the ounce) is poured on the surface of the glass very carefully all over, and poured off at one corner; I repeat the same with clean spirits until the film ou the glass has been well soaked; the glass is then dried slowly. When completely dry it is quickly immersed in cleau water, in which it may he convenient to mix a little carbonate of potash or soda. The yellow tinge of the film is soon removed by the chromic salt heing dissolved off, aud the image, on removing the glass from the water, ought to appear perfectly free from any forcign body, except the colour that has been used to produce it. The glass is allowed to dry, and is then ready to be placed into the muffle aud to be fired. It is necessary to observe that the margin of the glass all round the subject ought to he carefully cleaued hefore the firing takes place. When the photograph, engraving, or pattern to be copied, is on paper instead of on glass, it should be rendered translucent by waxing the paper well in the usual way.

When it is required to produce the image on chiua or other ceramic substance (for instance, on a china slah), it is well to choose one which is perfectly flat and free from inequalities, and also well glazed. The process of applying the colour is the same as for the glass, only the porous substance of the china renders it necessary to expose the slah to a more active heat to dry it after the spirits washing. To prepare the solution I proceed iu this way: firstly, I dissolve one ounce, by weight, of bichromate of ammonia, which should he very pure and free from sulphuric acid, in four ounces, by measure, of distilled water over a fire, stirring it well; when the liquid is boiling, and the salt perfectly melted, it is carefully filtered. I then take three parts, hy measure, of good honey, which I melt in a dish over a gentle firc; when melted, and taking care that the temperature of the honey does not exceed 100 Fahrenheit, I pour an equal quantity by measure of albumen, that is white of egg, heaten to a froth, and afterwards kept in a warm and dark place for about eight days. I mix the same well up with the honey, stirring and heating it. I then add thirty parts hy measure of distilled water, stirring up the while, and finally add five parts of the solution of hichromate when nearly cold, taking care the whole is well mixed. After filtering carefully, it is now ready for use as ahove described. In damp weather it is well to mix up with the honey a small quantity of a preparation which, as far as I am aware, is not knowu in England, hut which is sold iu France uuder the uame *sirop de froment*, the proportion of honey heing diminished to the same extent; this reuders the solution less liable to be influenced by damp, but experience alone in the operator can determine the exact quantity to produce the result most advantageously under varying circumstances. The preparation of the solution should be conducted in a room from which hright daylight is excluded, and, when prepared, it should be kept in the dark. I prefer to carry on all the operations, except the printiug, in yellow light. In place of honey, treacle may, in dry weather, be advantageously substituted, either in part or in whole; the result may also be produced by grape and cane sugar, and some other similar organic suhstances which will retain a sticky surface in ordinary conditions of the atmosphere, hut these substances caunot, I believe, he used so advantageously as honey. I have ouly alluded to pictures in monochromes, but it is possible to obtain them in two or more colours hy two or more operatious, one for each colour; for example, in case of a hunch of roses to be reproduced, the first operation will leave out the flower itself, and, after the first firing and fixing them by carefully registering the flower on the glass prepared with a fresh solution and adapting a different colour, when fired the secoud time the desired effect will be obtained. It is possible to produce pictures in two or more colours in one firing.

Having thus described the nature of my said invention and the manner of performing the same, I would have it understood that I do not confine myself to the exact details described, hut what I claim is the reproducing photographic and other pictures, engravings, prints, devices, and designs on the surfaces of glass, ceramic, and other substances requiriug to be fired in order to fix the same, by coating such surfaces with a sticky composition acted on hy light, then printing on the surface in the manner of photographic printing, thus destroyiug or changing the sticky composition where the light acts upon it, aud consequently causiug a suitable colouring matter to adhere to such portions of the surface as remain sticky as hereinhefore described. I also claim the use, as above described, of a composition containing bichromate of ammonia or other salt of chromic acid and honey, or other similar sticky orgauic substance; albumen being also added as hereiubefore stated.

A STRANGE REVELATION BY PHOTOGRAPHY.

MR. T. E. FRESHWATER states a remarkable circumstance brought recently under the notice of the Zoological Society of London, revealing, after a fashion, an example of a tendency for the lion to change its skin, and the leopard its spots. Mr. Eadweard Muybridge exhibited before the Society a series of rapidly-taken consecutive photographs of a lion, in all of which leopard spots were distinctly visible, although Mr. Muybridge stated that in the living animal itself they had been completely invisible to the naked eye. Mr. Freshwater states that the observers present at the meeting were satisfied that they were decidedly leopard spots, and not spots due to bad photography in some form or other. Colours which are exactly the same to the eye may be different when examined by the spectroscope; a difference is also occasionally revealed by the action of photographic plates, and this is perhaps the most remarkable instance of the kind on record. Would it be strictly accurate to call the interesting animal in question either a lion, a leopard, or a mule? or is it an instance of a tendency to return to a pre-historic type?

THE PARCELS POST.—Mr. G. W. Frodsham, 4, Change Alley, Corubill, writes to the *Journal of the Society of Arts*:—"Seeing that the Society of Arts was instrumental in hringing about a postal reform which has proved a great boon to the public at large, I write to ask whether some steps could not he taken by that iufluential hody to introduce a system which has long been prevalent ou the continent of Europe aud in America—namely, the collection of money due for a parcel of goods delivered, such collectiou taking place at the actual time of delivery. This is done on the continent hy the Post Office, and in America hy a Parcels Forwarding Company. Iu the latter country the system is so far extended as to render the sending of articles ou approval or trial (such as guns) possible, even to persons who are strangers to the firm sendiug the goods, the local agents receiving a deposit of the value of the goods during trial, aud refunding the same if the trial should not prove satisfactory, less a small charge. Without asking that this latter method should be introduced into our country, it would afford considerably increased facilities to trade were it possible to send goods through the Post Office to persons who had ordered them (through advertisement or recommeudation), payment to he received hy the *employé* of the Post Office, and be remitted, less a commission, to the sender of the goods. This system, called in the French-speaking countries *Envoi contre remboursement*, has not, so far as I can learn, given any trouble that is beyond the power of the English Post Office, and would, if introduced, no douht prove not only a source of revenue to that department, but also afford facilities for trading such as the public would not be slow to take advantage of."

DR. J. SCHNAUSS writes to the *Photographisches Archiv*, throwing the weight of his experience in favour of the doing away with the ferrous oxalate developer altogether, and suhstituting quinol in all cases.

PHOTOGRAPHY IN SWITZERLAND.

Switzerland, the playground of Europe and the paradise of tourist photographers, has at last a representative photographic periodical, the first number of which has reached us this week from Geneva. The title is the *Revue Suisse de Photographie*, the monthly organ of the Photographie Society of Geneva, of the Photographic Society of Lausanne, and of the Photographie Club of Zurich, published under the direction of M. E. Demole, Doctor of Sciences. The major portion of the first number is in the French language, but, as Switzerland has no language of its own, the new journal will accept indiscriminately articles in French, Italian, or German, those being the tongues chiefly spoken in three great sections of the nation.

The *Société Genevoise de Photographie* was founded by a few persons in 1881, and at first held informal meetings, until upon December 8th of that year a general assembly was convoked, and a committee of management appointed, with Dr. Fol as president, and M. Sautter secretary. Since then it has steadily progressed; at the present time M. H. C. Nerdinger is its president, and MM. J. Baud and J. Rey are its secretaries. On January 9th, 1888, a dozen amateurs met at the house of Professor Jaccard-Bornand, and founded the Photographie Society of Lausanne; it now holds its meetings on the first Tuesday of each month at its rooms in the Atheuæum, where its library is open every day to its members, and where the photographic journals may be seen. A laboratory in the same building is gratuitously at the service of the members, and strangers passing through the town are informed by notices at the hotels that they can have the use of the laboratory for photographie purposes on payment of a small fee. The president of the Lausanne Society is M. J. Jaccard, and the secretary is M. A. Bonnard. The Zurich Photographic Club was founded in 1887, and at the present time Herr K. Nussbaumer is president, and Herr H. Fretz secretary.

The first number of the *Revue* contains a long description of the "Escopette" miniature camera, invented by M. A. Darier, of Geneva; it is not unlike the "pistolgraph" camera of years ago, except that it has a roller slide containing enough paper for 110 views. The chief feature of the journal is an exeellent illustration executed in collotype by Thévoz & Co., of Geneva, from a negative by M. A. Molly, an amateur. There is also another good collotype illustration by J. Brunner, of Winterthur, from a negative by Mr. Frederiek Boissonnas, of Geneva.

The promoters of the new journal issued a circular to Swiss hotel keepers recommending them to keep a dark room on their premises fitted up for the use of photographers, and the journal contains a first list of the hotels, to the number of eleven, which have already provided such a convenience.

About ten years ago few native amateur photographers existed in Switzerland; but among those few were some good ones, including Dr. Stierlin-Hauser, of Rigi-Scheideek, who was an adept at photo-micrography. The *Revue* states that of late years the number of amateurs in Switzerlaud has been steadily inereasing.

Lights for the Optical Lantern.—At a meeting of the Chicago Lantern Slide Clnb Dr. Nicol stated that the light is the mainspring of the lantern; the best objectives and condensers are worthless without a good light. There is a great desire, he said, to find a lamp giving the maximum of luminosity with the minimum of heat. Experiments in that direction had not succeeded as he desired, most makers seeming to forget or overlook the fact that the rays of light falling on the condenser at an angle would be converged and brought to a focus at a certain point in the distance, and that only a small portion of an expansive light could be utilised in the condenser. For this reason, instead of three or four wicks in a lamp, he held that one argand light of even power and whiteness would give the best illuminated disc.

ENGLISH PHOTOGRAPHS AT THE PHILADELPHIA EXHIBITION.

On the first of this month a new monthly journal entitled *The American Amateur Photographer* was born into the world, edited by that remarkably active amateur, Mr. F. C. Beach, and by Mr. W. H. Burbank. It appertains eminently to the respectable class of photographic journalism, the only question being why it is published in an obscure country town, namely, Brunswick, Me, U. S. A. The answer is that the "acting" editor lives in that town, which, perhaps, means that Mr. Beach is an inactive editor, which—as Euclid says—is absurd; however, as a matter of grace and favour, and not as a matter of right, New York has also been given an office for the journal, and will doubtless sustain the honour with becoming modesty.

In the first number the inactive editor gives the following criticism of some English photographs at the Philadelphia Exhibition, some of which are old friends on this side of the Atlantic:—

The large display of foreign work was especially fine. Commencing with Frank M. Sutcliffe, Whitby, England, who took a diploma for general excellence, we find many interesting photographs well worthy of study. Of his thirty-three 6½ by 8½ pictures, 467, called "Hurricane Corner," was admirable as a landscape, with striking cloud effects. Original and attractive groups were 480, "Excitement," representing some dozen boys leaning over the wall of a pier, looking down apparently on something going on below on the other side. Their backs were towards the camera, and their original and natural poses—some boys being barefooted, others with patched pants, and others too short trying to push themselves up, as boys do, to see what was going on—made a very novel and effective picture. This wall of quay in Whitby harbour appears to be a favourite place for Mr. Sutcliffe to pose his subjects. Another, entitled "Under the Capstand," a group of three girls sitting in front of a capstand, and busy knitting and conversing, with a man a short distance away leaning against the wall of the quay looking off at the sea, was an extremely natural and effective picture. "A Bonnie Fisher Lass" was specially good as a single portrait. In addition to the artistic quality of all of Mr. Sutcliffe's work, there is a superior finish or warm brown colour to his silver prints which is especially desirable. It shows that he is a very careful worker. His pictures are excellent specimens for beginners and more experienced workers to study, since they are so thoroughly artistic and technically good.

The Rev. F. C. Lambert, of Cambridge, England, contributed several curious platinotype groups, which were remarkably well done. One portrait printed from an untouched negative of Prof. Caley, D.Sc., F.R.S., was very good indeed.

Undoubtedly the finest marine views of war vessels in motion were the eight 11 by 14 photographs of Japanese and Chilian steamers exhibited by William Parry, South Shields, Scotland. They had splendid smoke effects; No. 519, called "The Japanese Cruiser, Tacachiho," was particularly fine as regards the smoke, wind, and dashing of the waves as the ship ploughed through the water. Another, No. 515, "Roumanian Cruiser, Elizabetha, at Sea," was very clear and sharp. The views were fine models for artists fond of marine work to study. He received a diploma, which was well deserved.

Two photographs—one a bromide and the other a silver print with a special tone, looking like a print simply dipped in hypo without previous toning—sent by H. H. Geddes and Son, Arbroath, Scotland, were very good specimens of combination printing. One picture, called "News from Abroad," was a combination print from four different negatives.

Five excellent portrait and animal studies by Mr. Charles E. Wyrall, of Aldershot, England, printed mostly on platinotype paper, were particularly novel. One that was most striking (530), entitled "Convalescent," represented a large dog in a hammock. Mr. Wyrall supplemented the titles with verses of poetry, for the purpose of more fully explaining the object of the pictures.

Mr. Paul Lange's two large platinotype photographs, entitled "Hoar Frost on Trenton Farm," were most charming pictures, and were hung near Mr. Tolly's "On a Lonely Shore." The delicate tracery of the snow-covered branches of the trees, the bridge, the peculiar appearance of the snow in the road, and the happy location of the figures, all combine to make a picture that was most pleasant to see and worth studying. Mr. Lange, it

should be added, is president of the Birkenhead Photographic Society, in Liverpool, England, and he took a diploma.

Nearly forty fine platinotypes, about 6½ by 8½ in size, including many architectural subjects and beautiful landscapes, all the work of Mr. Richard Keene, vice-president of the Derby Photographic Society, of Derby, England, were placed together on one side of a large screen in the centre of the main hall, and were very much admired. He was awarded a diploma.

Mr. James Brown, Newcastle-on-Tyne, Scotland, sent five pretty road landscapes, printed on gelatine chloride paper.

Mr. and Mrs. W. J. Anckorn, Arbroath, Scotland, contributed five excellent figure studies. One, called "Auld Granny's Leather Pouch," was particularly meritorious and artistic.

Mr. Harry Symond's (of Portsmouth, England) twelve yacht-racing scenes, taken from a sail-boat, were as usual up to his high standard of excellence, and attracted the attention of all interested in yachting.

Mr. W. C. Harvey, of Gosport, England, contributed two photographs. One was quite original, and represented a boy and girl meeting in a village street, the boy, having kissed the girl, accidentally upset a milk-pail. They look at each other anxiously, and the question naturally arises how the matter shall be explained. It is suggested in the title, "What shall I tell mother?" "Say you slipped." Technically, the picture was not of a high character, but the originality in it made it amusing.

Nothing can be added to the praise that was given by all to the splendid single portrait study, "My Mammy," sent by Mr. W. W. Winter, of Derby, England. It was located in the centre of the west wall of the main hall, and was universally admired, not only on account of its technical excellence, but also because of its high artistic merit. It certainly deserved the special diploma which was awarded.

From G. West and Son, Southsea, Hants, England, were sent six yacht studies fully equal to those shown in former exhibitions. They were mostly of racing yachts: the one that struck us as being the most artistic was a stern view of the yacht "Yarana."

As usual, Mr. J. Pattison Gibson, of Hexham, England, sent some most charming landcape and water views (six in all). Two deserve special mention: one called "We watch the speckled trout glide by," was full of exquisite detail, had a beautiful distant effect, combined with fine treatment of the water in the foreground, and excellent arrangement of figures on the bank. The other, called "Landscape," was a platinotype print, representing a winter scene. The rendering of the slushy snow in the roadway was particularly fine.

Ten photographs, mostly studies of a dog in various attitudes, printed on bromide paper, by Mr. Arthur R. Dresser, of Bexley Heath, Kent, England, were very well done. One, of a dog in the act of swimming after a stick, was especially effective. The tone of the prints was also pleasing, showing that it is going to be possible to utilize bromide paper for positive prints much more extensively than has been customary.

In Mr. M. Auty's seven 8 by 10 photographs, we notice the same artistic quality and superior technical excellence that was so attractive in his pictures at the 1887 New York Exhibition. His "The Morning Mist" and "Durham Cathedral" deserve special mention. He resides at Tynemouth, Scotland.

Mr. P. H. Emerson, of Chiswick, England, sent twenty portrait and landscape pictures of excellent merit. "The Stickleback Catcher" and "Faggot Cutters" were among the best.

This Philadelphia Exhibition was rather an important one, being the joint exhibition of the Philadelphia, New York, and Boston societies.

RECEPTION BY A PHOTOGRAPHIC AMATEUR.—Sir David Salomons, Bart., threw open his new town house, 49, Grosvenor Street, W., on the fifth of this month, to a large gathering of members of the scientific world. The invitation was to meet the President and Council of the Institution of Civil Engineers, the President and Council of Electrical Engineers, and the President and Council of the Physical Society. The string band of the Royal Artillery was in attendance during the evening, and played a large and varied selection of music. Many of Sir David Salomon's electrical appliances were on view, and the visitors inspected the small but well-appointed workshops which have been fitted up on the first floor. Considerable interest was displayed by the guests in the movable shades used to protect the eyes of the workmen from the glare of the electric lights, and to concentrate the light upon the work in the lathe or vice.

A POWERFUL SOURCE OF LIGHT.

MR. LUDWIG MOND, president of the Society of Chemical Industry, and Dr. Carl Lang, exhibited at a recent *conversazione* of the Royal Society at Burlington House, a new form of gas battery, the interest of which to photographers is, that the inventors expect the principle, when fully perfected, to produce electricity so cheaply as to abolish dynamos altogether, at least so we were told by those in charge of the apparatus.

This battery is an improvement on the well-known gas battery invented by Grove fifty years ago, which produces electricity from hydrogen and oxgen gas by the intervention of platinum. The distinguishing feature of the new battery, which has been designed to obtain large currents of electricity by means of these gases, is that the electrolyte is not employed as a mobile liquid, but in a quasi-solid form, and it is therefore named "dry gas battery." Each element of the battery consists of a porous diaphragm of a non-conducting material—for instance, plaster of Paris—which is impregnated with dilute sulphuric acid. Both sides of this diaphragm are covered with very fine platinum leaf, perforated with very numerous small holes, and over this with a thin film of platinum black. Both these coatings are in contact with frame-works of lead and antimony, insulated one from the other, which conduct the electricity to the poles of each element. A number of these elements are placed side by side, or one above the other, with non-conducting frames intervening, so as to form chambers through which hydrogen gas is passed along one side of the element, and air along the other. One element, with a total effective surface of 774 square centimetres = 120 square inches, which is covered by 1 gramme of platinum black and 0·35 gramme of platinum leaf, shows an electromotive force of very nearly 1 volt when open, and produces a current of 2 amperes and 0·7 volt or 1·4 watt, when the outer resistance is properly adjusted. This current is equal to nearly 50 per cent. of the total energy obtainable from the hydrogen absorbed in the battery. The electromotive force decreases, however, slowly, in consequence of the transport of the sulphuric acid from one side of the diaphragm to the other. In order to counteract this disturbing influence the gases are from time to time interchanged. The battery works equally well with gases containing 30 to 40 per cent. of hydrogen, such as can be obtained by the action of steam or steam and air on coal or coke, if the gases have been sufficiently purified from carbonic oxide and hydrocarbons. The water produced in the battery by the combination of hydrogen and oxygen is carried off by the unconsumed nitrogen and an excess of air carried through it for this purpose.

A SUBSTITUTE FOR GLASS.—The new translucent substance intended as a substitute for glass has been adopted for some months in some of the public buildings of London, and various advantages are claimed for it, amongst these being such a degree of pliancy that it may be bent backward and forward like leather, and be subjected to very considerable tensile strain with impunity; it is also almost as transparent as glass, and of a pleasant amber colour, varying in shade from very light golden to pale brown. The basis of the material is a web of fine iron wire, with warp and weft threads about one-twelfth of an inch apart, this being enclosed, like a fly in amber, in a sheet of translucent varnish, of which the base is linseed oil. There is no resin or gum in this varnish, and, once having become dry, it is capable of standing heat and damp without undergoing any change, neither hardening nor becoming sticky. Briefly, the manufacture is accomplished by dipping the sheets edgewise into deep tanks of varnish, and then allowing the coating which they thus receive to dry in a warm atmosphere. It requires somewhat more than a dozen of these dips to bring the sheets to the required degree of thickness, and, when this has been accomplished, the material is stored for several weeks to thoroughly set. This fabric might be worth testing for those parts of studios through which a subdued light only is desired; as the substance contains no resin, and is practically solidified balloon varnish, there may be hopes of comparative durability.

THROUGH JAPAN WITH A CAMERA.

BY W. K. BURTON.

Chapter VI.

The Start from Awamori—Jinrikisha Travelling—Japanese Food.

From Awamori we started on our inland travels. There lay before us some six or seven hundred miles of road, all to be traversed in jinrikisha or hand carriage.

The following is the history of the jinrikisha, as I have been told it. Before foreigners were admitted into this country, some thirty years ago, the Japanese had only two modes of travelling. One was by bullock carts—a slow and tedious mode, of course—the other was by chairs or baskets suspended between two poles carried on the shoulders of two men—a method still practised when the roads are very steep. It is said that one of the earlier English settlers in Japan brought out a small carriage or phaeton with him, and that the jinrikisha is simply a copy of that on a small scale. Be that as it may, the jinrikisha or kuruma is a thing of but recent date in Japan. Its use must have spread, however, with remarkable rapidity, for it is now to be found in immense numbers all over the country.

On good roads a jinrikisha man will keep up a rate of seven or even eight miles an hour for several hours. When the roads are bad, or when a great distance is to be run, it is customary to have two men, one of whom pulls with a cord in front. In the large towns the hire of a jinrikisha with one man is 10 sen an hour (about 4d.), but from foreigners about double as much is generally expected. Not more than 1 yen (3s. 2d.) is, however, the maximum for one day, and the hire of a jinrikisha and man by the week is only 2 yen 80 sen (about 8s. 6d.) In the main roads in the country the rate is generally according to distance, being something like a halfpenny per mile for one man, and a penny per mile when there are two.

Jinrikisha riding in the towns, or wherever the roads are good, is a very comfortable and even luxurious mode of travelling, the wheels of the vehicles being large, and the bodies of the carriages being well balanced on easy springs, but I now experienced for the first time travelling on rough and rugged roads. The roads in Japan vary from many as good as the best we have at home, to mere stony paths of the very roughest nature. In the case of very many of them, the water, which has to be taken from the higher to the lower side of the road, in place of being carried in a culvert at some distance below the surface, is carried in a ditch covered with a board. This board is intended to be, and doubtless is at first, flush with the road; but very soon the wheels of the vehicles wear a deep groove at each side of it, and one goes flying over these boards with a preliminary and a final bump that is quite surprising.

In travelling, we did from forty to ninety miles a day, according to the condition of the roads and the number of hours that we gave to steady going. We changed jinrikisha generally at the end of every ten to twenty miles.

The three days after we left Awamori were spent in steady travelling over roads which were not particularly interesting. The heat had by this time become intense. Although we were in the northern portions of Japan, we just happened to strike what was, at that time, the hottest part. The thermometer rose to 95° or 96° in the shade every day, and there beat down a fierce sun that scorched and blistered the skin. I wore nothing but a white shirt and trousers. One day I opened the front of the shirt; there was a slight breeze, and I thought to get some relief. I certainly did not keep it open for five minutes; yet now—six weeks afterwards—I have a great dark streak down my breast where the sun burned the skin.

We were now fairly launched in the interior. I saw only one foreigner for a fortnight, and there was nothing but Japanese food to be had. I had been warned by all my foreign friends that I must carry English food (potted meat, &c.) with me, or I would starve. Although I was told dismal tales of those who had entered the interior, depending on Japanese food only, and how they had returned after a week or two quite broken down, I determined, in spite of this, that I would not carry any foreign food whatever with me. There appeared to be a want of adaptability in so doing, and I felt sure that when any people ate and lived on any kind of food whatever—except, perhaps, roast missionary—I could manage to exist. I must say I felt a little nervous, however, just before leaving Hakodatte. I made the acquaintance, then, of one of the twelve foreign residents, and amongst other things asked him how long he had ever lived on Japanese food. He smiled very grimly, and answered, "I once starved on it for ten days, but never again!"

The truth is that most kinds of Japanese food were not to the taste of Europeans, and that, moreover, as it is almost exclusively vegetable, and at that of but a slightly nourishing nature, it is necessary to eat very largely, otherwise one is hungry again an hour or so after a meal.

The following is a description of an ordinary Japanese meal, such as one gets at an average Japanese inn.

The food is brought in on a small square tray, such as I described as used in the case of the entertainment given to us at Awamori. On this there are, as a rule, four bowls with lids and one without. Of the four bowls which have lids (saucers inverted over them), these are generally of wood lacquered, the fourth is of china. These are all fairly large, and stand in the four corners of the tray. The fifth stands in the middle. In it there are generally some slices of raw daikon. This is a vegetable looking like an immensely long white radish, sometimes as much as three or four feet long. It has a strong, rank smell, and a taste which is to me positively disgusting. Most Japanese are very fond of it, and even some foreigners can take it. In two of the larger dishes there is generally soup; in the third often fish or some vegetable compound which I am unable to describe. Meat, apparently, is never used. The china bowl is empty. It is for the rice, which is to form the staple part of the meal. The rice is contained in a long wooden vessel with a lid, and is helped into the china bowl as it is wanted.

If one can manage rice in large quantities it is all right. If one cannot, he will fare very badly. For the first few days I could not manage the rice at all. It would be absurd to say, of a people whose staple food is rice, that they do not know how to cook it; but they do not cook it to suit the taste of Europeans. As it is eaten it is a clammy, agglomerated mass, generally tepid, without salt or any other flavouring. A Japanese generally finishes a meal with four or five bowls of this stuff. It simply would not go down my throat at all, and for several days I lived almost entirely on hard boiled eggs, and very sour, hard, unripe apples.

Japan, by the way, is a miserable fruit country. After a few days I got into the way of managing the rice. I observed that some of the people put tea amongst it, and I found that by making it into a sort of "hogs wash" in this manner I could get through a good deal of it; but I soon found out a still better plan. The rice, as I have said, is not good (to my taste) alone. The soup is palatable enough, but is of the very thinnest nature—a few bits of vegetable or seaweed floating in warm water which has a slight flavour of them, but has never been near meat of any kind; but the rice, however, and the soup mixed made an excellent dish, especially when pepper and salt were available. Pepper, however, was seldom to be got, salt by no means always. The Japanese scarcely use salt at all; and often what was offered to me was so black and dirty-looking that I rather did without it than use it.

I think there can be no doubt that in very hot weather a thin vegetable diet such as I have described is better for the health than the heavy meals that foreigners generally eat in the East. It agreed with me most admirably. I got to like it exceedingly after a time, and

were I to do the same trip again would carry nothing with me but pepper and salt.

The meal that I have described may be taken as a typical one. At large towns it was generally rather more elaborate, there being several additional dishes.

Sometimes the people, out of consideration for me, prepared what they imagined to be foreign food, and then verily must I have astonished my internal economy by the mixtures that I poured down my throat. At one place meat was produced. I could not tell of what animal it was, but it was unmistakably meat, and as I had tasted none for ten days, I confess to having fallen to with great avidity, when the first mouthful revealed the fact that the food had been cooked with sugar. It had not received a little flavouring of sugar, but had been saturated with it.

SMALL WEIGHTS FOR THE PHOTOGRAPHER.

BY W. E. PARTRIDGE.

THE smaller weights used in photographic weighing, even when made of aluminium, are inconveniently minute. They are not easily handled with the fingers, and it is not always that the tweezers are at hand. In the ordinary sets of grain weights it is always possible by a little thought to get any desired number of grains, but when one is busy there is often a wish for a full set that would do away with the necessity of "making change."

Half an hour's work will give anyone as complete a set of weights as may be desired, and of a style much more easily managed than those made of metal. The *modus operandi* is to take a number of fine corks, slice them up into prisms about one-eighth or three-sixteenths of an inch square, and half an inch long. Balance one of these against a grain weight, and pare it down with a sharp knife until it balances evenly. Mark it with ink, and you have a bulky weight which is sufficiently accurate for all practical purposes. Repeat the operation, and if you have not a half-grain weight, cut the weight in half. If the cork is pretty regular in texture, two one-half grain weights will be made very fairly accurate. If the scales are very good, greater accuracy can be obtained by making a rectangle of paper which will weigh just one grain. Then by carefully cutting it it in halves, quarters, fifths, or tenths, and balancing these, original weights can be made, from which cork copies can be made as before. Fine wire is so very regular in size that fractional weights are easily obtained by dividing a given weight of it into the required number of parts by linear measure. The cork copies are then easily made. A set of these weights may comprise the following: Four quarter-grain weights, two half-grain, one-grain, two-grain, three-grain, four-grain, five-grain, six-grain, eight-grain, and ten-grain.

If the scales will weigh with sufficient accuracy to indicate the tenth of a grain, a set of metric weights can be made with a fair degree of accuracy. One and one-half grains will be fairly equal to a decigramme, and fifteen and one-half grains will equal the gramme. The first is a trifle short, the latter nearly one-tenth of a grain too large. If one has patience to divide the grain into thirds, quarters, and fifths, quite close approximate weights can be made. Even those we have mentioned are about as close as common cheap scales will weigh. For fifty and one hundred-grain weights whole T corks are needed, and they should have paraffin wax melted into them to increase their density a little, and to render them impervious.

The convenience of a set of such weights, with the figures plainly marked upon all sides, is so great, that they have only to be seen to be appreciated.—*American Amateur Photographer.*

THE MIGHTY DEAD.—Busts and high relief medallions of Daguerre have been introduced into the market in Germany, to be followed by busts and medallions of Joseph Nicephore Niepce; the latter should have taken precedence, as critical historical students will admit. Is it not high time for English photographers to do something in honour of the memory of Fox Talbot? The things just mentioned as turned out in Germany are in plaster of Paris only; probably there are many in this country who would like to possess copies in bronze.

IT has been notified to the Speaker of the House of Commons that her Majesty desires to possess the photographs and autographs of all the members who sat in the House of Commons during the year of her Jubilee.

PICTURES BY THE ACTION OF HEAT AND "COLD."

BY D. WINSTANLEY.

ARTICLE VI.

I HAVE now explained how frigerograms and evaporograms may be produced, with ease and certainty, on the parlour table in aqueous dewdrops and in camphor crystals. I have endeavoured to obtain them with sundry other substances, and have been successful in getting dew pictures with methylated spirit and with turpentine. I have obtained a few indifferent results with iodide of mercury, and have failed entirely with flowers of sulphur, methylated spirits, and turpentine (used separately, of course); each give dewdrop frigerograms with reasonable certainty when used in the manner mentioned for the production of such results in water particles. The texture of such frigerograms, however, is very different from that of the aqueous ones—they are thin and filmy. They are destitute of "body," and they are destitute of beauty, too; whilst the camphor pictures are really beautiful, and the aqueous ones are glorious to behold. We have, however, the fact that frigerograms are easily producible in various substances, and various methods are accordingly and obviously open to us for their after treatment when they have actually been obtained.

The iodide of mercury frigerograms, like those in iodide of starch, were obtained by the after treatment of results in iodine alone; but as I have thus far only got one fairly decent scarlet picture, I will leave the method of treatment for the present undiscussed. The sulphur pictures failed, probably from a failure to maintain a suitable temperature for sublimation. The pictures in watery particles and in camphor are, of course, impermanent in the pure and simple condition in which they are obtained. In very short periods the aqueous pictures disappear, a single minute often sufficing for their evaporation. The lower the temperature and the greater the saturation of the air the longer they remain, and, when frozen, doubtless their duration would extend over a period of some days. The camphor pictures, freely exposed to the air in a room of comfortable temperature, require from one to three or four hours in order to exhale. One of these—a very perfect one—which I had produced upon a carte-de-visite cutting shape of glass with edges which were smooth, I endeavoured to preserve by hermetically sealing up. For this purpose, I cut down a carte-de-visite mount exactly to the dimensions of the glass, and then neatly removed its central part, so as to make a "mount" suitable to the beautiful figure of the camphor cross. Having placed this mount on the picture side of the glass, I covered it with another cutting shape commercially identical with the first, and, with gummed paper lapping over, fastened the glasses to each other very carefully all round. In this condition I carried the camphor picture in my pocket for several days, and submitted it to the inspection of numerous persons interested in this sort of thing. The picture, however, gradually exhaled; the corners of the cross first rounded off, and evaporation gradually encroached upon its body until it had altogether disappeared, and spangles of crystallised camphor were distributed with something like uniformity on the surface of both the glasses by which it was enclosed. Varnishes which are capable of dissolving camphor are, of course, quite useless for the preservation of pictures made of that material. At any rate, I have not thought it worth my while to try them, and with aqueous varnishes, such as gum arabic in water, I have, thus far, entirely failed. When the liquid is poured on, the beauty of the picture disappears at once, and as the water does not "wet" the camphor, the gumming solution retires therefrom in thickening, and by evaporation the camphor disappears.

It occurred to me, however, that many substances not volatile at ordinary temperatures might, for the time being, adhere to an aqueous picture, and by subsequent

treatment be permanently fixed upon the glass, and my early experiments in this line have been attended by remarkable success. Taking an aqueous dewdrop picture on glass—a picture of a six-rayed star—from the cup of water over which it had been made, I immediately cast upon its surface a quantity of sugar, fine and white and dry, and then reversed the plate at once: result, a very pretty picture made of sugar crystals, which, four months after its production, lies before me now, and, so far as I can tell, entirely unimpaired. The picture has had no treatment other than that which I have here described. Where the plate was moist, the sugar, by its own solution, is well cemented on, and where the plate was dry the sugar at once fell off and left the surface clear. Examined under a focussing glass the sugar crystals are interesting to behold, and, no doubt, slides so formed would prove useful objects for the projecting lantern ("optical lantern," by the way, is a redundant name, as all lanterns are appliances for giving light, and are, therefore, optical in kind; "projecting lantern" and "pictorial projector," to my mind, are more agreeable names for that which was first called the "magic" lantern when "magic" meant the scientific, not the supernatural).

By covering plates of glass with thin gum water and thoroughly drying in the oven, I have obtained another and practicable means of making permanent pictures by the action of the cold. Such plates, exposed in the manner which has been described, become tacky where the moisture has condensed; and the frigerograms are immediately rendered visible and permanent by powdering from a pepper-box any one of many hundreds of substances which any chemist can forthwith name. What is necessary in the powder is, that it shall not be volatile at such temperatures as those to which the picture will have to be exposed, that it shall not deliquesce or change by exposure to the air, and that its particles shall be too large and heavy to adhere where water is not present, and too small to fall off in spite of the tackiness of the surface on which they have been thrown. I have such a picture now before me made in carbon dust, the wire gauze-sifted scrapings of a piece of the "doue" plumbago made up for domestic use. Where to the unaided eye the background of this picture seems quite clear, the focussing glass shows a beautiful distribution of little carbon particles, which circumstance is suggestive of the possibility of obtaining half-tone pictures by the operation of the "cold." This picture, like the one in sugar, has been done four months, and, of course, is perfectly intact.

I have not made many more experiments than those described in the Photographic News, but it will be obvious that whatever part frigerography may ultimately play, it is fast heaving in the direction of a process capable of copying certain forms in materials suitable for indefinite reproduction.

Here are a few more or less interesting, but hitherto unpublished memoranda from my frigerographic note book:—

December 29th, 1888.—The night being cold (freezing), placed a large cardboard stencil (13 × 10, with six-rayed star, measuring 7 inches across the longest distance from point to point) in the window of my room, and also a large and painted mask (made of writing paper, with the figure in black varnish).

Sunday, December 30th, 1888.—Result.—In the early morning hours found stencil to be copied (though vaguely) in ice, and mask in drops of dew.

Same date.—A cup of cold water, which had been outside all night covered with a glass and wooden stencil of a six-rayed star, exhibited a splendid picture of the third order; that is, the star in big drops (not too big to prevent its being turned over) on a ground of minute dew, resembling ground glass, but possessing a beauty ground glass does not, and superior to that of camphor. Removed the mask and left otherwise exposed. After six hours the star was perfectly distinct, though manifestly fading.

Same date.—Tried the experiment with methylated spirit, and was successful, the dew deposit being extremely fine.

February 7th, 1889.—The sugar experiment a success. Another one with powdered resin failed.

February 8th, 1889.—Experiment with graphite on gummed plate was a success, and another experiment was partially successful when the plate had not been gummed.

Sunday, February 10th.—The star in ice experiment a moderate success.

TRANSPARENCIES IN PRUSSIAN BLUE.

Mr. Robert Benecke, of St. Louis, gives instructions in *Anthony's Photographic Bulletin*, to select glass free from scratches and bubbles, put it in a solution of washing soda for a time, wash, and set it up to dry. Now take one ounce of fine gelatine, such as is used for making dry plates, put it in clean water, wash it a couple of times, squeeze out the water and place it on a clean towel. After about one hour, dissolve the gelatine in twenty ounces of hot water, and filter through cotton, flannel, silk, buckskin, or cotton pushed into the neck of a funnel. Coat the plates with the gelatine solution warmed to 120° to 140° F. In cold weather it will be necessary to warm the plates. When the solution is spread evenly over the glass, lay it on a cold marble slab placed horizontally, and as soon as the coating has become stiff enough not to run, set the plates up on nails to dry. This will take from eight to twelve hours or more. Any number of plates can be thus prepared, and may be kept for any length of time in a place free from dust. Next mix the sensitizing solution. Dissolve citrate of iron and ammonia, 7½ drams in 4 ounces of water; also ferri-cyanide of potassium, 5 drams in 4 ounces of water. Mix and filter into a dish, and immerse the plates about five minutes, avoiding air-bubbles. This is better done in the evening by lamplight. Next morning they will be dry, and ready to be placed under the negative and exposed. The time for printing required is about double of that for albumenized paper. The last thing to be done is the washing, which removes the salts and develops a rich blue print. The solution must be freshly made, as it will not keep very long after being used. The plates will keep in the dark for some time.

The idea of making blue transparencies was suggested to me by my friend and enthusiastic amateur, Mr. R. Bain, president of the St. Louis Camera Club. He proposed to add the salts to the gelatine solution, but this plan would not work, as the citrate of iron and ammonia immediately coagulates the gelatine.

The Roller Blind Shutter.—The little camera which Ansebütz, of Lissa, has introduced into the market has been exhibited before the Antwerp section of the Belgian Photographic Association by an Antwerp dealer, Mr. Van Neck. It is a little camera taking plates nearly of quarter-plate size, and has a roller-blind shutter with the power of varying the length of the opening in the blind. The latter is the only point of interest recorded, since we believe that the originator of the roller blind shutter, Mr. B. J. Edwards, has not yet adopted any method of varying the aperture, because of his belief that it may introduce uncertainty of action. Mr. J. B. B. Wellington can throw some light, from experience, upon this matter.

Paris.—In Paris the photographic committee formed to manage the fête relating to the fiftieth anniversary of modern photography has ordered a commemorative medal to be executed by the sculptor, Soldi. A great photographic banquet will be held on the 19th of August at the Hotel Continental; tickets 30 francs each. The photographic jury of the Paris Exhibition consists of the *President*, M. A. Davanne (France); *Vice-President*, Mr. W. England (Great Britain); *Reporter*, M. Léon Vidal (France); *Secretary*, M. Pricam (Switzerland); *Titular Members*, Messrs. Darlot and Lévy (France); Bilbaut (French Colonies and countries under French protection); Hastings (United States of America); *Supplementary Members*, Messrs. Audra, Braun, Chéri-Rousseau (France); A. de Braam (Low Countries); Buisset (Belgium). Much of the work of the jury has been done, and all may have been finished by the time these lines go to press. The members have had miles of walking and climbing to do, photographs being scattered all over the Exhibition.

Notes.

To the uneducated European eye one negro is very much like another. In Borneo the similarity between the natives is, at times, very puzzling, and the difficulty of distinguishing is added to by the absence of peculiarities in clothing—one might almost say, in some instances, by the absence of clothing itself. A writer in the *British North Borneo Herald*, in commenting on Mr. Galton's method by identification of thumb marks, speaks of the plan with approval, as the identification of coolies, either by photographs or by measurements, is extremely difficult, while the question as to how identification could best be performed would probably become important in the early future of British North Borneo. What the precise meaning of this observation may be is not very clear, and we are left in doubt as to whether the Government of British North Borneo contemplate registering their criminals by means of photographs and thumb marks, or whether they intend to establish a system of pensions, and fear that what has happened in England may happen in Borneo, namely, the payment of money to the wrong person, owing to the difficulty of identifying pensioners.

The French are nothing if not precise. At the last meeting of the *Société Francaise de Photographie* a letter was read from the president of the Photographic Society of Florence, in connection with the Photographic Jubilee, congratulating France as the nation which had given to the world the "admirable discovery" of photography. This polite message was, of course, acknowledged with equal politeness, but in the reply the word "invention" became "divulgation," the president remarking that it was the publication of a photographic process which they were celebrating, and not the invention of photography, which dated back to 1824, when Niepce gave to the world the result of his experiments.

At the same meeting an interesting communication was made by M. Moutrille, of Besançon, in regard to Legray's waxed paper process, from which it appeared that, like Daguerre's first employment of the vapour of iodine, and subsequently of mercury, the discovery of the waxed paper process was due to an accident. It came about in this way. M. Mestral, working one day with Legray, placed inadvertently a slab of white wax upon a bromine box which they were using for Daguerreotypes. A short time afterwards they were surprised to see upon this slab of wax the silhouette of the window of the room in which they were. At once they rubbed a sheet of paper with wax and treated it as though it were a Daguerreotype plate, and obtained the semblance of an image. Neither being a chemist, the discovery might have stopped at this stage, but, communicating the experiment to M. Regnault, he advised them to plunge the waxed paper in a bath of iodine and afterwards in nitrate of silver, and they succeeded so well that M. Regnault interested himself in obtaining for them a commission from the Minister of Fine Arts to make a series of photographs of all the historical monuments in France. Accordingly, added M. Moutrille, they set out, though scarcely masters of the process, with a suitable vehicle to carry their apparatus, and made a tour of France, stopping wherever they found an ancient *souvenir* or historical monument, to reproduce it. These particulars were communicated thirty-five years ago to M. Moutrille by M. Mestral, who also gave his friend a collection of the photographs. M. Moutrille presented some of these interesting photographs to the Society for inspection.

Continental tourists who intend taking their cameras with them should also take the precaution, even if they know French and German, of looking up the equivalents in those languages for the technical terms used in photography. This knowledge will not only be useful if by chance the tourist has occasion to go to the photographic dealer, but will be especially so if he chance to get near the forbidden neighbourhood of fortifications and meets the inevitable policeman or sentry. Unfortunately, the proper technical terms are not so easily acquired, as they are not to be found in ordinary dictionaries. Probably a study of the advertisements in a French or German photographic journal would furnish as much information as is needed.

The writer of an article in the *American Journal of Photography* on photographing interiors remarks, "The only objection to magnesium is in the fumes; but these are not serious, and the householder seldom or never objects." This experience does not coincide with that of the majority of English amateurs. When the householder is a lady, she has a most decided objection to magnesium fumes, or, to speak correctly, to the result of the magnesium fumes. To have her drawing-room carpet and furniture covered with an impalpable white powder is enough to anger the mildest tempered English housewife. Perhaps the American ladies are not so particular.

It is well known that a favourite method of advertising among the cigarette makers of America is by means of photographs of pretty girls; but it seems that fresh faces are difficult to obtain, and smoking men are tired of the old ones. At one time certain makers of cigarettes used to have all the good-looking girls in their factories photographed, and the photographs were placed upon the boxes. But this led to rather awkward results. All the young men of a certain western city went mad over the photograph of a more than usually attractive beauty, and used to assemble in crowds at the door of the factory, waiting for her to make her appearance after her day's work. Naturally, a few quarrels ensued, and the proprietors thought it prudent to relinquish the plan.

A photographer who used to supply the cigarette makers with photographs of young ladies complains that he cannot now get them to sit. Some of them do not mind being photographed in a fancy costume, but this is not what is wanted. The taste runs upon everyday costume of a fashionable style. Even those girls who are willing to be photographed in an ordinary dress raise a difficulty over the expense of a dress made in the latest fashion; because, although one of last season might do well enough for the photographer, cigarette maker, and smoker, it is derogatory to the dignity of the lady.

PHOTOGRAPHIC OPTICS.

BY W. K. BURTON.

CHAP. V.—ON PHOTOGRAPHIC LENSES (*continued*).

WE now come to a consideration of the actual forms of lenses used in practice. I illustrate these, briefly describe them, and in each case point out what are the particular distinguishing qualities of the lens. It is impossible, however, as a rule, to go into the question of why any individual lens possesses particular qualities. For example, we cannot here discuss in detail why the portrait form of lens permits the use of a larger aperture than the "rapid symmetrical," as to do so would alone require a treatise involving advanced mathematics. The reader must, therefore, take it for granted that the lenses do possess the qualities attributed to them, and must—or ought to—thank those opticians who have worked out the various forms—often at the expense of almost inconceivable labour.

The Single Achromatic Lens.—Whilst discussing the question of chromatic aberration and of achromatism, we gave a cut showing the section of the actual glass portions of three different forms of single lens. I now illustrate a single lens as mounted.

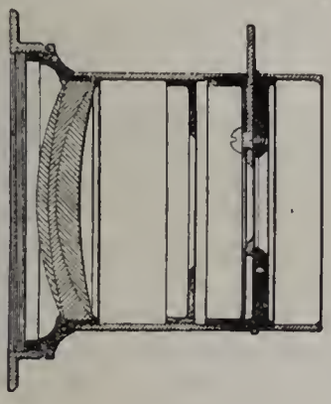


Fig. 21.

The single lens has certain advantages over all others. In the first place it is simple, and therefore comparatively cheap. The simplicity also results in the fact that the light has to pass through only two surfaces, at which very little of it can be reflected—there is practically no reflection of light from two surfaces of glass cemented together—and this results in a certain crispness of image greater than can be got by any other lens.

On the other hand, the lens is comparatively slow, includes only a moderate angle, and distorts to a certain extent. The older forms of single lens were very slow, working with maximum apertures as small as $\frac{f}{50}$ and even smaller. They also included only very narrow angles. Some considerable time ago both Mr. Grubb and Mr. Dallmeyer improved the construction of single lenses so as to admit of a somewhat larger aperture. The two forms are shown in the cut intended to illustrate the method of achromatization. The second of these shows Grubb's construction, the third Dallmeyer's. Dallmeyer secured, besides a larger aperture, a wider angle. Both lenses worked at about $\frac{f}{16}$. Recently Wray and Dallmeyer, both of London, have so far improved the single lens as to get an aperture of $\frac{f}{8}$—even with large lenses—giving definition good enough for some kinds of work (for large heads, for example), and giving good enough definition for any kind of work with an aperture of $\frac{f}{11}$. The lens made by the first-mentioned optician includes also a considerable angle when desired, and the writer considers both a real advance in the matter of lens construction.*

The single lens always gives some distortion of the "barrel" form if the stop be placed in front—as it almost always is—of the "pincushion" form if it be placed behind. This distortion is so slight as to be quite unnoticeable when there are no straight lines in the picture near the margin, and in all cases when only a narrow angle is included, except the one case of copying such things as maps. The writer considers it advisable to use the single lens whenever it is possible to do so; that is to say, when great rapidity is no object; when it is not needed to include a very wide angle, and when a small amount of distortion is not of consequence. It may be used for the greater part of landscape work, and for portraiture when it comes to a case of very large sizes, as then it is impossible to use a large aperture, even if the lens possess it, on account of the want of depth of focus due to the great focal length that must be used for large portraits. The distortion is by no means such as to show with portraits.

The Rapid Landscape Type of Lens.—This is the name given to a type of lens designed to overcome two of the objections that there are made to the single lens—or were at any rate at the time when the "rapid" form of lens was invented—namely, the slowness and the distortion. The lens was the result of the combined work of Drs. Monkhoven and Steinheil. We illustrate it here. It will be

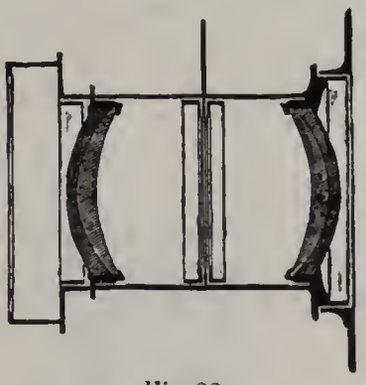


Fig. 22.

seen that the lens may be said to resemble two of the lenses of the kind last described—the single achromatic I mean, not the special form of single achromatic with three lenses that has just been illustrated—placed face to face. Each singly would distort, but in a direction opposite to the other. The two distortions therefore correct one another, and an image absolutely free from distortion results. Hence, the names commonly adopted, "rapid rectilinear," "rapid symmetrical," and soon. The form, besides giving no distortion, permits of a comparatively large aperture, which means increased speed. In fact, a stop the whole aperture of the lenses may generally be used. For this reason this form of lens is frequently called "aplanatic." The aperture common until quite lately were such as $\frac{f}{8}$ to $\frac{f}{16}$. Of late years, however, although there has been no radical change in the form of the lens, improvements in manufacture and in the quality of optical glass obtainable have enabled the aperture to be increased considerably. Thus, Suter, of Basle, issues a lens with an aperture greater than $\frac{f}{6}$, and indeed Voigtlander and Dallmeyer, whilst adhering to the form of construction, have contrived to increase the aperture to $\frac{f}{4}$, or even a little more, thereby bringing the lens under the head of portait lenses—to be presently considered.

The American Form of Rapid Lanscape Lens.—As has been said, although European opticians have, by care in workmanship and by the adoption of denser glass, been able to increase the aperture of their rapid landscape lenses, the old construction of Steinheil and Monkhoven has, for the most part, been adhered to. The only cases that I know of in which something entirely new has been struck out are those of the late Morrison, in America, who, some years ago, made a new departure in the construction of lenses, and of Steinheil, who has recently constructed a

* See description of Dallmeyer's new "single rectilinear lens" further on.

lens entirely different from anything that has been in use before. I here illustrate Morrison's lens.

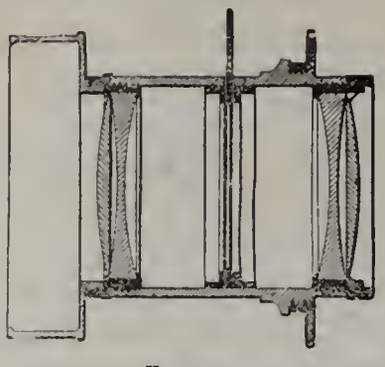


Fig. 23.

It will be seen that the lenses of each combination are separated from each other by some little difference. By this arrangement the necessary corrections are gained without the necessity for using the deep curves which are seen in the older Steinheil form, and which involved considerable expense in glass.

The writer cannot speak of the performance of the Morrison lens from personal experience, but as it is vouched for by so good an authority as J. Traill Taylor, he has no doubt it is excellent.

The New Steinheil Antiplanatic.—An illustration of this lens is here given.

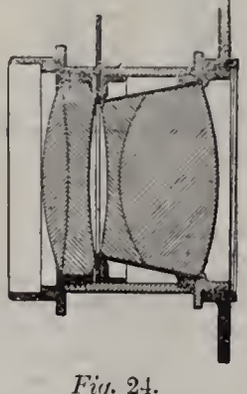


Fig. 24.

It will be seen that the construction is quite different from anything that we have yet considered. I have had no great opportunity of practically testing this lens, having, in fact, only once made a trial of it. It is scarcely fair to judge a lens from a single trial made with a single sample, however much care be used in the experiments, and I therefore stand ready to be corrected when I say that from that trial I could find no great advantage in the new over the older form of lens by the same maker. The maximum aperture was larger, it is true (about f_6), than that generally given to the older form of lens by Steinheil himself; but not larger than that recently given by some other opticians, and the field appeared to be rounder.

Uses of the Rapid Landscape Types of Lenses.—It may probably be said, without much fear of contradiction, that the rapid landscape is the best all-round lens that can be got. If a photographer can afford to have only one lens he will probably do better to have a rapid landscape than to have any other form. The angle included is large enough for all except very special cases; there is a complete absence of distortion, and the rapidity is such that instantaneous work may be done with the lens better than with any other landscape lens, whilst it is also well suited to portraiture. For the last-mentioned kind of work the more modern lenses, with considerable apertures, will of course be found to be the best. Indeed, I do not hesitate to predict that these lenses will, before long, all but oust the portrait lens.

(*To be continued.*)

LONDON MEETING OF THE SOCIETY OF CHEMICAL INDUSTRY.

THREE days of last week, July 10th to 12th, were pleasantly occupied with the annual business and interspersed social engagements of the Society of Chemical Industry, which now, in the eighth year of its existence, numbers 2,456 members. On Wednesday the general meeting was held in the theatre of the Royal Institution, when the president, Mr. L. Mond, F.C.S., delivered an interesting and important address, which dealt with the economic production of ammonia from small coal, and the utilisation of the hydrogen contained in the purified gas made therefrom as a source of electricity, when expended against air, in a new form of gas battery. The lecturer stated that he had succeeded in making available 50 per cent. of the theoretical electric force against the ordinary 8 per cent. result hitherto obtained. Models of the gas battery were shown with plaster septum and platinized surfaces, and two compound cells were set in action, producing a good light during the lecture. The officers for the forthcoming year were elected; Sir I. Lowthian Bell, Bart., F.R.S., is the new president; and the place of annual meeting chosen, Nottingham.

This formal business concluded, the members inspected the laboratories at Albemarle Street, and were shown several historical pieces of apparatus used by Davy, Cavendish, and Faraday. The afternoon was spent in visiting Messrs. Doulton's Art Pottery Works and Lambeth Palace, and in the evening the President and Mrs. Mond held a reception at the Grosvenor Gallery, which was very fully attended.

Next day (Thursday) the members proceeded up the river to Kew, the steamer stopping for an hour at Hammersmith to enable the party to inspect the Manbré Saccharine Company's Works; thence to Kew Gardens (visited under official guidance), and to Richmond, where the members dined together at the "Star and Garter" Hotel. On the covers of the menu card were a pair of admirably reproduced portraits from photographs of the late Professor Chevreul, and of Dr. Warren De La Rue.

On Friday the members visited Messrs. Truman, Hanbury, and Buxton's Brewery, Messrs. Cowan's Sugar Refinery, the Anglo-American Brush Lighting and Engineering Works, and Brin's Oxygen Factory, besides other alternative places of scientific interest; and in the evening the proceedings were brought to a close by a smoking concert given at the Café Monico. The scientific novelties which appeared to excite the most interest were the manufacture of glucose and invert sugar, the electric lighting apparatus, Brin's oxygen plant and appliances, whereby this gas is separated from the air, being alternately absorbed by red-hot baryta, recovered therefrom under diminished pressure, and pumped into cylinders. The use of this gas for oxy-hydrogen lighting and lantern displays is already well known, but a demonstration with Mr. Fletcher's new giant blowpipe, showing that it was capable of melting large masses of iron and steel, or of perforating thick pieces of boiler plate in a very few moments, gives the photographer hope of making short work of the reduction of silver residues, and of even getting the precious metal out of the ashes of waste platinum prints, which has hitherto baffled most efforts in this direction.

THE ABSORPTION SPECTRUM OF OXYGEN.—At the last *conversazione* of the Royal Society, Professors Liveing and Dewar exhibited the absorption spectrum of oxygen. The oxygen, compressed to 150 atmospheres, is contained in a steel tube fitted with quartz ends. In the red part of the spectrum are seen the absorptions corresponding to the Fraunhofer groups A and B. Less sharply defined absorption bands are seen in the orange, citron, and blue, and faint bands in the green and indigo. These band absorptions have a totally different character from the great line absorptions of A and B. Beyond the visible spectrum, photographs show some absorptions in the ultra violet, and the extreme ultra violet rays are wholly absorbed. This complete absorption extends nearly to the limit of the solar spectrum. This proves that the earth's atmosphere limits the rays which can reach us from the outside. Ozone has even a more powerful absorptive action, and oxygen, ozonized and unozonized, put a limit to our observations of stellar spectra. Professors Liveing and Dewar have experimented with a steel tube 60 feet in length, and easily capable of holding a mass of oxygen equal to that contained in a vertical column of the earth's atmosphere of equal section.

VARIOUS PHOTOGRAPHIC PROCESSES FOR COPYING LINE AND OTHER DRAWINGS.*

BY THOMAS SCOTTON.

I may say at the outset that I do not prepare my own paper, as this can be obtained ready prepared from several photographic dealers, but those who wish to prepare their own will find several formulæ in the photographic annuals.

There are various methods by which maps, plans, and tracings can be copied. First, there is the "ferro-prussiate process," by which copies can easily be obtained from a tracing. The operations are the most simple of any process known. After printing, the copies are merely washed or fixed in clean water, producing white lines on a blue ground. The face of the drawing is placed against the glass of the printing frame, and the prepared paper is then placed on the back of the drawing. It is advisable that the paper should be somewhat larger than the drawing, so as to leave a margin exposed to show the action of the light upon it. The exposure required in very bright sunshine varies from five to fifteen minutes, but in the very dull days of winter it may require two or three hours, or even a whole day. During the exposure to light the paper assumes various tints from greenish blue to olive. When the exposure is completed, the print is taken from the printing frame and immersed in clean water until the lines become purely white. The time required for washing occupies from five to ten minutes, but, if warm water be used, the result is obtained much quicker. Over-washing reduces the intensity of the blue ground, but the copies darken somewhat in drying. If a line or figure has been left out by mistake on the original drawing before being copied, the same can be produced upon the printed copy by using a solution of soda and water.

The greatest drawbacks to this process are the length of time occupied in printing, and the ground being blue, which make the copies unsuitable for colouring. Copies, however, can be obtained with blue lines on a white ground by this process, but a negative has first to be made. The negative print, to produce this result, requires at least three or four times the exposure as that by which white lines on a blue ground are produced.

Very pleasing pictures can be made by amateurs who may wish to make a fanciful experiment by printing from negatives on this paper, which can be obtained, ready prepared, from Marion and Co., Soho Square, London, and Messrs. Bemrose and Sons, London and Derby. Those who desire to prepare their own paper can do so by the use of the following formula :—

A.

Ammonia citrate of iron	1 part
Water	5 parts

B.

Ferricyanide of potassium	1 part
Water	4 parts

Mix together in equal quantities.

Black Line Process.—I now come to a process which is more suitable for colouring purposes than the latter, whereby black lines on a white ground are produced. The exposure required in this process is considerably less than the ferro-prussiate. The operations are as follows :—The drawing to be copied should be on very transparent tracing paper or cloth, of a white or bluish tint; care, however, should be taken to make the lines of the drawing uniformly black, and not too fine, as the lines on the copy are rendered somewhat finer. Place the drawing in the printing frame with its face to the glass, then over it lay the sensitised paper. It is advisable that the paper should be somewhat larger than the drawing, in order to leave a margin exposed to show the action of the light upon it. The exposure is complete when the ground of the sensitised paper, which is yellow, has become a pure white, and a distinct copy of the original appears in dark yellow lines. To develop, remove the copy from the printing frame, and immerse in a gutta-percha-lined bath containing the acid solution, prepared as follows :—

Gallic acid	1 part
Citric acid	1 ,,
Alum	8 parts

Take one and a quarter ounces of the above to one gallon of water. This should be mixed in another vessel the same day it is used. Allow the copy to remain in the solution until the lines are a deep black. The same solution can be used over again for several prints, or until it becomes quite black. After development, the copy must be thoroughly washed in clean cold water, frequently changed, and then hung up to dry.

Blue Lines on White Ground, or Pellet Process.—The next process I wish to describe is, perhaps, more difficult and complicated than either of the two already mentioned, but its advantages are many; it can be worked in all weathers, and requires no dark room. The copies can be coloured and varnished, altered, and corrected; and last, but not least, they do not fade. This process is ten times quicker than any other, was invented by a well-known French chemist, M. Pellet, and was introduced into England by Mr. G. E. Chapman, 69, Victoria Street, Westminster, who is the sole licensee. The instructions are : Place the drawing to be copied in a printing frame, and upon it a piece of the prepared paper, close the frame, and expose to the light. The exposure can only be determined by constant practice and test slips. These test slips should be placed in the printing frame alongside the tracing which is being copied. These small test slips are inserted so as to remain about two-thirds inside and one-third outside the frame at the back. They can then be conveniently drawn out without opening the frame or disturbing the print.

After a time one of the test slips is drawn out, and dipped in a saturated solution of yellow prussiate of potash, and its chemical action watched for from forty to fifty seconds. Should the background remain perfectly yellow, and the lines come out dark blue, the exposure has been sufficient. It is not necessary to develop the copies immediately after exposure; therefore all the printing might be done while the light is strongest (especially in winter), leaving the development until the evening or the following day. When the copy is to be developed it should be placed face downwards on a smooth board, and the edges turned up carefully, so as to form a sort of tray, three-quarters of an inch in depth. This renders the sheet more easy of manipulation, keeps stains from the back, and renders it white when developed in the prussiate bath. The copy is now placed face downwards and floated on the prussiate bath for about thirty seconds. The operator should see that uniform contact takes place everywhere while in the solution. Raise the copy, inclining it to allow the solution to drip off one corner; then notice particularly how the lines seem to stand out.

If they do stand out, and the ground remains perfectly yellow, the development may be considered complete. After development, the copy is immersed in clean water, in order to check the further action of the prussiate, and then immersed face upwards in the acid bath of a ten per cent. aqueous solution of hydrochloric acid, care being taken that the entire copy, both front and back, is saturated. The surface of the copy should be worked all over carefully with a soft brush to loosen the blue mucilage. The copy is next placed face upwards in an empty tray, and again well brushed to get rid of the superficial mucilage, being flushed copiously at the same time with water, both back and front, so as to remove all traces of the previous chemical solution.

Any blue stains on the copies may be removed, or alterations made, by the use of the blue solvent supplied with the paper. Any blue stains on the hands may also be quickly removed by a very weak solution of hydrate of sodium. It is essential that the contents of the two chemical baths do not get mixed, or blue stains will appear. To prevent this, it is advisable to well rinse one's hands in clean water after each operation.

Copying Drawings by the Aid of a Camera.—Mechanical drawings are sometimes required to be reduced by the aid of photography with the camera. I may say the best results are to be obtained by the wet or collodion process, but very good negatives can be secured with a dry plate, if properly managed. The greatest drawback with the dry plate is the probability of the fine lines on the drawing becoming clogged or veiled over during development.

But I have seen an excellent developer mentioned in *The British Journal of Photography* a few months ago, which I have tried with excellent results. It may not, perhaps, be out of place to give it here for the benefit of those who, like myself, have sometimes line subjects to copy :—

Carbonate of potassium	360 grains
Sulphite of sodium...	360 ,,
Water	6 ounces

To each ounce of developer, two drachms of this solution, together with thirty or forty minims of the ordinary ten per cent. solution of pyro (and sulphite), are added. The mode of development found to answer best is to soak the plate first of all in gallic acid solution (two grains to the ounce) for half-minute

* A communication to the London and Provincial Photographic Association.

or so, and then transfer it direct to the developer, where, in about another half-minute, the image begins to appear. Watch carefully, and when the details in the darkest part of the picture acquire tolerable strength, add five minims of a sixty-grain bromide solution, and proceed until sufficient density is acquired. Should matters hang fire at all, a few drops of the ordinary dilute ammonia solution may be added to freshen up the developer, but this is rarely needed if the exposure has been correct.

On the latter point a word may be said. Though the use of gallic acid does not necessarily lengthen the exposure required, it has been found better to give more than is absolutely necessary. Thus, if five seconds be sufficient to produce a perfect image under ordinary circumstances, give ten or even fifteen. The result will be quicker development and less necessity for forcing, and hence less chance of fog, stain, or filling up the lines. Six times the normal exposure has not produced any signs of the plate being overdone; indeed it seems next to impossible to produce such a result when the gallic acid is employed in the manner described.

TO DRY GELATINE PHOTOGRAPHS QUICKLY.—It sometimes happens that a print has to be made very quickly from a negative, or perhaps a lantern slide is wanted in a hurry. The process is not a new one, but is not generally known. After fixing the plate in hypo, wash it for a minute or two under the tap, or by soaking in three or four changes of water; then immerse in solution of alum of about fifteen grains to the ounce of water, for three minutes. Remove and wash slightly under the tap. Now rear up the plate in the rack to drain off the surplus water, which will take about three minutes. Then blot off the drops of water on the back and along the edges with a small piece of blotting-paper. Pour out in a tray 5 by 8 in size two ounces of alcohol. Immerse the plate in this, film side up, for from three to five minutes. When it is removed the alcohol will rapidly evaporate, and a peculiar mottled appearance will be observed on the surface by reflected light; this is due to the irregular process of evaporation. Place the plate on edge, and with a fan (an ordinary palm leaf fan will answer) proceed to create a breeze over the surface of the plate. Evaporation is accelerated. First the heaviest moisture is removed, leaving the film smooth and apparently dry, but the final removal at once commences, which can be noticed by the colour and appearance of the film at the edges. Continual fanning will soon dry it, so the entire operation need not take more than five or ten minutes. The alum hardens the film, aiding in expelling the water, and is specially desirable on hot muggy days. The negative, if it is valuable, should be washed for half an hour after fixing before drying.—*American Amateur Photographer.*

RUBBER STAMP INK.—The following is given as an efficient rubber stamp ink. The usual rubber stamp inks are prepared with water, soluble aniline colours, and glycerine. The following, which has been tested practically, is a good formula for blue rubber stamp ink:—

Aniline blue, water soluble, 1B	3 parts
Distilled water	10 „
Pyroligneous acid	10 „
Alcohol	10 „
Glycerine	70 „

Mix them intimately by trituration in a mortar. The blue should be well rubbed down with the water, and the glycerine gradually added. When solution is effected, the other ingredients are added. Other colours are produced by substituting for the blue any one of the following:—

Methyl violet, 3B	3 parts
Diamond fuchsin, I.	2 „
Methyl green, yellowish	4 „
Vesuvin B. (brown)	5 „
Negrosin W. (blue black)	4 „

If a bright red ink is required, three parts of eosin BBN are used, but the pyroligneous acid must be omitted, as this would destroy the eosin. Other aniline colours, when used for stamping, require to be acidulated.—*Printer and Stationer.*

THE *Daily News* says that at the Patent Office in Chancery Lane there are stored some 700,000 designs the registration period of which has expired. As room is required, it is proposed to destroy the designs. Mr. Blundell Maple has submitted to Sir Michael Hicks-Beach the suggestion that the designs should be permanently classified and preserved, so that artisans and others may have access to them.

DEVELOPING BROMIDE OF SILVER PAPER.

BY F. STOLZE.

PRESUMABLY the development of bromide of silver paper should offer no particular difficulties, everybody being acquainted with that kind of work by the development of dry plates, and particularly in Germany, where the oxalate developer is still principally used for negative purposes, it should be considered the easiest thing in the world. But exactly the contrary takes place. And this can easily be accounted for, if it is considered that some conditions arise which are quite immaterial in the negative process.

Of both—enlargements as well as negatives—we require strength and softness; but while the latter have to show these properties in their transparency, they have to be embodied in the picture on the former. Further, while in negatives the tone has no particular function, it is of the greatest importance for positives; and while finally a slight fog on negatives is in a good many cases even much liked, it is entirely inadmissible for positives. As now all these conditions for positives are disregarded in the development of negatives, it can easily be explained that frequent complaints are made about failures. To this may be added the circumstance that all the papers heretofore introduced in the market required different treatment, and that besides this, certain conditions were demanded by the several formulæ which are by no means a necessity.

I am not mistaken, I think, in asserting that all specified formulæ mark the application of soluble bromide salts, hitherto a *conditio sine qua non* for obtaining strength and a good tone. This, however, has to be declared decidedly as a mistake. In an actually successful preparation strength and tone will come out best if the exposure is such that bromide is not at all required; hence it is supposed that the negative is not too thin. In the latter case bromide has to be added to retard the high lights sufficiently long that the deep shadows can obtain the necessary strength. In every other case the addition of bromide for paper of first quality should be avoided. I know that it is difficult to obtain such a paper of uniform quality, and I know this from my own experience.

But even where the paper will not give sufficient strength without the bromine salt, it is the rule that the quantity of the same should be held back as much as possible, in the interest of the tone. Under all circumstances, therefore, also with the best paper behind thin negatives, so much exposure should only be given as is needed either to obtain the necessary strength, or for the development of all details, while the bromide addition is suited to the time of exposure, and not reversed. If we overstep this line the tone will suffer under all circumstances, and we are forced to apply various expedients for fixing, the details of which I will explain further on.

To find the correct time of exposure is, therefore, of more importance for enlargements on bromide of silver paper than for the production of negatives. While for the latter too dense a deposit necessitates only a longer time of printing, it would make a positive unfit for use.

Now we do not want to say that an exposure strictly correct to within a hair's-breadth is indispensably necessary. Even if we double the exposure, a relatively good picture can still be obtained by a simple stopping of the development, and without greater addition of bromide of potassium; it is surprising how large a limit there is in this regard in the time of exposure. But just on account of that we should be very cautious with the addition of bromide of potassium. I place so much importance upon this point, because I know from experience that many photographers are so fully convinced from the application of bromide of potassium, that they disregard the advice to work without it, and declare they know better. To be sure, some of the papers in the market cannot be used without the bromide of potassium, and are beforehand subject to so much chemical fog that, without this addition, a picture with clear whites and deep shadows can never be produced. But even here one should be very cautious, and not believe that by continually increased addition of bromide of potassium a brilliancy can be forced. That is impossible. The modification of the bromide of silver in these papers is such that it does not give an actual black, but always is more or less dark grey, which, by longest exposure with greatly increased addition of bromide of potassium, does not become darker, but only more greenish. It is, therefore, here also necessary to await the proper period of time at which the shadows become still darker with the aid of a certain addition of bromine salts during development. Increased exposure and

more bromine salts will then both act injuriously. The depths, which in such a manner cannot be obtained photographically pure, have to be put in afterwards by retouching. As this concerns always only the dark shadows, the fine half tones of these papers being always very handsomely delineated, they will always give good results for well retouched pictures. Without the same they will always have an unfinished and weak appearance.

In the development with oxalate it is necessary, as is well known, to put the pictures in weakly acidified water, if a yellow coloration is to be prevented. But many mistakes are made here. Thin negatives, to obtain the greatest possible strength in the developer, are worked with a great deal of iron; in extreme cases with one of iron solution to three oxalate, concentrated solutions. If we dilute a sample of this mixture with water, we will find that it will darken after a short time with formation of a yellow precipitate. This takes place, if a little slower, by diluting with the ordinary acidified water. The cloudiness, however, even takes place sometimes with one of iron to five oxalate, only that a longer time is then required. This explains now why under certain circumstances a yellow coloration of the pictures takes place in spite of all acid baths. This happens with a developer containing a great deal of iron, and with films which wash very slowly on account of the hard gelatine. In such cases, if too serious, an increase of the acid to double or three times its quantity in the first water will help; but if this is not sufficient, the picture should first be put in a pure oxalate solution, left for a few minutes therein, and then washed with weakly acidified water.

Many of the papers in the market have such a soft gelatine coating that this can be injured very easily, and in a wet condition a touch of the finger is oftentimes sufficient to melt it Although this condition is very inconvenient during the manipulation, it still offers the advantage that the above mentioned yellow coloration happens much less, because the film washes much easier. After fixing and excessive washing out of the fixing soda, care should be taken, under all circumstances, for a toning of the film, in case the application of an alum fixing bath is not preferred.

This leads me to a point already mentioned. One is able to essentially influence the tone of a picture in the fixing bath which became green in the development. The most simple means for this is based upon the well known toning action of the fixing bath. The picture is left therein for about half an hour, and the tone will be found considerably improved. The mixed alum fixing bath acts in this respect much more energetically, the pictures assuming a more bluish tone after a proportionally short time. Still quicker than this bath acts the toning fixing bath introduced by me for chloride of silver paper, in which even very green pictures, after complete fixing, will obtain a handsome tone. The composition of the toning fixing salt being not sufficiently known yet, I will publish it again at this opportunity. Dissolve 35 parts hypo soda, 9 chloride of sodium, 4 alum, 2 ammonium sulphocyanide in 150 to 200 water. The solution, which has a whitish colour and is thick, ripens in warm weather in about four days; during the winter one week is required. The bath is decanted from the sediment, or filtered. The undissolved, crushed, well mixed salt ripens also in this condition, so that it can be kept in stock. Immediately before use add a few cubic centimeters of chloride of gold solution 1:50 to the bath. The bath will keep for several weeks. If it should not work so energetically after some time, about 10 c. c. concentrated alum solution per litre are added to the same. If a black sediment should form in the bath after a while, it is a sign that it is saturated with silver. This is then precipitated in the manner described by me with sulphuret of potassium, avoiding a surplus of this salt, and the filtered bath can be used anew.

To give a fixed, standing formula for the oxalate developer is not recommendable. Proper judgment, according to conditions, has to be exercised, and relatively more or less iron has to be taken to the oxalate, having always in view that less iron will also give less soft pictures. I myself prefer to work with one saturated iron solution to five saturated oxalate solution, and I apply only with reluctance a stronger developer on account of the above mentioned yellow coloration. For weaker developer a dilution of this mixture is mostly sufficient; but as there exists still a certain danger of this discoloration, I increase the oxalate a little, and only after that I add pure water.

If several pictures have to be made in succession, the stronger parts should be developed first; afterwards the weaker pictures, by adding a little fresh developer. In this way from five to six pictures can be finished in the same solution.—Abridged from *Photographisches Wochenblatt.*

The Merry Photographers of Limoges.—Limoges apparently possesses a cheerful photographic society. At one of its recent meetings, M. Varaigne, president of its council, occupied the chair, and the official report of the Society says that the president opened the meeting with matters purely commercial, which "it is impossible to reproduce," our journal admitting only articles on pure photography. The president evidently took a humorous view of the situation, for he attached his own signature to the end of the said official and somewhat lengthy report, which is also signed by the secretary general, M. de Galard-Bearn. Another and more disappointing explanation may be that the editor of *Le Progrès Photographique*, for June, in which the official report with the signitures appended appears, has interlarded it with his own comments, and omitted quotation marks throughout. If so, it is a pity, and withholds from the president of the Limoges Society the honour of being a humoristic genius of credit to France. At the same meeting, the president advised the members of the Society to give up altogether silver printing on albumenised paper, since even gold toning gives no security that the results with be lasting; it gives, however, a certain inartistic prettiness which may be worth consideration in certain cases. He advised amateurs who cared for the permanency of their works to stick to the platinotype or carbon process.

Artistic Peculiarities.—M. Cain, the well known sculptor of animals, has refused the medal awarded him for his bronzes at the Paris Exhibition. His reasons are thus given in a letter to M. Proust, the Director of Fine Arts: "I have just learnt that one of the jurors of sculpture at the Exhibition is Signor Romanelli Raphaelo, of Florence. In the month of November, 1888, the Chamber of Correctional Police on my suit condemned him to a fine of 500f., and 500f. damages, with insertion of the judgment in five journals, for counterfeiting in marble and in bronze animals belonging to me." The explanation given in the absence of this juror from Paris is that the laws of artistic copyright are more lax in Italy than in France, and that Signor Raphaelo was not aware that he was guilty of an illegal act until prosecuted by M. Cain for selling copies of the works of that artist's father-in-law, the late M. Mène, who bequeathed them to that sculptor.—*Daily News.*

Photography and Weather Predictions.—It was stated some time ago by Dr. Zenger, of Prague, that valuable contributions towards weather-predictions might be obtained from photographing the sun, provided that the plates used in the work were those known as isochromatic (a word which very insufficiently describes a gelatine plate which will reproduce colours in their true *tone* relation to one another). Such photographs, he tells us, will indicate with great certainty the coming of atmospheric disturbances of all kinds; for on the approach of storms, the pictures will show round about the sun rings of circular or elliptical shape. If this be the case, it is obvious that at all naval stations where storms are common, the necessary apparatus should be provided for taking daily photographic images of the sun. The recent cyclone, which was so disastrous to the American and German navy, might have been foretold by such means.—*Chambers' Journal.*

Testing for Ammonia with Litmus.—An abstract of a useful paper on "Existing Tables for Aqueous Solutions of Ammonia at Different Specific Gravities" is given in the *Journal of the Society of Chemical Industry*, No. 5, vol. viii.:—In conclusion, "a strange and little known phenomenon is mentioned, which may be observed on neutralizing an ammoniacal solution with acid. If litmus solution be used as an indicator, it appears that there is a difference whether the acid is added to the ammonia, or whether ammonia is added to the acid. If a standard acid solution be added to ammonia, the litmus solution indicates the neutral point sooner than if ammonia be added to the same standard acid. The use of litmus solution as an indicator with ammoniacal solutions is, therefore, unsafe; red litmus paper acts more satisfactorily, whereas methyl-orange can be highly recommended."

A book on photo-surveying, *Die Photogrammetrie oder Bildmesskunst*, by Von Dr. C. Koppe, of Weimar, has been published. It enters fully into the subject, and contains a description of an instrument called a photo-theodolite.

ROYAL CORNWALL POLYTECHNIC SOCIETY.

THE fifty-seventh annual exhibition will open at Falmouth on Tuesday, 10th September. Medals and prizes are offered in various departments, including photography by professionals and amateurs, and for photographic appliances. The following are the general regulations:—

1.—All exhibits must be forwarded so as to reach the Polytechnic Hall, Falmouth, not later than Tuesday, September 3rd, after which no article will be eligible for competition, and no space can be guaranteed.

2.—All pictures and photographs must be framed, and if left at one of the following places of the Society's authorised agents on or before Tuesday, August 27th, will be conveyed from these depôts to and from the Exhibition free of charge—namely, Messrs. Worth and Co., Cathedral Yard, Exeter; Harris and Sons, 197, Union Street. Plymouth; J. Mitchell, 37, Fore Street, Devonport; Thomas Solomon and Co., King Street, Truro. The above agents will not receive any article unless delivered to them free of conveyance and other charges.

3.—The carriage of all other articles must be paid by the exhibitor.

4.—All cases and packages sent to the Exhibition must be addressed, "The Royal Cornwall Polytechnic Society, Falmouth," and must bear the name and address of the owner; the covers to be fastened with screws. The exhibitor must write on the back of each picture his name and address, its title, whether it is an original or a copy, the name of the artist, and whether he is a professional or an amateur. The works of professional artists may be sold from the gallery, through the secretary of the Society, Mr. E. Kitto, and a commission of five per cent. will be charged thereon.

5.—Exhibitors must enter all articles intended for exhibition on forms provided for that purpose by the Society, which may be obtained from the secretary, or any of the above-named authorised agents.

6.—This entry form must in all cases be returned to the secretary on or before August 24th.

7.—The Society will not be answerable for loss of or damage to any article sent to the Exhibition, but every care will be used to prevent injury while in the Society's possession.

9.—Discretionary power is vested in the officers of the Society as to exhibiting any article sent.

10.—Board of Trade protection is granted to all new and unpatented inventions.

In photography, it must be in all cases stated whether the work is professional or amateur, and the process of production named. All work sent for competition must have been executed within eighteen months of the date of this Exhibition. Carte-de-visite portraits are excluded from exhibition, except when illustrating some special process or novelty.

Medals are offered by the Society for meritorious productions by professional photographers in the following subjects:—(1) Landscapes, (2) Portraits, (3) Composition pictures, (4) Instantaneous pictures, (5) Interiors, (6) Six pictures in platinum, (7) Transparencies for lantern or window decorations, (8) Pictures by improved processes, (9) Enlargements (all enlargements for competition must be the work of the exhibitor).

Medals are also offered by the Society for meritorious productions by amateurs.

Medals are offered for improved apparatus and appliances, including magic lantern apparatus. All exhibits in this department must be accompanied by a written explanation of their specialities.

Information respecting the photographic department may be obtained from Mr. W. Brooks, Laurel Villa, Wray Park, Reigate (member of the general committee).

A TRADE APPLICATION OF PHOTOGRAPHY.—The *American Machinist* recommends a convenient method of obtaining photographic records of the patterns, or wooden models, used by iron-founders, so as to prevent them being lost sight of as they pass from hand to hand. A sheet of white paper is spread upon the floor, and upon it are arranged the separate patterns, each with a ticket bearing a number placed upon it. Above this paper is suspended a photographic camera, and a negative is produced. From this negative two prints are made, and while one is kept in the office, the other goes to the foundry. It is obvious that by quoting the numbers attached to the patterns in all future communications, mistakes would be impossible. The system is clearly applicable in many other trades.

Patent Intelligence.

Specifications Published.

6,749.—*April 20th*, 1889. "Shutters for Photographic Cameras." CHARLES A. HOFFMAN, Manufacturing Optician, of 20 and 22, Fourth Street South, and RALPH D. CLEVELAND, Photographer, of 221, Second Avenue South, both of Minneapolis, Minnesota.

This invention relates to an improvement in a device for operating the shutters used for excluding the light from a photographic camera, and the object the inventors have in view is to provide a shutter which can be used both for an instantaneous and protracted exposure without any change in the operating mechanism.

15,936.—*November 3rd*, 1888. "Preparing Photographic and other Pictured Cards or Mounts for Connecting them in Book-like Formation, also in Covers for the Purpose." JOSEPH WILLIAM ZAEHNSDORF, 14, York Street, Covent Garden, London, Bookbinder.

This invention relates to a novel method of preparing mounts or cards on which photographic and other pictures are printed, pasted, or otherwise secured so that said cards or mounts may be arranged in a superposed manner and held by lacing cords passed through holes punched along one edge of the card or mount, and corresponding with holes punctured or eyeletted in side covers, in order to enclose the pictured cards or mounts in superposed order between them, and in such a manner that the compiled series of cards or mounts can be opened for inspection at any part without disturbing their superposed order.

For the purpose of his invention he attaches to the back of the card or mount a linen or other fabric as a guard, with a portion overlapping a sufficient width for the reception of two strips of cards which are connected to the guard by cement, paste, glue, or otherwise, a space being formed between the meeting edges so that a folding can take place like a huge joint.

The outer or second strip of cardboard or the like with the linen attached is punctured at intervals, and these punctures correspond to punctured, or they may be eyeletted holes in the back edge strip of the cover or half covers, which covers are made to correspond to those of the pictured cards or the mounts of a cover board and two strips and covered with cloth or other material so that the covers fold also like a huge joint through the thin portions between the edges of the strips and board.

The covers are made in two side pieces without a positive back, and according to the length of the laces the superposed series may be extended without limitation.

He attaches tapes or ribbons to the top, bottom, and front edges to hold the series together, the combination constituting a portfolio of scraps, pictures, photographs, or other decorative sheets of card or other stout board.

The invention is chiefly intended for use by photographic amateurs to enable them to keep their photos as mounted in compact order and clean.

The mounts or cards may be printed with indications to which additions can be made for after reference.

ASTRONOMICAL PHOTOGRAPHY.—The report of Prof. Pritchard to the visitors of the University Observatory at Oxford sets forth that preparations are being made for joining in the international scheme of stellar photography, and the Savilian professor is only waiting for the completion of an object-glass by Grubb to commence the preliminary operations. In connection with his account of the additions to his instrumental appliances, he expresses a regret for the loss of Dr. De la Rue, which will be shared by every English astronomer. In the details of astronomical work done during the past year, Prof. Pritchard naturally gives prominence to that determination of stellar parallax by photography with which his name must be imperishably associated. Astronomers in all parts of the world will be glad to know that the volume containing the results of no less than thirty distinct determinations of stellar parallax is now passing through the press, and will very shortly be issued. The originator of the most trustworthy method yet devised of ascertaining this dubious and difficult element remarks with justifiable pride on its adoption at other well-known observatories. He then proceeds to refer to a projected scheme of photographic observations of the planetoid Victoria, with a view to the determination of the solar parallax, and to the adoption of his wedge photometer at Poulkova.—*English Mechanic.*

Correspondence.

A "WONDERFUL" DISCOVERY.

Sir,—Messrs. Browne and Co., in their astonishment at the article under the above title, have omitted to reply specifically to the two points upon which the whole matter turns. For the sake of clearness I will repeat these points. 1. That M. Bonnaud's process is based upon photography. 2. That the essential stages of the process were described by Dr. Liesegang in 1882.

As to the first point, M. Bonnaud, according to his own specification, starts with the solution of a bichromate salt and an organic compound, forming Professor Boys' mysterious "liquid." With a coating of this solution on glass, M. Bonnaud produces by the action of light an image which is subsequently developed by the dusting on of powder colours. If this be not photography, possibly M. Bonnaud will say what it is. Messrs. Browne "do not propose to discuss whether this is a photographic process or not," and perhaps they are wise in fighting shy of the subject. I would, however, point out that in the solitary remark which they do make concerning photography, they have given me credit for an assertion which does not belong to me. I did not contend that the "result" of the process was a photograph, but exactly the reverse. What I asserted, and now re-assert, is that the beginning of the process was and is a photograph, and also that the part which photography plays was ignored in the demonstration.

As to the second point. The most convenient method to deal with this will be to put the method of Dr. Liesegang side by side with that of M. Bonnaud.

Dr. LIESEGANG.	M. BONNAUD.
Stage I.	
A glass plate is coated with the sensitive mixture of bichromate and organic matter. Dr. Liesegang recommends water, moist sugar, gum arabic, and bichromate of ammonium.	"I take a sheet of glass, and, for the purpose of sensitizing it, coat it with a solution of organic matter." M. Bonnaud recommends water, treacle, or other like substances, bichromate of potash, borate of soda.
Stage II.	
The plate is, after drying, exposed under a positive.	The glass thus prepared, after having been left to dry, is placed on a positive photographic print, and exposed to the action of light.
Stage III.	
The picture is developed by dusting the plate with a vitrifiable pigment in fine powder.	The picture is developed by dusting on metallic colours. It is then coated with a varnish consisting of "essence of lavender, fatty essence of Venice, and powdered resin," and again coloured.
Stage IV.	
The picture is coated with collodion containing a certain proportion of fat. Dr. Liesegang recommends castor oil.	The picture is coated with "a fatty composition of collodion." M. Bonnaud uses "collodion, fatty essence of Venice, powdered resin."
Stage V.	
The collodionised plate is soaked in a solution of caustic potash until all traces of chromium salts are removed from the film.	The plate after washing is plunged in a 10 per cent. solution of caustic potash, again washed, and placed in water containing 10 per cent. of borax, and 5 per cent. of sugar.
Stage VI.	
The collodion film bearing the image is floated off and laid on a tile or other suitable surface.	"The collodion film will leave the glass, and I am thus enabled to transfer it to the china, or other like substance."
Stage VII.	
The image is vitrified.	The picture is "fired in the ordinary way."

It will be noticed that with one exception the two processes are identical in principle. The exception is that in Stage 3 M. Bonnaud uses a varnish so that the colouring may be continued. It may be that this addition is sufficient to establish M. Bonnaud's patent, but on this point I offer no opinion, and would simply remark that in his summary of claims M. Bonnaud makes no specific mention of this varnish.

I contend I have proved that in all essentials M. Bonnaud's process of 1889 was published by M. Liesegang in 1882, and I must leave to impartial judges to decide whether the parallels given above establish my case or not. Stretching Messrs. Browne's arguments as far as they will go in favour of their client, they amount to this: the application of M. Liesegang's process to china with the use of a particular varnish, and with the addition of colours. How they can claim more than this is difficult to see. I might say, in passing, that Messrs. Browne's "exhaustive search" at the Patent Office, resulting in their inability to find "any process of any kind in any way similar," was not at all likely to be successful, seeing that M. Liesegang gave his process freely to the world, and did not patent it at all.

On the side issues raised by Messrs. Browne, little need be said. It may seem strange to them that no one hitherto has made use of Dr. Liesegang's process; but a discussion on this speculative subject would not be very profitable, and I must leave Messrs. Browne to ponder over the mystery at their leisure. As for the remarks on M. Bonnaud's photographic career made by a gentleman at the luncheon, I am not responsible for them, and the important question of "opal glass" *versus* "opera glass" must remain unsettled as far as I am concerned. I simply recorded what was said.—Yours obediently,

Charles E. Pearce.

Sir,—It is not surprising that Mr. C. E. Pearce's article should have induced an attack from those interested in the "process" he describes; but, all the same, I think he deserves the thanks of photographers and others for his out-spoken exposure. He might, however, have gone much farther back than Liesegang's description for the leading points of the process he describes. So long ago as 1860 Joubert patented the use of the dusting-on process in connection with the production of burnt-in photographs, whilst in 1864 Obernetter not only used sugar and bichromate as the sensitive film, but described the process of transferring to the ceramic article by means of a coating of collodion.

Messrs. Browne and Co., in their letter, make a point of, as they say, the old process being one for producing pictures on enamel only, and not on china, and that if the process were used for china it would not glaze, and be, therefore, absolutely useless.

As a matter of fact, however, Joubert expressly mentioned china, and Obernetter directed that the powder colour used for developing the image shall consist of "porcelain colour with its flux." Producing a burnt-in photograph on china, therefore, appears to be no more novel than the rest of the process.

Messrs Browne are wise in "declining to discuss the question whether this is a photographic process or not." They say that M. Bonnaud states that it is not. If the accuracy of M. Bonnaud's other statements are to be judged by this one, the result must be eminently unsatisfactory to him.

One other quotation from Joubert may suffice in answer to Messrs. Browne's letter: "The photographic image can also be produced in a similar manner on well-glazed china or other ceramic substance, and by successive firings, or even in one firing, polychromes may be produced."

It is to be regretted that it seems always possible to obtain scientific-looking support for a process. A striking instance of this will no doubt occur to those readers of the Photographic News, who remember the pretended "natural colours" processes brought forward some two or three years ago. As for arguments to the effect that a few minutes' labour suffices to represent many hours of artistic work, one would think they had too often been urged in connection with "processes"—and found wanting—for them to have much weight now.—Yours obediently,

W. E. Debenham.

Last month a paper by Dr. William Huggins was read before the Academy of Sciences at Paris, on the *Photographic Spectrum of Uranus.*

Proceedings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

July 11th.—Mr. H. BEDFORD in the chair.

Mr. Evan Cook was elected a member of the Association.

A paper was read by Mr. THOS. SCOTTON on "Various Photographic Processes for Copying Liue and other Drawings" (see page 475).

At the conclusion of the paper, a number of prints, already exposed, were developed by each of the processes named, and passed round for inspection, the demonstration occupying the remainder of the evening.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

ON Thursday, July 11, thirteen members and friends, favoured by exceptional weather, took an early train for Ashbourne, and thence by conveyance to Dovedale, and were soon employed in searching for food for the camera. An *embarras de richesses* soon presented, for delightful scenery—river, rock, and dell—surrounded the party. All the characteristic features of the Dale were secured. "Dove Holes," "Tessington Spires," "Pickering Tor," "Pulpit Rock," and the "Stepping Stones," all claimed attention, and the party were busily engaged until time for tea. At Derby the party was met by the hon. sec. of that Society and a few members. Fifty-one plates were exposed, with an excellent average of successful uegatives.

Talk in the Studio.

FROM Wilhelm Knapp, iu Halle a. d. Saale, we receive *Taschen-Notizbuch fur Amateur-Photographen, von Ludwig David und Ch. Scolik.* It is a second edition, necessitated, as the publisher declares, by the cordial appreciation and rapid sale of the first edition. Its get-up is substantial, being well printed and bound, and embracing, in small compass, a large amount of useful information. It contains a portrait and biographical notice of Louis Jacques Daguerre, exposure tables by Burton and by Darval, symbols and atomic weights, English measures and weights with their German equivalents, foreign monies, postal and telegraphic information, a list of poisons and their remedies, a very clear and well-arranged register for negatives, followed by directions for the treatment of the negative, and various formulæ, with blank pages for the entry of such modifications as the experience of the worker may suggest. A collection of recipes that will be found helpful in ordinary practice is also among the features of this note and hand-book combined.

LEWES AND SUSSEX PHOTOGRAPHIC EXHIBITION.—An exhibition of photographs, photographic apparatus, aud lantern slide transparencies, &c., will be held at the Concert Hall, Lewes, on October 22nd, 23rd, and 24th, 1889. The Mayor of Lewes (Alderman T. R. White) will opeu the Exhibition on Tuesday, October 22, at 3 o'clock. It is not promoted with any commercial object; but in the event of there being a surplus, it will be equally divided betweeu the Lewes School of Scieuce and Art and the Lewes Photographic Society. The rules, regulatious, and conditious, and schedule of prizes, may be obtained on applicatiou to the hon. secretary, Mr. E. J. Bedford, 10, St. John's Terrace, Lewes, to whom all correspondence and inquiries are to be addressed.

CHEAP PHOTOGRAPHIC COPIES (Phot. Arch. 29, 135).—Dissolve one part of ferric ammonium acetate, one part of potassium ferricyauide, one part of bichromate of potash, each in six parts of water, and mix equal volumes shortly before use. Wash the paper with this mixture and dry in the dark. Copy till the shadows become dark blue, and then wash well and place for some minutes in carbonate of soda solution, and again wash. Tone with tannin solution.—*Journal Soc. Chem. Ind.*

THE members of the party of American engineers which visited England *en route* to the Paris Exhibition were armed with detective and miniature cameras to a far greater exteut than would have been the case with a party of English engineers.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The monthly technical meeting will be held on Tuesday next, July 23rd, at 8 p.m., at 5A, Pall Mall East.

PHOTOGRAPHIC CLUB.—The subject for discussion on July 24th will be "Copying Engravings." Saturday outing at Chigwell.

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Piper and Carter, 5, Furnival Street, London, E.C.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

TYRO.—Sodium thiosulphate is the new chemical name for hyposulphite of soda. Its adoption will be slow, because it has been so long the custom to use the contracted name hypo. The sulphocyanides are now known as thiocyanides, and pyrogallic acid has become pyrogallol—changes warranted by the progress of chemical science, but for the time very inconvenient.

J. S. B. (Hull).—You might get the little book published by Messrs. Harrison and Sons, 59, Pall Mall (price 2s.), entitled "Platinotype," by Capt. Pizzighelli and Baron A. Hubl, edited by Capt. Abney. In order to get the latest paper of instructions for the hot-bath process, we have sent your stamped envelope on to the manager of the Platinotype Company, 29, Southampton Row, Holborn, W.C., from whom you will doubtless receive a reply through the post.

PHOTOS.—The new illustrated photographic serial "Sun Artists" is not yet published, but announced as a forthcoming quarterly portfolio. The first number will contain four photogravures from negatives by Mr. J. Gale, on imperial quarto paper with a monograph. The Mr. W. H. Harrison who contributes to the first two numbers of the *Photographic Review* is not the editor of the NEWS, but a gentleman of the same name who is said to have experience as an operator with Messrs. Byrne and Co., of Richmond.

A. M. M.—The under-exposed negative appears to have been a doubtful plate in the first instance, coated by hand, kept too long (ten months), and too much forced in the development in order to try and get out the details of an instantaneous picture. The burnished silver stains show this to be the case, and this opinion might be tested by exposing another plate of the same batch to a still subject for a much longer time.

STUDIO.—Your construction as regards glazing seems quite satisfactory, and the dimensions are good. All the windows, top and north side, will require to be furnished with blinds, which for convenience might be made to run separately, but slightly overlapping to avoid chinks of direct sunshine; spring roller blinds for the roof and curtain fashion at the side. According to season, or time of day, you may have to shift the position of the sitter occasionally, so that backgrounds ought to be movable, and permit also of diagonal working when required.

C. G. (Rennes).—1. Sodium hydrate is the body named "soude caustique" in French commercial language. 2. The granular particles frequently noticed after ferrous oxalate development are due to the precipitation of oxalate of lime from the hard water; they are easily got rid of by washing the negative with very dilute hydrochloric acid, or even with alum and citric acid. 3. Opal portraits, if not direct enlargements, are usually carbon prints transferred and developed on opal glass; or, if on card, see advertisement on page iii. last week.

W. S. A. (Ilkeston).—Graphotype inks are made of various qualities by dissolving the respective colouring matters (which should be basic) in oleic acid, and mixing as required with boiled oil or litho varnish. They can be procured of Messrs. Waterlow and Sons, Finsbury Works, E.C.

MEDALLIST.—Your best mode of proceeding in order to lower the lustre of silver medals so that they may show on white flannel dresses would be either to paint them temporarily with gamboge and water, or apply a spirit solution of aurine cake, which is easily washed off again.

F. R. AND CIE.—Detective cameras are not ordinarily made for pictures so large as cabinet or half-plate. Why not use a Kodak, and enlarge your two-inch negatives to the size required? But for photographing animals in motion, neither Anschutz, Marey, nor Muybridge employed detective cameras, but used rapid lenses fitted to ordinary apparatus.

M. M. AND CO.—We should advise you to correspond with some of our advertisers on page v. last week. There are several offering the qualifications you require. We do not happen to know of anyone disengaged just now, for it is the busy season.

A. C.—Thanks for your letter, *re* portrait of the late W. F. Donkin. We have written to the parties.

R. P. (Barnsley).—The address in Paris of M. Chevallier is Place du Pont Neuf, 15. We do not find the opera-glass camera figured in any of the English catalogues.

J. F. L.—Yellow and orange non-actinic glass can be procured from Messrs. Hetley and Co., Soho Square; and Messrs. Geo. Houghton and Son, 89, High Holborn, W.C.

C. K. (Paris).—If you do not succeed with Spence's metal, try Wood's fusible alloy, made of bismuth 4 parts, lead 2 parts, tin and cadmium of each 1 part. This melts easily in boiling water.

THE PHOTOGRAPHIC NEWS.

VOL. XXXIII. No. 1612.—*July* 26, 1889.

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ALLEGED STORED-UP LIGHT.

POPULAR errors die hard, and among photographic inaccuracies which from time to time come to the surface, few are more common than the statement that Niépce de St. Victor, the nephew of the great Nicéphore Niépce, of Châlons, discovered that light could be stored up, and afterwards made to produce photographic effects at will. The late David Winstanley fell into this error in the article published in these pages a fortnight ago; his experiments were right, but his conclusions wrong. More than thirty years ago, in the first article printed in this journal by its first editor, Mr. William Crookes, attention was given to these experiments of Niépce de St. Victor, which were then new, and of which Mr. Crookes then spoke in the following enthusiastic and poetical strain—a strain foreign to his present style, now that experience has made him more scientific and less romantic:—"This faithful but somewhat capricious servant may now no longer resist the power of the human will, for Niépce de St. Victor, the modern Laputan sage, has taught us how we may store the sunshine in our cellars, and in a moment release it from imprisonment, amid the profound darkness of the night, to fix with delicate and perfect accuracy a living memorial of endeared objects. Those wonderful agents steam and electricity readily obey the wand of the modern magician, and effect an immediate realisation of human desires; but no discovery can compare with this, the last and greatest acquisition that the bold hand of science has snatched from the secrets of nature."

Mungo Ponton, the discoverer of the action of light upon the bichromates when in contact with organic matter, was the first to examine these experiments of Niépce, and to explain their real bearing. He sets forth that Niépce discovered that when a sheet of white paper with a printed or other design upon it is exposed for a long time to bright sunshine, and then allowed to remain for twenty-four hours in contact with sensitive paper in a dark room, the white of the sunned paper will produce an impression on the photographic surface; the same result follows from exposing black and white marble, black and white feathers, and some few colours. If a tin tube, closed at one end, be completely lined with white paper, and its interior be exposed an hour to bright sunshine, and it be then placed in the dark, face downwards, upon a sheet of photographic paper for twenty-four hours, an impression of the mouth of the tube will be made on the paper, and if a design upon very fine tissue paper be interposed, a photograph of the design will be obtained. The tube, after exposure to light, may be sealed up and kept for a very long time, yet afterwards be opened and used to obtain the effects just stated.

Mungo Ponton found out that the interposition of even the thinnest glass, or a film of mica, of varnish, or of wax, totally prevents the action, but that the interposition of gelatine, collodion, skin, or tissue paper, does not do so. To interrupt the action, the interposed substance must be a non-conductor of electricity and moisture, proving, he said, that the image is due not to photographic but to electro-chemical action. Mungo Ponton thought that in the tube experiment, the action might consist in the conversion of part of the confined air into ozone. This, however, is improbable, for ozone, being a strong oxidising agent, would have a tendency to retard rather than to accelerate the darkening of the sensitive paper. On the other hand, in the photograph of the cross sent to us by David Winstanley, and taken as described in his article, although the cross is darker than the surrounding ground on the front of the sensitised paper, it is much lighter than the rest of the photographic paper upon the back of the latter. Foreign note-paper appears to have been used in the experiment.

GROUP PHOTOGRAPHS.

A PAINFUL sight to an observer of any artistic taste is the ordinary group photograph, in which a number of individuals with wooden faces and in wooden attitudes are arranged in straight lines in front of the lens, with a brick wall or the side of a wooden shed as the background. A correspondent sends us the following letter, accompanied by a lively-looking, but not very sharp, photograph:—

To the Editor of the PHOTOGRAPHIC NEWS

SIR,—I have read the note in your last issue *re* cricket and photography, and entirely agree with you that groups of players as generally taken are stupid things, and that men at play might be as interesting as these are otherwise. I enclose you a scrap taken by me a month ago under very ordinary circumstances, and in it the boys were at play. I never spoke to any of them but to the children lying there, whom I induced to change the places they at first occupied. Doubtless, with special apparatus, very fine and valuable things might be secured. My little effort is "the play close at Melton Mowbray." WM. ADCOCK.

North Lodge, Melton Mowbray.

At the convention to be held in and about London next month, cannot something above the average in the way of arranging groups be attempted? The grouping might be left under the management of one real artist, not two, for the veritable artist is usually a genius, an excitable being free from guile, who knows absolutely what it is proper to do, but does not know it in exactly the same way as any brother artist who may be present; consequently, the effect of appointing two might be that nothing but tattered raiment and fragments of human flesh would be found upon the greensward when the members arrived to be grouped under authority.

JOSEPH NICEPHORE NIEPCE was born March 7th, 1765, in Chalons-sur-Soane, France, and died July 3rd, 1835, in Graz. During one part of his life he was a cavalry officer.

THE PHOTOGRAPHIC EXHIBITION OF BERLIN.

[THE followiug is the full text of the programme which Dr. H. W. Vogel has sent to the *Bulletin Belge de Photographie*.]

Exhibition for the celebration of the fiftieth anniversary of the birth of photography, organized by the German Amateur Society of Berlin, under the patronage of the Princess Royal of Saxe-Meinengen, sister of H.M. the Emperor of Germany.

EXTRACTS FROM THE REGULATIONS.

I.—The Exhibition will be opened in Berlin about the 15th August, and will close about the 15th September, in the salons of the Royal Academy of War.

II.—The Exhibition will be divided into five sections :—

(*a*) The history of photography, and its application to science and art, to military purposes, to industry, to commerce, and to engineering.

(*b*) Portraits and landscapes of artistic value.

(*c*) Photo-mechanical printing.

(*d*) Apparatus and chemicals.

(*e*) Photographic literature.

III.—Exhibitors of all kinds will be admitted to the Exhibition, whether they be members of socictics or otherwise. Admission is subject to thc consent of the managing sections, and may bc rcfused whcu the pictures sent are of doubtful quality.

IV.—Applications for space should be addressed before July 8th, to M. W. Zenker, secretary of the German Society of thc Friends of Photography, Berlin W., Bülow Str. 4, Hoff. II.

V.—Each exhibitor, member of any society whatever, will pay four marks per square metre for space ; those who are not members of any society will pay eight marks, to be applied to the reduction of the expenses. The committee of direction has the right to reduce or to abolish this charge at the request of the exhibitor.

VI.—Before the 10th of August, exhibits should be delivered at the following address :—Photographische Ausstellung, Berlin N.W., Königs Kriegsakademie.

VIII.—The committee of the Exhibition will undertakc the care of apparatus when it is not done by the exhibitor.

IX.—Prizes will be given for the most meritorious work. Thc list of awards will be published hereafter. Any exhibitor has the right to declare his work not in competition.

XI.—The carriage of packages to and from thc Exbibition is at the cost of the exhibitor. The committee of direction may make exceptions.

DEVELOPMENT BY WHITE LIGHT.

THE editor of *Wilson's Photographic Magazine*, of New York, gives the following account of a short time spent with Dr. J. J. Higgins, who had invited him to come on a certain evening to see him develop bromo-gelatine negatives by white light :—

At the appointed hour we stood beside the learned doctor while he accomplished, over and over again, all he had agreed to do. A Seed plate of the highest sensitiveness was placed in a holder in contact with a glass positive of Raphael's *Madonna*, and exposed one second, at ten feet distance, to a gas-flame. The developer having been previously prepared, the plate was immersed in it, and allowed to remaiu covered two minutes. The covering was theu removed, aud with no uon-actinic glass interposed, the gas-flame—au Argaud buruer—turued on full head, and the development went ou, ouly the shadow of the doctor's person intervening betweeu the plate and the gas-flame. When the image now began to appear we watched closely for the rays of fog to shoot, aurora-like, across the plate, but there was no intrusion of that kind. The development went bravely on, and the confident operator, with all the gusto of a necromancer, stood aside aud let the light have full play upon his still unharmed plate. The gas-buruer was pulled over to the full exteut of the bracket, where all the power of the light might be received upon the coming image, and the image continued to come. Then the dish was carried to the next room, where a stronger flame was burning, aud placed upon a table four feet distaut. No fog. No doctor's body was interposed ; on the contrary, another gas-flame was lighted at a like distance, and the development went leisurely ou "betweeu two fires," so to speak. The query came to our mind, "Will a gas-flame fog ?" or again, "Has our friend turned alchemist, and, by some invisible pervasive fume, drawn the poison from the fangs of the fog-producing light and rendered it harmless ?" Now one flame was four feet away from the plate, aud another gleamed over it. There was no fog, but the plate had developed a blooming uegative, and seemed to be waiting further orders from its master. It was next held closely within a foot of the larger gas-flame, and after at least five minutes, the streaks of fog began to chase over it until its usefulness was gone.

In a secoud experiment, the developing dish was brought out at once to the two lights, one foot away. We looked for a fine display of "northern lights" then, but fifteen minutes elapsed before the streaks came.

A third experiment was the development of a plate in a glass cell, in full light, only a ground glass being interposed for its diffusion : no fog. Thus it will be seen that the interesting operation of development may be exhibited to an audience fearlessly, and on any scale, without trouble.

Shall we say that we marvelled at all this—all done in less time than it has taken us to write about it ? Here is a discovery which will prove a great boon to mauy people, and save lots of good eyes from destruction if it is followed. Exposed plates can be haudled almost recklessly, and the developmeut of them made a luxury iustead of the great trial it is to those who must develop their plates after the hard work of the day. Then you can sit down and search your *Quarter Century in Photography*, or scan your current magazincs, whiie your dishes do your work for you.

"And what is the composition of this patent light-defying mixture ?" we hear you say. On the word of our generous friend, it is nothing but that well-known mixture of iron and bromide and potash, known as the "ferrous oxalate developer"—a developer yielding the very finest of negatives, staining neither hauds nor plate ; a developer which, as Dr. Higgins also says, wheu uuderstood is always treasured as a "bosom friend." In its use as now made knowu, there is a luxury in development almost iuconceivable. Development here is not a matter of guess-work by "darkness madc visible," but one of leisurely inspection and judgment. You may all do as we have described, and thank Dr. Higgius for telliug you so.

REACTIONS IN INTENSIFICATION.—The photographer frequently finds he has produced a negative which is all right in every respect but one—the image is too thin to give good prints. It then bccomes uecessary to inteusify. If possible, this process should be avoided. The results by any method yet discovered are rarely exactly what is desired, and often either the image or the film, or both, are deteriorated by the process. A perfect process would be one which increased the density strictly proportionally, which allowed the action to be stopped at any point, did not injure the film, and left the image as permanent as formerly. The intensification in most geueral use is that by means of mercuric salts—chloride or iodide. Mercuric chloride—corrosive sublimate—acts upon silver, forming silver chloride and mercurous chloride—calomel—both of which are white, but can be blackened by various means. Ammonia acts ou calomel to form a black compound, aud dissolves out the silver chloride. If mercuric iodide, dissolved in potassium iodide, be employed, then we get silver and mercurous iodides formed, and these may then be both darkened by Schlippe's salt—sodium sulphantimoniate. In this case the intensification is greater, as the silver compound remains in the film. The two chlorides can also be blackened by ammonium sulphide. When blackened in this way the process can be repeated *ad lib.*, as mercuric sulphate, HgS, takes up corrosive sublimate, and the compound thus formed can bc again blackeued by ammonium sulphide.—*St. Louis Photographer.*

THE ROYAL WEDDING.—The correspondent of the *Daily News*, in an article on Mar Lodge, Braemar, says :—"New Mar Lodge is rather a puzzle to photographers, who are anxious to produce views of every place of interest in this neighbourhood. The house is too low to be seeu over the trees from the distauce ; it is so pitched on a slope, and surrounded with trees, that only a peep at isolated corners can be got for the lens of the camera ; so that a view which will give a general idea of the place is out of the question.

INSTRUCTIONS FOR TAKING PHOTOGRAPHS OF LIGHTNING.

BY WILLIAM MARRIOTT, F.R. MET. SOC.

At the meeting of the Photographic Club on July 10th, I was requested to draw up some instructions for taking photographs of lightning, so that photographers, professional as well as amateurs, might, in the event of a thunderstorm, be prepared to obtain some really good photographs.

If the following brief instructions be complied with, the photographs of lightning will possess scientific value :—

1. The camera should be focussed during the daytime to some distant object, and a mark made on the camera so that at night it may quickly be adjusted when a storm is approaching.

2. A rapid rectilinear lens with full aperture should be used.

3. The camera should be directed to the part of the sky where the lightning is most likely to occur.

4. The camera should be firmly screwed to the tripod stand.

5. It may be necessary to tilt the camera slightly, especially if the lightning be mostly in the zenith. If this be done, a note should be made of the inclination.

6. A portion of landscape, roof, and chimney-pot, should, if possible, be included on the plate. If this cannot be done, the top of the plate should be carefully marked before it is removed from the dark slide.

7. The exact time of each flash, the interval in seconds between the lightning and the thunder, and the point of the compass in which the flash appeared, should all be carefully recorded.

8. It is desirable that there should be only one flash upon each plate.

9. If circumstances permit, two cameras should be used, one fixed on the tripod stand, and the other held in the hand, and two separate photographs obtained of the same flash.

10. It would be very interesting and valuable if two or more photographers could obtain pictures of the same flash from different points of view. By this means it might be possible to determine accurately the distance of the flash, and also its movements in the atmosphere.

The Royal Meteorological Society, 30, Great George Street, Westminster, will be glad to receive copies of all photographs of lightning that may be taken ; even apparently poor ones often contain useful evidence.

THROUGH JAPAN WITH A CAMERA.

BY W. K. BURTON.

Chapter VII.

Akita—Japanese Bells—A Private House.

Several days of travelling brought us to a town called Akita, where we stayed several days. Akita is a fair sample of a considerable Japanese town, but I don't think I have anything to say of it that would be particularly interesting to readers. For one thing, the thermometer still kept going up to 95° in the shade every day, and what energy was left me was all taken up in attending to business. Let me say, however, that the 95° temperature of Akita, with dryness, was not nearly so oppressive as 85° in Tokio with the dampness, that I wrote of at the beginning of these papers.

There is a very fine old castle at Akita, which I might have photographed had the weather been cooler, or had we been less busy ; but I am glad I did not, for the castle we afterwards saw at Shirakawa was quite as fine, and much more photographable—of it more hereafter.

I made two exposures towards the evening from the roof of the hotel we stayed at. The bell tower will form an excuse for a few words on Japanese bells. There is at least one of these in every town of considerable size ; there are many of them in very large towns. They are often elaborately ornamented with figures, but the great beauty of them is in the sound they give. There is nothing of the metallic clash about it. At a little distance it comes as a clear, booming musical note of the extremest purity and sweetness. The tone is attributed by many to the fact that the bells being religious institutions, the people mixed gold and silver with the baser metals when they were cast. I do not doubt the existence of a small proportion of gold and silver in the composition of the bells ; but I would need some proof to make me believe that the minute percentage likely to be present has any material effect on the sound given out. I cannot help thinking that the shape of the bells, and the fact that they are struck with wood, not metal—the wood consisting of a baulk of timber suspended after the manner of a battering ram—has a good deal to do with it. When a bell is struck with a metallic clapper a deal of noise, produced by the contact of the metals, is sure to accompany the true musical note of the bell.

We left Akita one morning very early, having a long day's drive before us. The road the first day was not particularly interesting, but the second it was very beautiful. We had again a long distance to get over, and the making of any exposures was out of the question. Seeing how badly my plates had turned out I am not sorry, but I have a note in my note-book on the suggestion contained in which I intend to act next summer, if circumstances permit. Here it is.

"We travelled almost the whole day through almost the most lonely valley that I have ever seen. The road is by the side of a deep gorge with a river flowing along its bottom. It is to be noted that it would be well worth while to spend a week between Yokoto and Midzusawa with a large camera, and Nagasaki-san mentions the road between the former of these two places and Yamagata as still more wonderful, especially at Nozomi."

At the end of our second day's journey from Sendai we arrived at a large village or small town which was the birthplace of my travelling companion, Dr. Goto. Here we stopped as guests at the house of a friend of his, and as it is the first and only time that I have stayed in a Japanese private house, I give a short description of it.

Nokote-san, our host, is a merchant, or as we would say, a shopkeeper. The shop faced the street. There was a passage at the ground level, between the two raised platforms forming the floor of the shop. This passage led to the private part of the house at the back. In the large room the whole family (three generations apparently) lived. The room was capable of being partitioned off by screens, so as to form a number of small rooms, as much separated from each other as Japanese rooms ever are. There was a large square hole in the floor with a fire burning in it, over which all the cooking was done. In the "guests' room" we were lodged. Except for the posts supporting the roof, it was in the day time quite open to the living rooms on one side, and to the courtyard on the other. We were told that when the Mikado had passed through the town he had lodged in the same room, the house being the largest, and the owner of it the richest man in the village. Certainly this room would, in its perfect simplicity of beauty, have put to shame the drawing room of any shopkeeper or even merchant prince at home.

The grandfather of the household was brought in and introduced. He was positively over-powering from his extreme civility and from the number of times that he saluted. His eldest son, the head of the house, also appeared to make his respects. He also was very civil, although not to the embarrassing extent that the old gentleman was. His eldest daughter waited on us, a pretty girl of some sixteen years. She spent the winter months, he told us, at a school in Tokio, where she studied English amongst other things. She was too shy, however, to speak it with me—a most unusual fault with Japanese girls.

At night our room was closed in on the two open sides by a series of sliding doors or panels.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY—A GUIDE TO BEGINNERS.

TWENTY-EIGHTH ARTICLE.

BY W. M. ASHMAN.

THE best test of the quality of any negative, and the best means of exhibiting all its characteristics, in the way of delicacy of detail combined with depth of contrast, is to be found in a really good transparent positive made therefrom by a suitable process specially designed for that purpose.

Scarcely one of the methods for the production of prints, such as have been described, is capable of doing justice to a first-class negative that is full of vigour and yet possesses the widest range of gradation in half-tones. In a technically perfect transparency we have each item of detail faithfully recorded, even to such as the eye can barely trace, however well trained it may be. Nor are we confined to size, as by means of the camera we may either reduce from the original negative to dimensions available to such purposes as exhibition in the optical lantern; enlarge the scale for window decoration; or for the production of another negative of increased size by contact with the transparent positive so magnified. To reproduce negatives which shall be fac similes of the originals, it is merely necessary to press an unexposed bromide plate close to the image side of a negative (a printing frame answers the purpose), expose the negative briefly to diffused day or artificial light, and then develop and fix, when we have a transparency. If we serve this in the same way after drying it, we shall have a reproduction of the original; and as we can repeat the process with the same positive, we can also easily repeat the production of the original, a valuable possibility where large numbers of prints are required to be rapidly made of the same subject. Not only so, but we are thus provided with the power of modifying the quality if so desired, first, by varying the character and intensity of the light employed, and secondly, by the method of development, so that from a weak negative full of detail, it is quite possible to prepare others which shall be by no means wanting in vigour. This, however, can only be expected after a careful study of the subject of development in connection with the action of various qualities of light upon the sensitive film, and by patient practice.

Another invaluable suggestion here presents itself, and that is the wisdom of making a transparency by contact of any especially important negative before it is put in to print, in case of its receiving irreparable injury in that process. Thus at any time the making of another negative to take its place is a very simple matter. Some large firms take this precaution. By far the larger number of transparencies, it may be presumed, are taken for what are known as lantern slides, and the standard size for the same now recognised by all photographers is three inches and a quarter square, and when larger or smaller sizes are adopted it leads to confusion in the manipulation of the lantern. As such pictures are always intended to be seen enlarged to a scale of considerable dimensions, varying from eight or ten to thirty feet in diameter, it is necessary to arrange the production of these to meet this condition, and to vary the printing to suit the intensity of the light to be employed in the lantern. The older form of oil lamps demanded the use of very thin transparencies, so delicate that hardly a trace of detail could be discerned in the thinnest parts when examined by the light reflected from white paper. Now so many forms of mineral oil lamps are constructed with several wicks, we have a vastly superior illuminating power, and the slides can therefore be more deeply printed. The light from the oxyhydrogen jet, as it impinges upon a lime cylinder, is that most commonly employed, and known as the lime light; being of great intensity it is possible to exhibit more detail and greater contrasts. The aim is to get out the largest amount of detail that the kind of lantern will properly illuminate, a thin plate and a strong light looking flat upon the screen, and a weaker light with a rather opaque picture exhibiting too dark an effect to be of any use. The greater the extent of the enlargement, the more necessity there is for absolute sharpness in the slide, and for grainlessness in the structure forming the image. It is for this reason that ordinary rapid plates are not so suitable for transparencies to be thus magnified from thirty to ninety diameters, the grain in such films being anything but delicate, although they are largely employed for this purpose. A microscopic examination of several films employed for lantern work, under the same power, led to the conclusion that the finest texture was to be found in those produced by a collodion process (collodio-chloride), or by that mentioned in a previous chapter, the citro-gelatino-chloride method of printing out. Every sort of positive printing which is independent of a paper basis is really available for the preparation of lantern slides, and the choice rather rests with the taste and fancy of the producer. The carbon process is often said to be unrivalled for the reproduction of negatives; by supplying an easy method of obtaining the necessary transparency, and with a specially prepared tissue in which the pigment is a sort of Indian ink, there is hardly any perceptible grain upon enlargement, while the transference of the image to opal is simple enough, and its flexibility renders it peculiarly adapted to the decoration of curved surfaces. Indeed, to a beginner, the facilities offered for the manufacture of lantern slides and transparencies for decorative purposes by means of carbon tissue, render the process especially attractive. The directions already given for this work will be useful here, but as the first support, that of a clear glass in the case of a lantern slide, is the permanent one, it is necessary to make the adhesion perfect. Presuming that we have the proper tissue, either that before referred to in the twenty-seventh article, page 444, or a warmer tint may be selected, though the result is not then quite so good (and also glass of a size which can afterwards be cut to the standard) the method of procedure is as follows:—A solution of gelatine (Nelson's No. 1), of a strength of one ounce to the pint of water, is prepared, and to it is added enough of the dichromate salt to make it a pale sherry colour. This, if necessary, is filtered, and the plates are thinly coated therewith, and afterwards dried away from dust but in the light. The exposed tissue, after being coated with plain collodion (which must be allowed to set), is placed in water until all greasiness has disappeared. The prepared plate is also soaked for a few minutes, and the tissue brought into contact with the gelatinised surface of the glass under water, and both removed carefully and squeegeed together as before described. The development follows in due course in water not above 90° F., and then fixing in alum solution and subsequent washing conclude the process. As before remarked, the printing must be suited to the light by which it is to be viewed, and if it is intended for window embellishment, the tone can be much darker than would be of any use for lantern work. When opal or ivory are to be the permanent support, the above gelatine solution is employed, but, instead of the chromic salt, an ounce of a twelve-grain solution of chrome alum is employed to render the gelatine insoluble after it is once dried.

Transparencies for decoration are usually backed up with some translucent diffusing medium like ground glass, which answers very well if finely ground, and the two are bound together to protect from dust, with an opaque mat intervening at the edges to prevent actual contact between the plates. A matt varnish is sold for this purpose, which imitates the effect of ground glass. A finer texture is obtained by etching the glass, and perhaps the finest of all by coating it with white wax dissolved in pure benzole or chloroform. If barium sulphate is formed by the mixture of very dilute solutions of barium chloride and sodium sulphate, to each of which a little gelatine is added, the

precipitate is very finely divided, and, after washing by decautation, it can be mixed while wet with a warm eight or ten per cent. solution of white gelatine, and poured over glass. Upon drying this, a delicate translucent film is left, with very little grain in it, suitable to back up a carbon or any other transparency. A coat of white varnish will protect such from injury. For lantern slides a plain piece of clear glass is employed, and the necessary matt of opaque paper of standard size, and strips of the same ready gummed for binding the two together, can be procured at any dealer's; there is also an accepted rule to mark one side as a guide to prevent the picture being presented in a reversed position in the screen as to the right and left hand objects depicted.

Transferrotype paper fulfils some conditions, but does not offer the same range of tone, or indeed possess the beauty of the carbon process for this class of work. Perhaps the simplest of all methods by which lantern slides can be made by photography is that in which a slow emulsion of either bromide or chloride of silver is employed. Such plates are now a commercial article, and are obtainable anywhere. They are made three inches and a quarter square, and are accompanied by plain directions for their treatment. They are intended to be used by exposure to artificial light behind, and in contact with, a negative, and a minute at a foot distauce from an ordinary candle is usually sufficient unless the negative is very dense or yellow. Experience alone will teach the beginner the exact exposure necessary. As to the development, which, of course, follows all methods but those of printing right out, the preference must be given to ferrous oxalate, hydroquinone, hydroxylamine, or that known as citro ferrous oxalate, which will be given further on, to that of alkaline pyro. There is an interesting field for experiment in this part of the production of good slides. It must be remembered that the plate should be carefully watched, and, as a guide when to stop the action, note half shadows defined and lights still appear white in the developer. Such a plate, when fixed, will answer well if used with the lime light in lantern. Both for reproducing negatives and for window transparencies much more strength can be given with advantage, but under no circumstances should the highest lights receive a perceptible deposit, or flatness will be the result. It is well to refer to the remarks in a previous chapter on developing negatives.

(To be continued.)

Photographic Papers.—The popularity of the "Rives" paper is in no way diminished, but it is a noticeable fact that the importation of the non-albumeuised paper into this country is yearly falling off. This may be explained by the very superior way in which papers are albumenised on the Continent, particularly in Germany and Paris. The Germans were very early in recognising the importance of the Rives paper, and paid a high importation duty into Germauy, and there albumenised the paper, with the result that the German business has made rapid strides within the last ten years. This fact has of late been practically observed by Mr. A. Schaeffner, a well-known manufacturer of Paris, who for more than twenty years has been established in this business in Paris, but who has not greatly cultivated the English market, and lately a new departure was made by the arrangement of a direct agency, with the result that the sale in London is rapidly increasing, aud the papers are now recognised as being among the best albumenised and sensitised papers attainable for photographic purposes. This is easily explained by the fact that the papers are obtained on the spot, and are prepared under the special direction of the proprietor of the factory.—*British and Colonial Printer and Stationer.*

A circular from Harvard College Observatory, dated June 26th, states that the sum of fifty thousand dollars has been received by that Observatory from Miss C. W. Bruce, of New York, to be applied "to the construction of a photographic telescope having an objective of about 24 inches aperture, with a focal length of about 11 feet; . . . also to secure its use under favourable climatic conditions in such a way as will best advance astronomical science."

ORTHOCHROMATIC PHOTOGRAPHY.*

by C. H. Bothamley, F.I.C., F.C.S.

Eosin Dyes (*continued*).

Optical Properties.—Fluorescein has a yellow colour, and if part of the hydrogen which it contains is replaced by chlorine or by nitroxyl, the chlorofluoresceins or nitrofluoresceins thus formed have a somewhat deeper and more orange tint, but their tinctorial power is much inferior to that of the derivatives which contain bromine or iodine.

Eosin in dilute solutions has a very beautiful crimson colour, recalling that of the sky in the early morning (hence its name), but in stronger solutions it is crimson red with a distinct tinge of yellow. Those derivatives which contain the same quantity of bromine as eosin, but in which a further quantity of the hydrogen has been replaced by chlorine, have a distinctly bluer tint. Erythrosin, which contains iodine in place of bromine, is still bluer in shade, and the derivatives in which hydrogen has been replaced by chlorine as well as by iodine have the bluest shade of all. It will be understood, however, that even the bluest of them still remain decidedly crimson, and never approach anything like a true blue. It is also noteworthy that the aqueous and alcoholic solutions of the alkali salts of the eosins have much greater tinctorial power, and much more beautiful shades of colour, than the alcoholic solutions of the free eosins.

Fluorescence, which is so strongly marked with fluorescein, is also observed with many of its derivatives, though not with all. The property is confined to the salts of the eosins, and alcoholic solutions of the free eosins themselves show no fluorescence. The intensity, and even the occurrence, of fluorescence, depends upon the liquid in which the eosin is dissolved; in some cases, an eosin which shows no fluorescence in an aqueous solution of any degree of concentration whatever, is distinctly fluorescent in an alcoholic solution. Even in the case of those eosins which are fluorescent, the phenomenon is not observed in very strong solutions. If, however, the solution is gradually diluted, the fluorescence appears and increases in intensity as dilution proceeds up to a certain point, beyond which the intensity of the fluorescence decreases, although the ratio of the fluorescent light to the absorbed light remains constant throughout a wide range of dilution. The fluorescence of some of the eosin dyes, and of some other compounds, has recently been investigated by Walters, but it will be sufficient to give a reference to his papers, which may be found in the *Annalen der Physik und Chemie* [2], 34, 316-326, and [2], 36, 502-518 and 518-532.

In aqueous solution eosin shows a strong green fluorescence, and the fluorescence of safrosin (dinitrodibromfluorescein) is similar, though less intense. In tetrachlortetrabromfluorescein the tint of the fluorescence is much yellower, and in phloxin (dichlortetrabromfluorescencein) it is green, but is less inteuse than in the case of eosin and safrosin. In alcoholic solution, the fluorescence of all these dyes is very much yellower, although it still has a distinct green tint, especially in dilute solutions. Tetrachlortetrabromfluorescein gives a reddish yellow fluorescence, but even in this case the green tint can be recognised if the solution is made sufficiently dilute. Erytbrosin and the other derivatives which contain iodine show no fluorescence in aqueous solution, though in one or two cases a faint fluorescence of a reddish tinge can be observed in alcoholic solution.

All the eosin dyes give a well-marked absorption spectrum when their solutions are examined with a spectroscope. The position of the maximum intensity of the absorption bands varies somewhat with different solvents, and lies nearer to the red end of the spectrum the higher the refractive power of the liquid in which the eosin is

* Continued from page 428.

dissolved. The absorption spectrum of the solid dye, whether alone or in a gelatine film, does not coincide with that of its solutions, though it has the same general character, all the bands being slightly displaced.

It is also noteworthy that the absorption spectra of the metallic salts of the eosins, whether in aqueous or alcoholic solution, are much better defined and more intense than the absorption spectra of alcoholic solutions of the free eosins. So strongly marked, indeed, is the effect of even a trace of alkali, that when it is desired to observe the absorption bands of a free eosin, it is essential to add to the alcoholic solution of the latter a few drops of acetic or hydrochloric acid in order to be quite sure that the whole of the eosin is in the free state.

The absorption spectra of many of the eosin dyes have been examined by Vogel (*Practische Spectralanalyse irdischer Stoffe*, 2nd Ed., 1889, vol. 1., pp. 368-376) and by G. Kruss (*Zeitschrift f. Physikalische Chemie*, 1888, vol. 2, pp. 318-321). They all belong to the same type, the main difference being the position of the maximum intensity of the absorption bands. Strong solutions transmit only the orange and red rays, but as the liquid is diluted it allows the violet and blue rays to pass through in greater and greater quantity, and with suitable concentration the spectrum consists of an intense absorption band in the green and greenish-yellow. If the dilution is carried still farther, this broad band splits up into a well-defined and intense band, α, which is visible even in very dilute solutions, and a second much fainter band, β, lying a little nearer to the blue end of the spectrum. This second band is not visible in very dilute solutions. The position of maximum intensity of these bands varies with the different derivatives. In the case of eosin itself the maximum of the band α is in the green close to the position of the Fraunhofer line E, and the maximum of the band β is in the greenish-blue, very close to the position of the Fraunhofer line F. Derivatives which contain chlorine as well as bromine give absorption bands lying somewhat nearer to the red end of the spectrum, and this displacement towards the red is more strongly marked in the derivatives which contain iodine instead of bromine, and most strongly of all in the derivatives which contain chlorine as well as iodine. There is, in fact, as I pointed out in one of my earliest papers (*Journal of the Society of Chemical Industry*, 1887, p. 427), a gradual displacement of the absorption bands towards the red end of the spectrum as the molecular weight of the dye increases. According to the later measurements of Kruss (*loc. cit.*), the wave lengths of the two absorption bands at their points of maximum intensity in alcoholic solution are as follows:—

	λ	λ_1
Eosin	515·0	488·4
Safrosin	515·0	485·4

According to Vogel, the corresponding values for the darker band in the case of the iodine derivatives are as follows:—

	λ
Di-iodo-fluoresceïn	518
Erythrosin	535

The metallic derivatives, as already stated, give a better defined and more intense spectrum. The spectra of the salts of potassium, sodium, and ammonium are practically co-incident, and the bands are nearer to the red end of the spectrum than in the case of the free eosins. Salts of heavy metals, and notably the salts of silver and lead, show a smaller displacement towards the red; but the displacement is most clearly observed with the methyl and ethyl derivatives.

Some of Krüss's measurements with alcoholic solutions of salts of eosins gave the following results:—

	λ	λ_1
Eosin—salt of alkali metal	525·1	491·5
Eosin—salt of heavy metal	521·5	489·0
Safrosin—potassium salt	512·2	*nil*
Methyl eosin—potassium salt	531·4	496·8
Ethyl eosin—potassium salt	536·5	500·0

It will of course be understood that in addition to the variations resulting from the presence of different metals or basic radicles, the salts, like the free eosins, show differences depending on the nature and proportion of the haloid elements which they contain.

(*To be continued.*)

THE PYROCATECHINE DEVELOPER.

DR. CARL IRNA gives the following formula:—

Solution A.	
Sulphite of soda...	100 grammes
Hot distilled water	400 c.c.
Solution B.	
Carbonate of soda	100 grammes
Water	400 c.c.

Take 30 c.c. of A, 60 of B, and add one gramme of pyrocatechine.—*Revue Photographique.*

PORTRAIT PAINTING AS APPLIED TO PHOTOGRAPHY.*

BY G. J. SERSCHALL.

To produce good results in colouring, it is not simply necessary to possess the technical skill to imitate with some success the colour of the original; but a first requisite in the education of the painter is a knowledge of the value of his colours, of their relations and harmonies, and of their effects in combinations and juxtaposition.

As in music, an utterly inexhaustible world of beauty and delight results from the varied combinations and sequence of seven different notes, so in painting, a source of beauty scarcely more limited results from the combination and arrangement of three primary colours. Again, in painting, as in music, the beauty does not consist in any one colour any more than it does in any single note, but in the relation it is made to bear to others.

It is true that the province of the portrait painter is, perhaps, more limited in this respect than that of the painter of works of fancy and imagination, as in the case of historical or classical painting, or that of the landscape painter, whilst the scope of the colourist of photographic pictures is *most limited* of all. Still, without some knowledge of the principles of harmonious colouring, he can scarcely hope to even approximate to the best results. And whilst in portraiture in many points the painter is bound to reproduce as nearly as possible the colours inherent in his model, yet in the choice of colour for draperies and background, more latitude is admissible; and here he will avail himself of such analogies or contrasts of colour as that whilst producing a harmonious whole give value and effect to the colours of the complexion.

Straying from my subject, I leave colour to comment upon character, which should be one of the greatest aims when painting portraits.

My object for speaking upon this subject is the fact that photographers have a propensity for obliterating all character; they want it to look clean and nice, and this must be done at the expense of character if necessary, and in most cases is necessary and must be sacrificed for the £ s. d. Now this should not be, for all of you remember Cromwell's words when about to have his portrait painted. He said, "Paint me as I am, warts, wrinkles, and all." Yes, and that is right, but of course there is the other extreme, which care must be taken to avoid, not to exaggerate anything, because if you do, you at once launch out into caricature, for the caricaturist's avocation is to exaggerate—for example, a man has a large nose, make it larger; a slight cast in one of his eyes, give him a good wholesome squint; and so with the warts and wrinkles, you must not make them into wens and furrows, but still they should be there, you have no right to obliterate them. This brings me to the matter of retouching. Now retouching is a very great adjunct to the photographer when legitimately used, but when we see photographs of individuals which have the appearance of having been taken from an inanimate statue of carved yellow soap rather than from the living individual, one regrets that the art of retouching should ever have been known to photo-

* Abstract of a communication to the Birmingham Photographic Society.

graphers. "Use, and not abuse," is the moral to be here applied.

Colours in their varied combinations are called hues. These hues when weakened by admixture with white are called tints, and when deepened by admixture with black are called shades. The various gradations of tints and shades of one colour form a scale. The presence, in happy proportions, of the three primary colours or their combinations in a picture produces harmony. Any two primary colours mixed in certain proportions produce a secondary colour which is complementary to the remaining primary colour; thus the mixture of blue and yellow produces green, which is complemeutary to red; the mixture of yellow and red produces orange, which is the complementary of blue; the mixture of red and blue produces purple, which is the complementary of yellow. These combinations may be carried to an almost unlimited extent with similar results. Thus the combination of any two secondary colours will produce a tertiary, which is complementary to the remaining secondary. For instance, the mixture of orange and green produces citrine, which is complementary to purple; purple and green produce olive, which is complemeutary to orange; purple and orange produce russet, which is complementary to green; and so on.

This statement of the relations of colours is not arbitrary, nor the result of taste or fancy, but is based on absolute inherent principles. They exist as a physical necessity of the organs of vision, as may be ascertained by a few simple experiments. Who amongst you haven't tested this by trying to obtain the £1,000 reward offered by Pears if you can prove this principle to be incorrect by looking at those discs—red, blue, and yellow?

This principle applies to every variety and combination of tint. If a red inclines a little to yellow as in scarlet, then the complementary green will incline a little to blue and become a bluish green. If, on the other hand, the red inclines a little to blue, as in crimson, the complemeutary will incline a little to yellow and become a yellowish green. These combinations may be so multiplied by gradations so delicate that it is impossible for me to enumerate them; but if any of you would like to test the above statements, I am sure you would find it very interesting, and can be carried out at a very moderate cost. Procure, then, a box of wafers of varied colours and a piece of white cardboard. Place one in the centre of the cardboard, look at it for about half a minute, then transfer the sight to the clear part of the cardboard, when its complementary will appear. If you find it does not, don't rush off to Pears' for the £1,000, but take it for granted that you are colour-blind. If you do see it, try it on a Sunday afternoon after dinner; you will find nothing so soothing and conducive to a quiet Sunday afternoon's nap. Each pair of colours—consisting of a primary and its complementary secondary also—presents special contrasts peculiar to themselves. Thus blue is the coldest colour, and is also the most retiring; orange, its complementary, is the warmest colour, and the most advancing. Every combination of colour as it approaches to orange or blue is warm or cold in its effect, and has the appearance of approaching the eye or receding from it.

Yellow is the brightest colour and most allied to light, while its complementary, purple, is the darkest of colours. Red is the most positive and exciting of all colours, whilst its complementary, green, is the most soothing of all colours. Complementary colours in juxtaposition mutually enrich each other, and produce what is called the harmony of contrast. Thus purple and yellow, of equal purity and intensity, become each brighter from contact with the other, the yellow becoming intensified by the extra yellow rays reflected by the purple, and the purple gaining an accession of richness from the purple rays given out by the yellow. From the same cause, neutral tints placed in juxtaposition with full hues appear to be tinged with the complementary colour of such hues. Thus, grey placed in juxtaposition with red will assume the appearance of greenish grey, green being the complementary of red.

Colours not complementary to each other are mutually injured by contact. Thus blue and purple placed together are both injured, the blue becoming greenish from the yellow rays induced by the purple, and the purple assuming a russet tinge from the orange rays induced by the blue. Besides the effect produced by contrast of hue, that resulting from contrast of intensity has to be considered. If two tints of the same colour, but of different degrees of depth or intensity, are placed side by side, the deep tint will appear still deeper, whilst the light tint will appear still lighter, the difference in intensity appearing greatest at the points of contact. I have have said before that the laws which regulate harmonious colouring are not dictated by fancy, but are based on inherent and absolute relations.

In conclusion, I will here remark that if you will carefully observe nature, it will afford you many pleasing illustrations of harmonious colouring. A striking illustration of the harmony of analogy is seen in the beautifully blended and graduated colours of the rainbow; and again, in almost every landscape, where the blue of the distance blends with the cool greens and greys of the middle distance, and these merge into the warmer greens, yellows, and browns of the foreground; or, again, view another landscape when the sun is setting and is flooding and beautifying the whole scene with its golden light—what are its shadows? Have you ever reflected when beholding them? They are purple. With instances of the harmony of contrast nature teems in every garden, field, and moor, as the damask rose with its yellowish green leaf, the scarlet holly-berry and its deep green foliage; and where is the man who has ever crossed a common who has not seen the almost unvaried mingling of yellow gorse and purple heather?

A proper understanding of these principles which I have briefly indicated, will enable the colourist, whilst preserving fidelity to nature in the points absolutely inherent in the model, at the same time to so manage the draperies, background, and so on, as to give value to the complexion and produce a perfect and harmonious picture.

TESTING FOR BROMINE.—*Bulletin de l'Académie Royale de Belgique*, May.—On a new method of testing for bromine, by Frédéric Swarts. This method, which yields excellent results, is based on the well-known fact that resorcinic phtalin (fluorescein) is transformed to its tetra-bromuretted derivative (eosine), characterized by a beautiful pink colour. The reaction consists in liberating hydrobromic acid, which is immediately oxidized by the hypochlorous acid. The bromine thus obtained then acts on the fluorescein, converting it into eosine, which is transformed to a pink salt under the influence of a slight excess of alkali. This reaction is so sensitive that it succeeds with a tenth of a cubic centimetre of water containing a hundred thousandth of potassium bromide, a quantity corresponding to a thousandth of a milligramme of this salt. In the case of iodine, it detects the presence of bromine in sea-water without submitting it to any preliminary treatment.—*Nature*.

INTERNATIONAL CONGRESS ON CELESTIAL PHOTOGRAPHY.—When one photographic Congress ends at Paris, another will begin. According to *Nature*, the International Congress which met in Paris in 1887 to make arrangements for the preparation of a photographic chart of the heavens, expressed a wish that a similar Congress might meet for the discussion of questions relating to celestial photography in general. M. Janssen and Mr. Common were asked to take such steps as might be necessary for the attainment of this object; and afterwards, by a ministerial decision at Paris, an organizing committee, with M. Janssen as president, was appointed. The arrangements have now been completed, and the Congress will be held in Paris from August 22 to September 3. The aim of the Congress will be to determine the methods which are most suitable for each branch of celestial photography, and the means by which the results are obtained by these methods can be most effectually published and preserved.

THE following hotels in Switzerland have provided dark-rooms for the benefit of tourist photographers:—Hôtel Beau-Rivage, Interlaken; Hôtel d'Angleterre, Davos-Platz; Hôtel Obwaldnerhof, Sarnen; Hôtel du Grand-St.-Bernard, Martigny; Hôtel Roy, Clarens, Canton de Vaud; Hôtel des Alpes and Grand Hôtel, Territet, Canton de Vaud; Grand Hôtel de Vevey, Vevey; Hôtel-Pension du Panorama, Vevey; Hôtel du Grand-Muveran, Villars sur Ollon, Canton de Vaud; Etablissement Hydrothérapique, Schönbrunn, Canton de Zoug; Hôtel du Château de Laufen, Canton de Zurich.

THE PARAPHENYL-DIAMINE DEVELOPER.—Paraphenyl-diamine, a new organic body recently patented in Germany as a photographic developer, has been tested by Herr Stoll, and he finds that it does not give the good results that the patentee claims for it. The use of caustic alkalies improved its working, but showed a ready tendency to fog the negative.—*Anthony's Bulletin*.

A PHOTOGRAPHIC CLUB, says *L'Amateur Photographe*, has just been established at Havre, under the presidency of M. Emile Rougé; it meets at 27, Rue de Normandie; its treasurer is M. David, architect in chief of the city, 3, Rue Fécamp, Havre.

Notes.

When preparing for the Paris Exhibition, M. Ed. Beernaert, of Ghent, invited the Abbé Coupé, M. Goderus, and M. Edmond Sacré to see the coating with gelatine emulsion of the largest sheet of glass, as he believes, ever used in the world for photographic purposes, and the subsequent development of the picture. The subject was Amiens Cathedral, which had been taken with a wide angle lens upon a plate 18 by 24 c.m., from which an enlarged transparency on glass was required 2½ metres long by 1½ metre broad—that is to say, 2 yards 26½ inches long by 1 yard 23 inches broad. The emulsion was laid on by machine; its sensitiveness was 25 by Warnerke's sensitometer. The time of exposure was half an hour, with a diaphragm one centimetre in diameter, and the use of daylight diffused by ground glass. The developing bath consisted of more than 45 litres of solution, in which were 400 grammes of quinol. The glass weighed 80 kilogrammes. The transparency is declared to be without fog, and irreproachable.

Mr. Burne Jones has taken a hint from photographers and gone in for "portraits at home." He holds, we learn, that a man's every-day surroundings and occupation may be made as important a factor in a representation of him as a mere expression of his face, giving, as they do, a suggestion of his life. Thus he has painted Mr. Watts in his studio, and Lord Rayleigh in his laboratory; so he will paint Mr. George Lewis in his dingy office in Ely Place. This is an excellent idea, but to such orthodox men as Mr. W. P. Frith and Mr. J. C. Horsley it must appear as rather lowering to the dignity of the artist. For the latter to take his brushes, his palette, and the rest of his paraphernalia to the sitter's house instead of the sitter coming to the studio is certainly analogous to the photographer carrying his apparatus in obedience to a summons to attend and photograph. As for the substitution of natural surroundings for the pillar, curtain, and the property chair, why it must seem like sapping the very foundations of proper portrait painting. But what was to be expected when the best patrons of art are now to be found among the advertisers of soap and patent medicines?

The question of the identification of prisoners is one that should demand the careful attention of the prison authorities, because an accidental resemblance or a careless and superficial examination by a not over-acute official may result in great injustice. This was the case recently with a man named Coyle, who had a previous conviction of seven years' penal servitude proved against him, the fact being that the warder mistook him for somebody else. In this case, as a correspondent of the *Globe* points out, neither photography nor the description was sufficient to prevent a miscarriage of justice, and some system of measurement, such as is adopted in Holland and France, is imperatively required. Photography alone is clearly not sufficient. In France, the measurements which are taken not only assist identity, but enable the authorities to classify the photographs, so in a very few minutes the photograph required is produced, whereas for the same task in England five or six hours are often needed. In default of a system of measurement, the plan of identification by thumb marks, to which we alluded last week, might be tried. In any case, however, more intelligence is required than is at the disposal of the average prison warder.

Dr. Dwight's forthcoming article in *Scribner* on "Form in Lawn Tennis," based on a series of instantaneous photographs of the best players at work, showing the exact position taken in making all the principal strokes, is not the first example of the application of photography to the study of sport. A couple of years ago a book was published on football, wherein most of the drawings were based on instantaneous photographs. The models for the lawn tennis photographs are well known champions, and we shall look for the pictures of these gentlemen with much curiosity, because their value as assisting the player will greatly depend upon Dr. Dwight's treatment. The difficulty which presents itself seems to be this: that if the photographs are really instantaneous, the position of the striker caught by the camera in a fraction of time inappreciable by the eye, will either be useless as a guide, or will convey an erroneous impression. It is pretty well acknowledged that instantaneous photographs of the horse in motion are useless to artists, and we are afraid that instantaneous photographs of lawn tennis players in action will not be more valuable to the votaries of the game. If, on the other hand, the mere pose be taken, then the photographs will not be instantaneous in the proper sense of the word. Speculation on this subject is, however, premature, and therefore, as we have said, we shall look forward to Dr. Dwight's photographs with interest.

Photo-mechanical printing processes have run wood engraving very hard in every direction save one—that of reproducing drawings of machinery. It is essential that the lines should be sharp and firm, and no pen can draw a line as clear and sharp as it can be cut. In order to compete with the wood engraver, the artist whose drawing is to be photographed has to take the greatest care. Every line must be drawn and be absolutely black, and all the spaces between the lines must be pure white, in order that a perfect negative may be obtained. This drawing alone often takes more time than to engrave the same in wood. The Americans, who have perfected photographing direct on to the block, apply this method with great success to the representation of machinery. They have such command over the process that lights can be taken out, solid blacks put in, and the whole may be actually redrawn, so far as the shading is concerned, with the graver. The result is that English and Scotch manufacturers of machinery now find that their catalogues can best be illustrated on the other side of the Atlantic, and orders which English printers might otherwise receive are lost. A glance at the American periodicals devoted to the machinery trade will show at once what strides the mechanical engraver has made. Ordinary advertisement blocks are as highly finished as first-class engravings.

The pulling down of the old White Hart Inn in the Borough, immortalised by Dickens in Pickwick as the scene of the introduction of the ever green Sam Weller, takes away an interesting example of old London architecture, the house having been built in 1676, though its associations go back to the time of Jack Cade. We presume the White Hart is one of the subjects in the list of photographs taken by the now extinct Society for photographing relics of old London, for so notable a house could scarcely be overlooked. If so, it shows the value and the justification of such a society, and the pity is, that it was allowed to lapse. What the reasons for its dissolution were we do not know, but if it be impossible to resuscitate it, could not some photographic society continue the work? The Camera Club has shown it possesses both enterprise and ability; perhaps such a task would not be beyond its scope. One thing is certain, that any society which took up the subject would find both pleasure and renown in its pursuit.

THE INTERNATIONAL PHOTOGRAPHIC CONGRESS.

The directors of the Paris Exhibition, by authority of the Minister of Commerce, Industry, and the Colonies, have confirmed and published the following rules in relation to the International Congress of photographers to be held in Paris next month.

I.—In accordance with a ministerial order dated August 2nd, 1887, during the universal Exhibition of 1889 an International Photographic Congress will be held in Paris.

II.—This Congress will be held in August, 1889; its opening* and closing† meeting will take place within the Exhibition; its other meetings will be held on the premises of the Photographic Society of France, 76, Rue des Petits-Champs, Paris.

III.—Membership of the Congress may be obtained upon application to the secretary of the committee of organization before the opening of the session, and during its sittings, upon payment of the sum of ten francs.

IV.—Each member of the Congress will receive for the said payment a ticket, which will be delivered to him by the committee of organization. These tickets will bear the stamp of the Commissioner-General. They will be strictly personal; any ticket lent will be immediately cancelled. These tickets do not give the right to free entrance to the Exhibition.

V.—The bureau of the committee of organisation will proceed, before the first meeting, to the nomination of the bureau of the Congress, which will have the direction of the work of the session. This bureau will consist of one president, five vice-presidents (of whom two will be foreigners), five secretaries (including two foreiguers). It will, besides, nominate honorary presidents.

VI.—The bureau of the Congress will draw up the programme of each day's meeting.

VII.—The Congress will comprise general meetings, sectional meetings, conferences, and visits to scientific and industrial establishments. A public conference on the work of the Congress will be held at the close of the session ‡

VIII.—The members of the Congress have alone the right of taking part in the meetings and in the visits prepared by the committee of organisation, also of giving in papers and taking part in the discussions. The delegates of French and foreign administrations will be awarded the privileges of members of the Congress.

IX.—The memoirs presented to the Congress on the questions of the day in the programme of the session will be discussed in general meetings.

Memoirs not related to the programme published in advance will be read in sectional meetings.

X.—No paper can be presented at a meeting, nor allowed to be discussed, if the author has not communicated an abstract, or at least its conclusions, to the committee of organisation fifteen days before the opening of the session.*

XI.—Speakers must not occupy the tribune more than fifteen minutes, nor speak twice at the same meeting upon the same subject, unless the meeting be consulted and decide otherwise.

XII.—Members of Congress who have spoken at a meeting should send to the secretary within twenty-four hours an abstract of their utterances for the official report. Should this not be sent in, the notes of the secretary may be substituted, or the subject of the remarks alone be mentioned.

XIII.—The committee of organisation, by authority of the superior commission of congresses and conferences, can call upon the authors to shorten their abstracts; it may make such reductions, or decide that the subject alone shall be mentioned, should the author not have done it himself by the date fixed.

XIV.—The official report will be printed and sent to the members of the Congress as soon as possible after the session.

XV.—A detailed record of the works of the Congress will be published by the committee of organisation, which reserves to itself the right of fixing the length of the memoirs or other communications to be printed.

XVI.—The bureau of the Congress will settle all matters not previously regulated.

All communications relating to the Congress should be addressed to M. S. Pector, secretary of the committee of organisation, 9, Rue Lincoln, Paris.

The public conference on the work of the Congress on the 20th August, at the Trocadero, will be under the presidency of Dr. Janssen, member of the Institute, and director of the observatory at Meudon.

* The opening meeting will begin at two o'clock on Tuesday, August 6th, in the Trocadero Palace.

† This closing meeting will begin at two o'clock on Saturday, August 17th, in the Trocadero Palace.

‡ This conference will take place in the Palace of the Trocadero, on Tuesday, August 20th, at two o'clock.

The commemorative album which will be presented to Mr. and Mrs. Gladstone this evening, at the National Liberal Club, as a gift from the members, in celebration of their golden wedding, is described by a writer as "a unique type of that form of testimonial. The artists who have combined in its production, virtually as a labour of love, are Mr. Marcus Stone, R.A., Mr. J. MacWhirter, A.R.A., Mr. A. Parsons, R.I., Mr. Arthur Severn, R.I., Mr. H. Holiday, Mr. Walter Crane, and Mr. Lewis F. Day. The covers, which are 22in. by 16in., are of golden-brown crushed morocco, tooled in gold with emblematic device by Mr. Lewis Day, and it bears on the top the words, 'William Ewart and Catherine Gladstone, A.D. 1839'; and at the bottom, 'A.D. 1889. National Liberal Club.' The congratulatory address is brief, and in it controversial politics are almost entirely avoided; it is distributed over five pages, the bulk of the space on each being taken up by the work of the artists above named. The frontispiece is a beautiful half figure by Mr. Marcus Stone, typifying freedom. All the pictorial contributions are water-colours, and the ornamental designs throughout are upon a gold background."

The Council of the Manchester Amateur Photographic Society consists of the *President*, S. F. Flower; *Vice-Presidents*, James Davenport, Rev. H. J. Palmer, M.A., Henry Smith, William Stanley; *Committee*, John Bathe, A. L. Bostock, T. Morley Brook, G. J. Crippin, Chas. Dawson, John Macnamara, F. W. Parrott, T. Steventon, Geo. Wheeler, James Whitham; *Treasurer*, J. G. Jones; *Librarian*, James H. Seed; *Secretary*, R. O. Gilmore; *Editor of Magazine*, Geo. Whecler.

* This rule has been published too late for foreigners to comply therewith; these rules only reached us last Wednesday.—Ed. Photographic News.

PHOTOGRAPHIC OPTICS.*

BY W. K. BURTON.

CHAP. V.—ON PHOTOGRAPHIC LENSES (*continued*).

Dallmeyer's New Rectilinear Landscape Lens.—It is probably due to the great increase of the practice of photography that has arisen since the introduction of dry plates that the past few years have beeu prolific in the production of new forms of photographic lenses. Amongst the most remarkable of these is the lens just mentioned above. This lens may be described as half-way between the single lens and the rapid rectilinear. By an inspection of the cut it will be seen that although it really consists of two separated lenses, these are both at the same side of the diaphragm ; that in fact they take the place of the siugle combination in the "single landscape lens." The lens is useful for all work that a rapid rectilinear can be used for with moderate aperture, it gives better marginal illumination, and more equal lighting from the centre to the edges of the plate. It has been claimed for it that it has the advantages of the old form of single lens, throwing a smailer amount of reflected light into the camera. This is a claim that the present writer cannot admit, as he has already explained in the PHOTOGRAPHIC NEWS. The angle iucluded is moderate, but is sufficient for most work whcre a very wide angle does not ueed to be included. The lens cau be specially rccommeuded for copying.

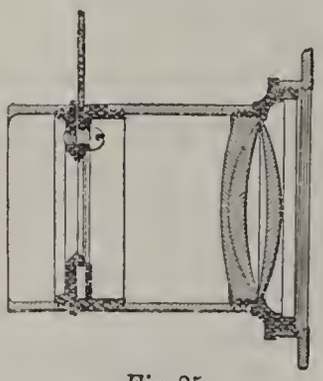


Fig. 25.

Wide Angle Lenses—The term "wide angle" has been applied to some moderu forms of single lenses because these include a considerably wider angle thau was included by the older forms of single lenses, but to these the writer does not here refer. He refers to double combination forms of lens, whereby a very great angle—often as much as 90 degrees on the diagonal of the plate—may be got. The reader has already been warned against using such lenses to include thc full angle that they will take in, except in such cases as is unavoidable, the result being a false perspective.

In Eugland there have been practically only two forms of wide angle lens in use during many years. The first of these is the Dallmeyei form, which is illustrated here.

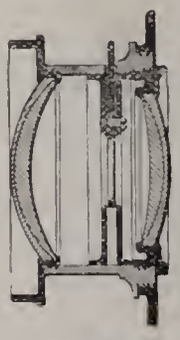


Fig. 26.

It will be seen that there is great similarity between it and the rapid symmetrical form of lens, the chief difference being that the combinations are placed closer together in the wide angle form.

The next lens that I illustrate is Ross's portable symmetrical. In this certain corrections are secured by

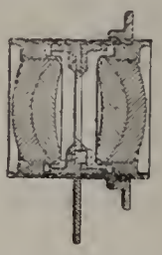


Fig. 27.

thickening the glass. The lenses are of comparatively small diameter, hence the term "portable." They are, moreover, so constructed that a number of them will screw into the same flange. These facts make the portable symmetrical one of the most popular lenses in England for general landscape work, the lens for such work being used to cover a plate much smaller than the largest it will cover. Thus a portable symmetrical of 10-inch focus which will cover a plate 13 by 11 inches makes a capital lens for ordinary work on any plate from 6½ by 4¼ to 8½ by 6½.

These lenses—and, indeed, nearly all wide-angle rectilinear lenses—are particularly well adapted for working as a series, or, as it is commonly said, as a "battery," by which is meant that their form is such that, working any particular size of plate, it is easy to take out a set of three or four of such lenses as will permit any angle to be included that may be desired. As an example, for a whole plate (8½ by 6½) a battery of so-called "wide-angle" lenses might consist of four of the following focal lengths, 6 inches, 8 inches, 10 inches, 12 inches.

We next come to the wide-angle lens of Morrison, which I illustrate. It will be seen that the inventor has, with characteristic boldness, departed entirely from all common forms, inasmuch as one element of the lens is without

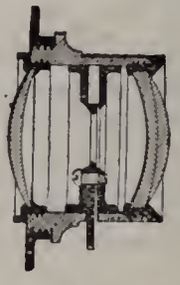


Fig. 28.

achromatisation at all. Presumably the other is overcorrected. The writer has not had practical experience of this lens, but again takes the word of Mr. Taylor, who pronounces its performauce excellent.

Uses of Wide-Angle Lenses.—I have alrcady spoken of the objection to the use of wide-angle lenses to include all the angle they will include except when it is unavoidable. I should add that when they are so used it is always necessary to insert a small stop, and that therefore the lenses are slow.

For ordinary landscape work any of the forms of wide-angle lens described is excellent if it be used for a plate of moderate size only, so that but a moderate angle is included. They all have the advantage that they give no distortion, even when the widest augle is included. For this reason they are particularly well adapted to architectural work. The maximum aperture of wide angle lenses is, as a rule, about $\frac{1}{8}$; they must, therefore, be ranked as slow lenses. Indeed, moderu single lenses have shot ahead of them in the matter of rapidity.

The Portrait Lens.—This lens may be considered to be in

* Continued from page 473.

great measure the crowning triumph of the photographic optician. It is true that in the present day it is of comparatively little use, but this does not make the credit of having worked it out when it was a great desideratum the less.

The object in the portrait lens has been to get the greatest rapidity possible. Other qualities have certainly to some extent been sacrificed to this one of rapidity, but still it is a lens wonderfully well adapted for the purpose for which it was designed—namely, the production of portraits pure and simple on films which, according to our modern ideas, were very slow. With an enormous aperture, the portrait lens gives definition of a very high quality on a small plate. The angle included is small—full aperture being used, and fine definition being required to the edge of the plate—very small, indeed. Still, this is not altogether a disadvantage, as a quality has some use which restrains photographers in their tendency to include too wide an angle in portraiture—in other words, to use lenses of too short focus. The greatest defect in the portrait lens is the want of depth of focus, a defect which a consideration of what we have said under the head of depth of focus will be seen to be inherent to a lens with a very large aperture.

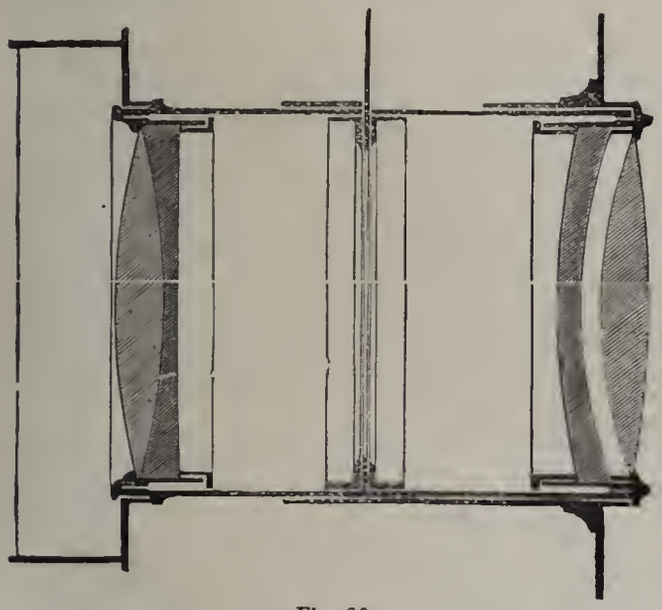


Fig. 29.

The lens illustrated here is the Petzval form of portrait lens, which was, until quite recently—unless we consider Dallmeyer's diffusion of focus lens, to be hereafter described—the instrument universally used for portraiture.

(*To be continued.*)

A PLAINT FROM THE RIVER SIDE.

EDITED BY C. BRANGWIN BARNES.

I AM a professional photographer, and have been so for thirty years. True, I have no studio, so far as an edifice of bricks, or wood, or iron, or glass is understood. My studio is the open air, and for the last twenty years I have pitched my tent, literally, in one and the same spot—and a very picturesque little spot it is, too—on the banks of the grand old Thames, under the chestnut trees which decorate the garden of one of the very nicest roadside hosteleries, and, at the same time, one that is very popular with boating gentry. Although I only take glass positives, I do my work as well as I know how, and the bearers of more than one well-known name in the photographic ranks has been kind enough to compliment me on the quality of my pictures. My clients are, naturally, boating folks, and from the fact of my always being found in one place I have, or had until recently, managed to get together a nice little connection. Year after year the same people have said to me, "Well J——, here you are still, then; you had better take us again this time." And, mind you, each boat's crew have, as a rule, had a copy each at "a bob a nob," and I have got to thoroughly know my customers, and they to know me, and I have never minded a little extra trouble, such as taking one or two extra pictures so that all should have good ones, and often have been asked to have a lemon and brandy in token of the satisfaction I have given.

The last year or so things seem to have changed, for although just as many people come up the river, and my old customers among them, I find that in many cases I am not wanted. A boat pulls up, and I greet my past client with good morning, or good afternoon, as the case may be, and although they are ready enough to give me a return of the compliment, still they do not order me to photograph them, as one of the number produces from the boat a camera, lens, tripod, and all complete, and, under my very nose, proceeds to take the boat himself. In one or two cases they have actually had the impudence to ask me to just touch the spring of some new-fangled instantaneous shutter for them, so that all their party might be complete. This is bad enough, but when they go into the inn, and over their liquor offer to take other parties in their boats and supply them with copies "just at cost price," it makes me right down mad. To see your old customer turn amateur and not require you, is certainly tantalising, but to see him turn professional and take the very bread out of your mouth in what you have looked upon as almost your own studio, is something more. If the cases of this sort were few and far between, I should say nothing, but every day they are getting more frequent, and my nice little connection is narrowing down into very small limits; in fact, I am at a loss what to do for a living.

I have grown old in the service of the boating public, and do not suppose I could very well turn my hand to any other branch of work. It strikes me, too, that if this amateur craze (I can find no other name for it) hits the poor itinerant so hard, it must hit every branch of the profession as well, and what I want to know is, who is to blame for it all? I do not think, honestly, that any share of it rests with me. Is it the dealers in cheap apparatus and chemicals, or is it all due solely to the extra ease of the dry plate process and the cleanliness of the ferrous-oxalate developer? I can, personally, give no reason; I only leave it to the profession to find the cause of the ill, having myself found the effects, and that much to my cost.

I have been asked to print their negatives by some of these amateurs, but have hitherto declined, only to find that other photographers in a better position than myself, who could have declined also without suffering much, have accepted the work, and that, too, at prices that could not be very highly remunerative. I may be right or I may be wrong, but I think if we left these amateur-professionals to do their own printing, we should hear and see far less of them.

Operating, when conducted as amateurs conduct the process, is mere play, or rather sport; but the after processes are tedious, and partake more of the nature of work for these gentry to be very fond of; hence they fly to the professional for aid when real *work* is to be done, and what is more, they expect to get it *well* done, and at a very cheap rate. Let the professionals either decline the work altogether on the plea that they have quite enough to do in finishing their own negatives, or let them, through the medium of the various photographic societies, arrange a hard and fast limit of charges for finishing amateur work, and keep to it. This charge should be one that would repay them for the necessary trouble, and at the same time help to repay them for the loss of work which amateurs in general have helped to bring about. It should be borne in mind that if an amateur brings a professional a negative to develop, he expects to get it done at about the actual cost of the developer, and is beautifully vague in his ideas as to whether it is over-exposed, under-exposed, or what not. In many instances I have heard of plates being taken to a photographer to develop which have never been exposed at all: either the dark slide has not been drawn, or the shutter has not acted properly. Other instances recur to my mind in which plates have been hopelessly fogged, owing to their having been filled in in too strong a light, or the plates have been finger-marked.

When cases of this kind occur, the amateur usually credits his professional brother with the blame. He knows the plate was all right when he brought it to be developed; he always changes his plates in the same light, and has never had a fogged one before, and so on. This is, of course (like Epps's cocoa), very "grateful and comforting" to the conscientious pro. who has taken considerable extra pains over the plate.

But I have left my own troubles in the background, and am getting a bit a-field. Such being the case, I must draw up sharp,

trusting that some abler pen or pens than mine will take up the strain where I have left it, and throw out some hints as to what the crowded-out pro.'s are to do now the reign of the *amateur-professional* has commenced in real earnest.

DEVELOPING BROMIDE OF SILVER PAPER.

BY F. STOLZE.

II.

BEFORE large sheets of bromide paper are exposed, proof should be had of their sensitiveness by testing a small piece of the paper. I use one negative for this purpose of medium printiug time, which serves as a uormal negative for direct prints and for developed enlargemeuts. Bromide of silver paper I expose behind this negative at a distance of 2m. and au ordinary flat flame burner, and I expose in divisions, by moving a small board, 2½, 5, 7½, 10, 12½, and 15 seconds. I develop in 5 parts of a saturated solution of oxalate of potassium, and 1 part saturated iron solution without potassium bromide.

From the result I can see which exposure is the best, and whether potassium bromide has to be added or not. If, now, the best time of exposure was known for former preparations, the proportion for corresponding enlargements will follow therefrom. This test with a negative is better than that with the photometer, being not only couclusive for the half tones, but also for the whole picture. Attention may be here called ouce more expressly to the fact that the potassium bromide addition, also unnecessary for negatives of normal density, cannot be spared for thin negatives, and that it has to be withheld for hard negatives as much as possible, if exposure and development are not to be prolonged unnecessarily.

For slowly developing paper it is urgently advisable, if an addition of bromide of potassium is required, to prolong also the exposure, which sometimes may even be doubled. A quick and still brilliant development is thereby obtained.

Although certain kinds of bromide of silver paper of high sensitiveness, as mentioned before, will give no strong pictures generally, it is not a necessary conclusion that bromide of silver paper cannot be highly sensitive and work brilliantly at the same time. These properties depend upon the method of preparing the emulsion. Thus I succeeded, for instance, in producing emulsions which work brilliantly with a little bromide of potassium, and have from twelve to twenty times the sensitiveness of the Eastman paper. They are even sensitive enough for the most rapid instantaneous pictures. If, nevertheless, I advise against the regular production of such sensitive preparations, and myself have abstained agaiu from their use, it is done because experience has taught me that they are generally overexposed by professionals who have no faith in such a sensitiveness. To be sure, one is capable of making enlargements on such paper with gas or kerosene light iu a moderate time ; but as most of these have preparatious for the magnesium flash-light, they would be obliged to work with very small diaphragms, to which they are not used. I have returned again, therefore, to a moderate seusitiveness, as in the beginniug, which has the advantage of easier aud simpler production. It is beyond doubt that emulsions of higher sensitiveness will render the same strength with more difficulty than less sensitive ones.

To return now to the developmeut and further treatment, it happens sometimes than an emulsion film fixes with difficulty, and this not only with differently prepared emulsions, but also with such prepared by the same formula, for reasons not explained yet. This peculiarity goes mostly hand in hand with a reduction of oxalate of iron iu the film, which takes place in the first wash. As explained previously, the best means agaiust the yellow colouration produced hereby is an increase of acidity to double and three times its proportion in the first water, and long fixing. In particularly obstiuate cases the acetic acid may also be replaced by muriatic acid. A softening of the gelatine is not to be apprehended, as this fixing difficulty occurs generally only with very hard films. One should not always come to the conclusion of its being a faulty preparation if the paper shows this property, as the applicatiou of the means we advise will lead to a successful result.

Besides the means mentioned by me recently for the improvement of the tone—it was a prolonged resting in the fixing bath, the alum bath, or any combined tone fixing bath—there are several others. Gold baths, which also help, are generally too expensive. A much diluted bath of chloride of copper will act very rapidly. To produce the same, a concentrated solution of this salt is made, or one part of a saturated chloride of sodium solution is added to one part of saturated sulphate of copper solution ; and drops of this liquid are added carefully to water, uutil this will quickly tone a bromide of silver print. The picture is then quickly taken from the dish and washed, to prevent bleaching. But in the beginning it will not weaken the shadows, but strengthen them. Captain Himly has confided to me still another similar means, which is still more handy to all, and which I have also found to be of good effect. It consists iu a very diluted bi-chloride of mercury bath, with adequate subsequent treatment. Leon Vidal's process might also be recommended, whereby the silver picture is changed into a platinum one.

Regarding the oxalate developer already used, I would still remark that I restore the same always after Lagrangc's method, and I keep in well sealed bottles. Working very little with bromide of potassium, and taking usual developer each time, reproduced developer will work but little harder. The development of the large pictures is very cheap, and this process can be highly recommended.—*Photographischcs Wochcnblatt.* (*Anthony's Bulletin translaiion.*)

PHOTOGRAPHIC SOCIETY OF JAPAN.—A meeting of the Photographic Society of Japan was held on Friday, June 7th, at the Chamber of Commerce, Tokyo. Professor Kikuchi took the chair. His Excellency Viscount Enomoto, Minister of Education, was elected to the post of President of the Society by acclamation. After some formal business, the special business of the meeting was begun. This was a demonstration, by Mr K. Ogawa, of Willis's platinotype process. The capabilities of the process were shown by a set of mounted prints hanging on the walls of the room. The process of coating the paper was shown, and that of development was demonstrated on some prints that had previously been exposed to daylight in printing frames in the usual way. There was a good attendance of those interested in the "black art," and they all took a keen interest in seeing the magic way in which the picture appears in the developing solution. Mr. Ogawa spoke chiefly in Japanese, and some additional explanation was given by Professor W. K. Burton. It was explained that the paper was coated with a mixture of certain iron and platinum salts, that the light in the priuting frame affected the former, which, in its turn, had the power, when dissolved by the developer, of reducing the platinum salt to the metallic state, so that an image in metallic platinum in a very fine state of division resulted.

THE uew *Revue Suisse de Photographic* iuteuds shortly to deal with some rather interesting scientific subjects, namely, the results of sub-aqueous photographic experiments iu the Lake of Geneva, a series of photographic experiments determining the law of the fracture of glass in plates submitted to torsion, some researches in histological photography, and the beginning of a study of the decomposition of bromide of silver by light. The first number contains a notice of Mr. F. de Paula Cembrano's experiments on platinotype processes.

ROYAL SOCIETY OF BRITISH ARTISTS.—At a special assembly of the Royal Society of British Artists, held on the 23rd inst., the following gentiemen were elected members :—Messrs. W. D. Almond, Frank Braugwyn, Nelson Dawson, F. Hamilton Jackson, Jas. Macmaster, R.S.W., Robert Morley, C. Mottram, Laslett J. Pott, Adam E. Proctor, Octavius Rickatson, F. Cayley Robinson, R. W. A. Rouse, Henry Sykes, W. Harding Smith, William Strutt, H. T. Schäfer, W. H. Y. Titcombe.

SOME interestiug articles on "The Analysis of Glasses" are uow in course of publication in the *Chemical News.* This subject may have to be studied hereafter by photographers when the question arises in relation to the permanency of historical photographs, as to the durability of the support.

THIS year the French Association for the Advancement of Science will hold its annual meeting in Paris. The session will last from August 8th to 14th. A great number of members is expected to atteud the meeting, and it is hoped that many foreign men of science may also be present.

THE Brussels section of the *Association Belge de Photographic* occasionally gives an eveuing's entertainment to the general public by means of the optical lantern and photographic slides. The last of these for the season took place in the great Salle de Conférences of the Brasserie Flamaud, where M. A. Rutot, vice-president, exhibited and described a vast number of lantern pictures.

THE Photographic Society of Geneva has ordered a die to be cut, from which medals may be stamped for future photographic exhibitions in that city.

LITERARY AND PICTORIAL NOTICES.

Two of Percy Lindley's "Holiday Handbooks" have been received, the one on "The Moselle," and the other on "The Hartz Mountains." These guides are issued under the auspices of the Great Eastern Railway Company, tastefully illustrated with woodcuts, and at a price of but one penny each, for the Company is doing all it can to popularise continental tourist excursions within moderate distance of London. The Moselle guide may, perhaps, tempt some tourists to quit the crowded highway of the Rhine at Ehrenbreitstein, for the comparative quietude and solitude of the Moselle. The guide to the Hartz Mountains has a picture, injudiciously inserted, of some tourists ascending the Brocken; if they have to experience what is therein depicted, those with any intelligence will stay at home. This guide contains a picture of an old German eagle, who looks as if he had been dipped in treacle while in a state of inebriation, and is not yet sober enough to cleanse himself. If the young Emperor of Germany brings over one of these birds and presents it to the Zoological Gardens of London, his popularity will be unbounded. Both these guides have picturesque scenes printed on the cover, but no information as to what places they represent. "Tourists' Travel Talk," by Percy Lindley, also comes from 125, Fleet Street, and the words in different languages, likely to be useful to tourists, are selected with more common sense than usual in linguistic guides. A defect in these and most other guides issued by Mr. Lindley is, that they contain an insufficiency of maps. The most valuable characteristic of a good guide is a plenteous supply of useful maps.

Mr. A. Johnston, of Bridge Street, Wick, sends us a little book of German phototype reproductions of his drawings of ocean scenery on "The Wild North Coast," which is the title of the selection. Some of the pictures represent nature in its wildest moods, and the work throughout is of considerable artistic excellence.

Mr. B. Grant, with his letter on the night-blooming cereus, which appears on page 494, forwards us two views—one of Sundy Bay, and one from Red Hill—admirably showing the ridges and other views. These are accompanied by a guide book, now out of print, describing the scenery of St. Helena.

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.

An Exhibition of photographs, photographic apparatus, and appliances will be held in the Assembly Rooms, Town Hall, Cardiff, from the 9th to 19th October.

Conditions.

I. The charge for wall space will be 2s. 6d. for each ten square feet, fractions of ten feet to count as ten feet. Each exhibitor can, on application, have a season ticket, not transferable.

II. A charge of 10s. to each exhibitor will be made for the exhibition of apparatus and trade requisites. The committee reserves the power to limit the space to each exhibitor, and will make special terms for any cumbersome or extra large collection of articles. This section is limited to recent inventions and novelties.

III. All pictures must be mounted and framed (Oxford frames rejected), labelled on the *back* with particulars of subject, process, exhibitor's name and address, and if for sale, the price, including frame, subject to ten per cent. commission. The committee reserves the right of rejecting any picture or pictures.

IV. The exhibitor's name must not appear on the face of any picture.

V. Carriage both ways must be paid by the exhibitor. The Society will not be responsible for accident to or loss of exhibits.

VI. In the amateur classes the exhibits must be the sole work of the exhibitor—exposure, development, retouching, printing, and toning.

VII. The annexed form A [forwarded on application to the hon. secretary, as below] must be filled up and sent to Mr. G. Bedford, together with a remittance, not later than the 16th September, 1889.

Special classes are reserved for pictures that have taken prizes at this or any previous exhibition, and no first-prize picture will be allowed to compete in any other classes.

The following medals and certificates are offered for competition, but the judges shall have the right to withhold any medal or certificate on the ground of insufficient merit, and their decision shall in all cases be final:—

Class 1.—*Portraiture, Amateur:* One silver, one bronze medal, one certificate.

Class 2.—*Portraiture, Professional:* One silver, one bronze medal, one certificate.

Class 3.—*Landscape, Professional:* One silver, one bronze medal, one certificate.

Class 4.—*Landscape, Amateur:* One silver, one bronze medal, one certificate.

Class 5.—*Landscape, Amateur* (frame of not less than six, from quarter-plate negatives): One silver, one bronze medal, and one certificate.

Class 6.—*Architecture, Professional* (interior or exterior): One silver, one bronze medal, one certificate.

Class 7.—*Architecture, Amateur* (interior or exterior): One silver, one bronze medal, one certificate.

Class 8.—*Genre or Figure Picture, Professional:* One silver, one bronze medal, one certificate.

Class 9.—*Genre or Figure Picture, Amateur:* one silver, one bronze medal, one certificate.

Class 10.—*Enlargements (not portrait), Professional:* One silver, one bronze medal, one certificate (print from negative to accompany enlargements).

Class 11.—*Enlargements (not portrait), Amateur:* One silver, one bronze medal, one certificate (print from negative to accompany enlargements).

Class 12.—*Lantern Slides, Professional* (best series of twelve): One silver, one bronze medal, one certificate.

Class 13.—*Lantern Slides, Amateur* (best series of six): One silver, one bronze medal, one certificate.

Class 14.—*Best General Collection of Apparatus:* One silver medal.

Class 15.—*Instantaneous Photographs of Objects in Motion, Professional:* One silver, one bronze medal, one certificate.

Class 16.—*Instantaneous Photographs of Objects in Motion, Amateur:* One silver, one bronze medal, one certificate.

Class 17.—*Best Illustration* of photography as applied to engineering in connection with collieries, surface work only. Open to amateurs only. Gold medal. The winning exhibit to become the property of the Society.

Class 18.—*Champion Class, Amateur.* The Society presents a gold medal for competition, between pictures that have already taken prizes at this or any other exhibition.

Class 19.—*Champion Class, Professional.* The Society presents a gold medal for competition between pictures that have already taken prizes at this or any other exhibition.

OPEN TO MEMBERS OF THE SOCIETY ONLY.

Class 20.—*Best Series of not less than four Landscape Pictures:* One silver, one bronze medal, one certificate.

Class 21.—*Photographic Views of South Wales and Monmouthshire* (frame of not less than four pictures): One silver, one bronze medal, one certificate.

Class 22.—*Best Six Prints from Negatives taken at one or more of the Society's Excursions.* No previous visit to be made for selecting or studying subjects. First prize, value five guineas; second prize, value two guineas. Previous prize winners will not be eligible for the second prize.

Class 23.—*Best Six Lantern Slides from Negatives taken at one or more of the Society's Excursions.* The winning slides to become the property of the Society. Prize, value three guineas.

Communications requiring a reply must contain a stamp and be addressed to Mr. G. H. Bedford, 127, Bute Road, Cardiff.

Note.—Exhibits will only be received on Monday 7th, and Tuesday 8th October.

Sir Edward Watkin was the client for whom Mr. Perks bought the summit of Snowdon at Tokenhouse Yard a few days ago. It is said that Sir Edward has intimated his intention of offering a site on the summit to the Royal Astronomical Society for purposes of an observatory similar to that on Ben Nevis.

Photographing a Mirage.—Mr. W. H. Irwin, of Brandon, Ont., has recently succeeded in photographing a mirage. The inverted figures of a group of surveyors standing at their instruments is seen against the foggy background. The picture is very curious.—*Wilson's Photographic Magazine.*

Patent Intelligence.

Applications for Letters Patent.

11,354. ISAAC JOEL, 68, Fleet Street, London, "Automatic Apparatus for Taking and Delivering Photographs."—July 15th.

11,416. B. J. EDWARDS, Suffolk House, Lawrence Pountney Hill, London, "Cameras and Shutters."—July 16th.

11,555. J. H. SMITH, 156, Strand, London, "Apparatus for Coating Photographic Plates."—July 19th.

Specifications Published.

12,181.—*August 23rd*, 1888. "Shutters for Photographic Cameras." ARTHUR RAYMENT, of the firm of Perken, Son, and Rayment, 99, Hatton Garden, London, Wholesale Opticians.

The inventor states that this invention relates to improvements in the arrangement and construction of shutters for photographic cameras, and will be found very suitable and advantageous for hand detective cameras, as well as for all other cameras where applicable.

The arrangement and construction of his improved mechanism is as follows:—On a framework a suitable aperture, advantageously circular, is formed opposite the lens or lens aperture, and across the plane of such aperture is moved a semi-circular piece of thin sheet metal or other suitable material, having a corresponding aperture therein, and mounted upon a centre or pin just below the aperture.

Attached to this shutter piece is a cog or toothed wheel which gears with and is actuated by a kind of quadrant or "bell-crank" having teeth on its outer curved edge, and turning upon a pin at its inner end, or centre, which latter is continued through the bottom of the camera, or case, to serve as a lever or trigger for "loading" or preparing the shutter ready for "letting off."

A suitable spring fastened to the frame at one end is at its other secured to the aforesaid "quadrant" in such a manner that the pull of the spring has a tendency to keep the shutter closed normally.

A releasing catch or trigger is provided in the form of a crank arm mounted on a pin or centre at the angle, and having one arm thereof extended in a horizontal direction with a notch or shoulder on each side of the end thereof, one of which engages a pin on the "quadrant," and so holds the shutter loaded ready for releasing—which is done by a push on the other end of the said crank—while the second shoulder can be brought into use by removing a stop, which thus allows it to engage a projecting pin on the cog wheel to hold and retain the shutter "open" as long as the pressure is kept up on the releasing push.

A spring break is provided with an exterior crank for regulating the duration of exposure by tightening the spring, and so varying the pressure of such break upon the travelling shutter or some part in connection therewith.

The foregoing description applies to a shutter constructed according to his improvements with the actuating and regulating levers and cranks brought out below; but it will be obvious that these can be placed at the top, or either side, if desired, as the shutter will work equally well in any position.

By making most of the parts of thin sheet metal, the whole of the apparatus may be made very compact in cross section, and can be arranged and mounted in or on any suitable part of a photographic camera or lens therefor.

12,340. *27th August*, 1888.—"Frames and Stands for Photographs." CARL SCHUBÖ, successor to J. P. Leonhardt, of Offenbach-on-the-Main, Germany.

This invention relates to frames and stands for photographs and other pictures, and has for its object to enable any person, without possessing any previous experience in the mounting of pictures, to place a picture in the frame or stand, and remove it again in an easy and convenient manner.

According to the said invention the frame or stand is not a firmly connected whole, but consists of two parts united by a spring hinge.

The improved stand constructed according to this invention can be made in the form of an easel. With its lower part is connected, by means of a hinge, a support which enables the stand to be put in an upright or inclined position.

A cross piece arranged on the said lower part forms a kind of channel, in which the photograph or other picture and the glass plate for covering the same are placed. The upper part of the stand, which is connected with the lower part by the spring hinge, is turned backwards when the photograph or other picture is to be mounted with a glass plate.

After the picture has been placed in the channel formed by the aforesaid cross piece, the upper part of the stand is simply released, so that it is moved back to the original position through the medium of the spring hinge, the upper edge of the picture and glass plate being covered by an upper cross piece provided on the upper part, thus giving the picture the necessary hold.

In another arrangement the upper cross piece of the frame or stand for the picture is connected with the lower part by means of two spring hinges arranged at suitable points, so that it can be turned back. The vertical frame parts are made hollow at their rear side, so that, with the cross piece to which a support is attached, a groove is formed, into which the picture and the glass plate are slid. This having been effected, the upper cross piece is released, whereupon it is caused to move back to the original position by means of the spring hinge, which completes the framing of the picture.

In frames which do not possess the cross piece for the support, he provides in the vertical frame parts, grooves into which the picture and the glass plate are slid in lieu of the said channels.

Frames and stands constructed as above described have the advantage of enabling photographs and other pictures to be mounted and dismounted by any person, and readily exchanged.

12,438.—*August 29th*, 1888. "Dark Slides for Photographic Purposes." FRANCIS BEAUCHAMP, High Cross, Tottenham, Engineer.

Improvements in dark slides. For this purpose he provides the dark slide with one or two rollers with pinions fixed thereon working into a rack; the said rollers are provided with a blind to wind up or down automatically or by hand, or a push piece which, by pressing, unrolls the blind and covers the plate, and, when released, the blind rolls up, and the plate is exposed; the said push-piece is provided with an ordinary catch or a cord to take the place of the push-piece to answer in the same manner. He sometimes uses one or two doors or flaps to open or close inside the camera. By moving a lever or button connected to the door or doors at the side of the dark slide, it enables the operator to expose or cover the plate instantaneously, thus dispensing with the inconvenience of drawing the dark slide to expose the plate, which must be done with the one now in use. This arrangement entirely prevents any light from entering the camera. The dark slide can be made to carry one, two, or more plates.

Correspondence.

PHOTOGRAPHING THE NIGHT-BLOOMING CEREUS.

SIR,—I am pleased to note in your issue of May 10th, that you have published my letter anent the Night-blooming Cereus, and received the photographs safely. I had hoped that you would have reproduced one of them to let your readers see this beautiful flower. I regret that you should have, in your comments, fallen into error by stating that the photographs were "taken after dark, some with the flashlight, and others at twilight;" whereas they were taken in the early morning, just before the sun's rays had fallen upon the flowers. The sun had risen fully an hour before I took them, but it had not come over the hill to the east of the "Briars Village." The mornings were very cloudy indeed, and I had therefore to give a rather prolonged exposure, which, on developing the plate, I found was insufficient to bring out the full details of the vine, in endeavouring to get which the flowers became very dense, and the printing consequently a matter of difficulty and delay. It would be next to impossible to take a flower after dark, except by means of the flashlight, of which I have had no experience. I have not the slightest doubt that I would be successful in getting a photograph of the flower by twilight, but not of the *vine* that bears it—indeed I consider myself very fortunate to have obtained such, as you term it, "a fine series of photographs" of that magnificent night-bloomer which adorns some of the hills and valleys of Helena's picturesque isle; where the aloes flower in rich profusion, their bulbules

sprouting on their tall spines, and dropping from thence to the ground to root therein and multiply by hundreds; where the pretty scarlet flowers of the wild geranium grow amid the prickly pear and rocks, presenting a beautiful sight to the beholders; where the moon plant, with its large, white, bell-shaped flowers, fill the ravines and country roads with a delicious odour when Luna lifts her head above the eastern hill-tops, tipping the lofty trees with her silvery light, which is frequently so bright that one can read a book of the smallest print while strolling along the roads; where the snow-white flowers of the green, broad-leafed yam, which studs the sides and beds of the many limpid streams meandering through the valleys, bloom in their spotless purity; where huge boulders and immense dykes of the most fantastic shapes are to be seen standing out in savage grandeur; and where, in fact, some of the most beautiful, romantic, and sublime scenery is to be met with. The rugged and broken nature of the ground makes landscape work, however, a by no means easy task, as will be understood when I say that on this side wooded glens ensconced low down deep ravines with far-reaching hills literally encircling them, or that yawning chasms between bare and rugged rocks rising 700 or 800 feet sheer above one, present themselves at every turn to the camera, to secure a level spot for which is the main difficulty.

I have somewhat rambled from my subject, but will briefly conclude by asking you to kindly correct the error by stating that the photographs of the "Night-blooming Cereus" sent by me were taken *in daylight*, as it might be important to amateur photographers to know that these night-bloomers can be photographed early in the morning, and thus they would be enabled to get photographs of the different kinds which grow in other climes, and so give as faithful a representation of them as can be acquired by means of photography, as results obtained in daylight are far more satisfactory than those obtained with the "flash-light" or at twilight.

With best wishes for the success of your excellent paper, from which I have gained much information, believe me to remain, yours faithfully, B. Grant.

Guardian Office, St. Helena, July 5th.

Proceedings of Societies.

Photographic Society of Great Britain.

At the monthly technical meeting held on the 23rd inst., the chair was taken by Mr. Leon Warnerke.

Some plates, developed by a new substance called eikonogen, were shown by Mr. A. Cowan. A series of developing mixtures containing, one pyro and meta-bisulphite, another ferrous oxalate, a third hydrokinone, and a fourth the new reagent, had been employed upon plates that had been exposed for equal times under a Warnerke's sensitometer. The highest numbers came out on the application of the eikonogen solution. A chloride plate printed as a transparency, and developed with eikonogen restrained with bromide, was also shown. The colour was of a warm sepia character, and the whites remarkably pure. The mixed developer did not oxidize, and could be used for several plates in succession, though towards the end, the time of development might be increased twice or threefold.

Mr. W. E. Debenham thought that although the eikonogen developed plate showed a higher number than the pyro developed one, it also looked to be rather more forced; perhaps the omission of the meta-bisulphate from the pyro solution, or a longer application of it, might have resulted in as high a sensitometer number appearing as with the eikonogen.

It having been suggested that the new developer was essentially pyrocatechin, Mr. E. Clifton remarked that the solution of the latter substance was brownish in colour; and

Mr. Cowan said that the eikonogen gave a green solution.

Mr. Chapman Jones had heard it said that eikonogen was a derivative of naphthaline.

Mr. Cowan also showed two bromide prints upon opal, one of which had been toned with gold to the point of complete substitution of the metal, so that when immersed in nitric acid diluted with an equal bulk of water, the image remained unaltered until the gelatine was dissolved. With the untoned print similarly treated, the image was immediately dissolved.

The Chairman asked whether a method for toning ordinary developed bromide prints so as to resemble albumen prints in colour was known; and not receiving a reply, said that he had accomplished it by first changing the deposit into a chloride by immersion in a solution of chloride of copper, and then, after washing, developing the print again in the light with iron, or better still, with hydroquinone. A red image could thus be obtained which might be toned with the various gold toning methods. The mixture he preferred for the purpose was that directed to be used by Obernetter, and contained sulpho-cyanide together with a small quantity of hypo. The chairman next referred to a circular which he had received from the committee of organization of the Photographic Congress to be held in Paris, and contrasted the general arrangements connected with the Congress with those made at the recent Moscow celebration. In the latter case, three hundred members had been entertained free of cost at hotels, and carriages provided to take them to various places of interest. In the case of the Paris Congress, a fee of ten francs was required from those invited to attend it, and there was a banquet, the ticket for which was charged thirty francs. The French ticket, too, spoke of the exceeding hospitality of the French nation. Coming to the programme issued by the committee of the Congress, he found that the work of the Photographic Society of Great Britain had been completely ignored. The first proposition related to a standard for unity of light, and the recommendation given was to adopt the acetate of amyl lamp for that purpose.

Mr. Arnold Spiller on the whole preferred the pentane standard. The acetate of amyl evolved acetic acid when burning, and this corroded the metal work of the lamp, which should be of porcelain throughout.

The next question in the programme was that of a unity of method for determining the sensitiveness of photographic surfaces. The plan recommended was to use paper with various shades printed upon it, a plan which did not meet with favour amongst the members.

The next question was uniformity of measuring focal length of lenses, a point which the chairman considered as unimportant, seeing that the result should be the same with all accurate methods. Next was uniformity in the mode of indicating the photometric effect of diaphragms. The standard recommended was f_{15}, which the members who spoke considered to be too high a divisor, and not so convenient as the established standard of f_{8}.

Measuring the speed of shutters was next referred to, and then came a recommendation to adopt certain sizes as standard for sensitive plates. Some of the sizes were much more nearly square than others, and it was argued by several members that there should either be one common proportion running through all the sizes, or that any particular proportion should not be confined to one size, as was the case in the recommendation of the Congress circular. On the unity in the expression of photographic formulæ, the decimal system was recommended, and Mr. T. Bolas said that for weighing out quantities the decimal system was one of the worst. If a quantity had to be divided by four, three figures were at once required, and with other divisors it was worse still. There was also a recommendation to describe all photographic processes by words which should commence with photo and end with graph. This, it was thought, would be at once cumbrous and monotonous. The last question was one relating to property in the negative, and here it was agreed by most of the members that the case would be fairly met, as far as concerns portrait negatives, by adopting what was actually the custom in this country: that the property in the negative belonged to the photographer, but that the use of it was joint with the sitter, so that it could not be printed without the consent of both parties.

Mr. Spiller referred to some photo-etchings upon flashed glass which Dr. Eder had recently shown him, and which he understood to have been produced by putting a protective photograph upon the glass, then submitting it to the action of hydrofluoric acid.

Lewes Photographic Society.

July 16th.—Meeting at the Glee Room, Cliffe, with the President in the chair.

Two new members were elected, a resolution was carried in favour of the adoption of the metric decimal system by photo-

graphers, and the Hon. Sec. was appointed the delegate to represent the Society at the forthcoming convention to be held in London in August.

The Hon. Sec., Mr. E. J. BEDFORD, then read a paper on "The Artistic Side of Photography," the paper being supplemented by a collection of photographs lent by Mr. H. P. Robinson, and other photographs by Mr. F. M. Sutcliffe and the Hon. Sec., as also by a few etchings and engravings.

Work was shown by members who had attended the excursions held on the 13th and 22nd of June. On the 13th Alfriston was visited; the party numbered eight, carrying six cameras, and thirty-five plates were exposed. On the 22nd, the members of the Brighton Society visited Lewes, and were conducted to the principal places of interest in the town, including the Castle and Priory ruins, by several members of the Lewes Society. The party numbered fourteen, and seventy-two plates were exposed by ten cameras. After tea, the party adjourned to the Glee Room, where they were met by other members and friends, to witness a lantern slide entertainment.

The next excursion will take place at Sheffield Park and Fletching on Friday, August 2nd.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE ordinary meeting of the above was held at the Club rooms, Colmore Row, on Thursday, July 18th, Mr. W. J. HARRISON, F.G.S., vice-president, in the chair.

The HON. SEC. read a letter from Mr. Geo. Bankart awarding the prize for the best picture taken during the excursion to the Shakesperian Villages to No. 9. On the sealed envelopes being opened, the winner was found to be Mr. E. C. Middleton.

Excursions were announced for the half-day to Alton Towers on August 10th, and to Stratford-on-Avon on August 24th.

The CHAIRMAN, as leader of the excursion to Warwick, read his report. It showed that thirteen members attended, and eighty-five plates were exposed; principally Ilfords and Thomas's.

Mr. G. S. SERSHALL delivered a practical and theoretical paper on "Portrait Painting as Applied to Photography," with illustrations (see page 486).

The paper for August 15th is by Mr. J. Edmonds, on "Light, Lenses, and Stops."

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.

A MEETING was held at the Studio on the 23rd inst., Mr. S. W. ALLEN in the chair, when Messrs. Daniel Jones, F. Coleridge Boles, Charles Huxtable, and E. J. Champneys Smith were elected ordinary members.

A sub-committee was formed to make certain alterations and additions to the studio; and

Mr. JOSTI intimated his intention of giving, at stated intervals, instructions in lighting and posing.

The recent excursions to Margam Abbey and Walnut Tree resulted in some first-class specimens of photographic work.

The next excursion is arranged for Barry on the 3rd of August.

Talk in the Studio.

MESSRS. MARION & CO. forward us a new catalogue which they have specially prepared for amateurs. It consists of nearly 100 pages, well arranged, neatly printed, freely illustrated, and gives, in addition to detailed particulars of their goods, several pages of useful information. We also receive from the same firm a packet of "Eikonogen," a new developer for dry plates, for which they claim certain advantages, upon which a discussion took place at the meeting of the Photographic Society on Tuesday last (see page 495).

MESSRS. SAMUEL FRY & CO. submit for our inspection their "Hawk-Eye" Detective Camera for plates 5 by 4 inches. Among its advantages for "detective" work are claimed the provision of facilities for converting it at a moment's notice into an ordinary view camera for use on the tripod; a receptacle at the back for holding four of the Blair featherweight slides; simplicity in the means of exposure in due order; a focussing arrangement with an easily read indicator, giving the means of varying the distances between object and lens from 10 to 100 feet; and adjustability of the speed of the shutter.

PHOTOGRAPHIC CLUB.—The subject for discussion at the meeting on July 31st will be a paper by Mr. C. Ray Woods, on "Photographic Experiences at the Cape." Saturday outing at Richmond; Bank holiday outing at Godalming.

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper and Carter, 5, Furnival Street, London, E.C.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

F. A. B.—Thanks for print duly received. It is an extremely interesting memento of our departed friend. The date was October 1st, 1887.

A. E. D.—Perhaps it would be best to sell the whole lot by auction at Stevens' Rooms, King Street, Covent Garden; making it known in the catalogue to whom they belonged. Or advertise in the NEWS.

G. F. W. (Erith).—It is difficult to answer your question, because all the instantaneous shutters have adjustable arrangements; even the varying tension of the elastic bands used in the simpler contrivances would influence the drop. However, the rapidity of action is easily determined, either by a tuning fork with quill pointer and smoked glass, or by an apparatus such as Wilson's shutter chronograph. As a guess, one-tenth of a second for No. 2 would be near the mark.

F. G. S.—The report of the Robert Hunt Memorial Fund has just been issued. The total amount raised is £632, which is to be spent in the erection of a Memorial Museum at Redruth, Cornwall, trusting to local subscriptions to cover any deficiency in furnishing the building. The work is already begun, and Sir W. W. Smyth has inspected the site, seen the stone, "Carharrack Elvan, with dressings of granite," and approved the plans on the part of the committee. The treasurer is J. Way, M.D., and honorary secretary Arthur G. Phillips, F.C.S., of the Royal School of Mines, Jermyn Street, S.W.

ASTRO.—The clearest account we can find of a process for silvering glass specula is that given in the Appendix to Mr. John Browning's pamphlet, dated 1867; the materials used are nitrate of silver, ammonia, purest (alcoholic) potash, and milk sugar. The cost of silvering an 8-inch speculum is stated to be 9d., and time occupied about an hour.

L. M. (Jersey).—The paragraph in our contemporary is surely ironical—citric acid would be a curious addition to a fixing bath, whether composed of hypo, cyanide, or sulphocyanide. No wonder, then, that the images were observed to fade out entirely in six months!

FIELD WORK.—The walking-stick camera stand seems to lack one important power of adjustment by reason of the tripod being made so uncommonly short for convenience of portability. It will only stand well on flat ground, and then the guy-ropes are under equal tension; but tilted over ever so little, the strain would no longer be fairly distributed. To meet this defect it is proposed to block up nearly level with stones, if they can be found on the spot.

TYRO.—To convert grains per fluid ounce into grammes per litre, you have only to multiply the number of grains by 2·3; or for per centage proportions (*i.e.*, grammes in 100 c.c.) you take of course one-tenth this number, or ·23, as your multiplier. For "thiocyanides," in our answer last week, read "thiocyanates."

A. T.—There are grounds for supposing that the process mentioned in your letter may be considered to some extent an infringement of the patentee's original claim, and it may be that the inventor is taking steps to assert his rights; but we do not know for certain that this is actually the fact at the present time.

C. N. W.—The *Chemical News* of last week has a whole-plate illustration showing the spectra, to scale, of several rare earths. These formed the subject of the late President's Address.

WORRIED.—Blisters may often be prevented by putting a little common salt into the first wash-water, so as to raise its specific gravity more nearly to that of the fixing solution, whereby an inrush of clear water is avoided on such immersion.

G. W. & S.—The address of Messrs. Dawson is the Typographic Etching Company, Hogarth Works, Chiswick, S.W.

R. J. (Royston).—We regret to say that a long search through various chemical papers and exhibition reports fails to indicate the address of M. Ch. Guignet. Possibly, it may be found in 1858 specification of the patent for Guignet's green; but as that is so far back, you had better enquire of M. Gariel, secretary of the French Association for the Advancement of Science, 4, Rue Antoine Bubois, Paris; or of the secretary of the Academie des Sciences, Paris. The paper recently published in the *Comptes Rendus* would not be likely to give the address of the eminent author.

W. H. H. C. (St. Louis).—We are sending you a copy of the NEWS for December 9th, 1881, the other two numbers containing M. Leon Vidal's letters being out of print. These we will extract and send you in manuscript.

A. H. C.—Answered by post.

THE PHOTOGRAPHIC NEWS.

VOL. XXXIII. No. 1613.—*August* 2, 1889.

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THE INTERNATIONAL PHOTOGRAPHIC CONGRESS.

THE International Photographic Congress about to be held in Paris under the auspices of the French Government and the authorities of the Paris Exhibition, has been established on the model of various other international congresses to be held in the same city while the world's show is open. An organising committee was appointed, including some of the most honoured names connected with photography in France, such as Edmund Becquerel, Dr. Janssen, M. Albert Londe, M. A. Davanne, and a score or more besides. The Minister of Commerce and Industry invited various foreign photographers residing in different countries throughout the world to attend and to act as honorary members of the managing committee; for instance, those invited from Great Britain included the Astronomer-Royal, Captain Abney, Sir Howard Grubb, Dr. William Huggins, Mr. James Glaisher, Mr. John Spiller, Mr. A. Common, and several others; Dr. J. M. Eder was among those invited from Austria, Dr. H. W. Vogel from Berlin, Mr. Carey Lea from the United States, Mr W. K. Burton from Japan, and so on. The chief object of the Congress is the selection and recommendation for international adoption of certain standards in photography, and in order that the Congress, when it meets, shall have definite proposals previously drawn up for its consideration, a number of committees composed of good scientific men has been sitting in Paris, to draw up such suggestions; in this way was born into the world Colonel Sebert's report on a fixed unit of light for photography, published in these pages to-day.

One recommendation in that report is excellent, namely, that the pear-oil or acetate of amyl lamp shall be brought into general use as the basis of a standard light in photography. Captain Abney recommended this some years ago, but, like his first suggestion of the use of quinol as a developer, the recommendation met little or no practical attention. The advantage of the pear-oil lamp of Hefner Alteneck is that it is small, simple, and should be cheap, yet so efficient that it has been a question whether it ought not to supplant all the standard gas flames and complicated apparatus connected therewith, which various experts are recommending to the British Government, to give standard lights for testing the illuminating power of the gas sold to the public by the gas companies. One authority says that the only objection to the pear-oil lamp for the purpose is, that it gives slightly too yellow a flame to permit accurate comparison with the light given by common gas. The French committee suggests furthermore, that the light of only a portion of the brightest part of the flame shall be used, a kind of Methven screen with its orifice being interposed. Under these circumstances we should not be surprised if one of the volatile paraffins could not be burnt in the lamp, yet give a practically uniform light, thus doing away with one objection incidental to acetate of amyl, namely, that in its burning acetic acid is given off, and the acid in time attacks ordinary metal work. The pear-oil flame would at once be a great improvement upon the luminous tablet of Warnerke's sensitometers, for these tablets, when excited, have sometimes differed so much in brightness, that the defect was visible to the eye, as proved on one occasion at a public meeting. Mr. Warnerke's ingenious little instrument has been of great use in its day, but that day is probably nearly over, and perhaps the standard instrument of the future for testing the rapidity of plates will be some combination of the pear-oil lamp with Mr. Spurge's perforated sensitometer screen. Capt. Abney is well informed as to the value of Mr. Spurge's sensitometer, an instrument which probably will have to be well examined and considered by the Congress ere it can complete its work efficiently.

A FIXED UNIT OF LIGHT FOR PHOTOGRAPHY.

COLONEL SEBERT'S REPORT.*

I.—The introduction into photography of a fixed unit of light is of special interest for the solution of various questions, such as the appreciation of luminous intensity in photographic operations, and the determination of the sensitiveness of photographic preparations.

The luminous source produced by a surface measuring one square centimetre, of incandescent platinum at the moment of solidification having been adopted by physicists as the unit of light, in consequence of the propositions set forth by M. Violle at the Electrical Congress in 1881, it is convenient that the standard of light to be adopted for photographic purposes shall bear a relation to this unit†.

To apply to the qualities which obtain more particularly in photography, the comparison should be made with those rays which exert the greatest chemical action.

It follows that the relation of the intensities of the two luminous sources shall be determined by spectrophotometric methods, and that, in making the comparison, those regions shall be used near the line G in the blue of the spectrum.‡

This research should be confided to a special commission in continuation of the work of the Congress, after the latter has chosen the practical unit of light to be adopted.

* This is the report of the committee drawn up for the consideration of the forthcoming International Photographic Congress at Paris. The members of this committee consisted of Messrs. Edmund Becquerel, Cornu, Paul Henry, Londe, Adolphe Martin, Peligot, Sebert, Vidal, and the members of the bureau—namely, Messrs. Janssen, Wolf, Davanne, and Pector.

† See *La Lumière Electrique*, vol. xiv., 1884, p. 475, and vol. xxvii., 1888, p. 618.

‡ See the *Annals de Physique et de Chimie*, second series, vol. xxix., 1883, p. 556, Crova: Description of a spectrophotometer.

This choice should be subordinate to the practical problems to be resolved, notably for measuring luminous intensity for photographic purposes, and for testing the sensitiveness of plates.

II.—As to testing the sensitiveness of plates, the special committee charged with studying this question will bring forward a proposition that the measurement shall be made by the longer or shorter time necessary to obtain—after direct exposure to the standard light and development in a stated way—an image of a grey tint and normal tone easy to define and to reproduce.

For the gelatino-bromide plates now employed, and to render more easy the measurement of the time of exposure, it will recommend the employment of a feeble luminous source, such as the light passing through an orifice of one-fifth of a square centimètre, pierced in a screen placed before a flame analogous to that of an ordinary candle.

To avoid variations incidental to candles, because of their mode of manufacture and the nature of their wicks, and to remove the practical difficulties due to oscillations and variations in the height of the flame, the committee recommend the employment of lamps without exterior wick and burning volatile essence; and it is of opinion that a practical standard is the acetate of amyl lamp, which has given favourable experimental results for some years past, and has the advantage of burning a liquid which can easily be obtained in a state of purity.*

It is then the luminous intensity of a determined portion of the surface of the flame given by an acetate of amyl lamp—as transmitted through an orifice in a suitable screen—which should bear a definite measured relation to the Violle standard, in the part of the spectrum near the ray G, which is recommended as the practical standard for testing the sensitiveness of plates.

In accordance with the view of the committee charged with studying the mode of measuring the sensitiveness of plates, the relative value should, meanwhile, be ascertained of the luminous intensity of the flame of the Etoile candle, over a surface reduced to the same area by means of a screen.

III.—In the matter of the appreciation of luminous intensity in photographic operations, it is necessary to renounce all methods of measuring this intensity by means of standard sensitive surfaces with the intermediary use of any photographic apparatus whatever, because then one can only obtain a measure which will be a function of the nature of the substance employed, combined with that of the apparatus used.

It is equally inadmissible to estimate the luminous intensity of the image formed upon the ground glass of any given camera, because this intensity will be a function of the particular apparatus employed, and not alone of the real illumination of the object considered independently of the means of obtaining its photographic reproduction.

Processes based upon the measure of this intensity of the image, will always rest upon the disposition of photographers who wish to ascertain the result they will finally obtain with particular apparatus under determined conditions.

It becomes necessary then to seek for a measure of the luminous intensity itself, but from the special point of view of its photographic action, and it is necessary also to state that that which should be sought to be determined is the intensity of the light coming from the objects themselves which are to be photographed, and not the diffused light—that is to say, following an idea recently introduced in consequence of the works of M. Mascart,† the determination to be effected is that of the light proper of the objects due to their method of illumination, these objects not shining by their own light, at least in most cases under which photographs are taken.

* See notably *La Lumière Electrique*, vol. xxvii., 1888, p. 414.

† See the *Bulletin* of the International Society of Electricians, or the journal *La Lumière Electrique*, vol. xxviii., 1888, p. 180.

As photographers may wish to know the amount of light coming from particular parts of the objects to be photographed, which may be of various colours, it will be useful to give them the means of ascertaining the true luminosity of the coloured parts, at least, of those colours which are strongly differentiated, such, for example, as blue, green, and red.

The solution of the problem seems to be found in the employment of a portable photometer, analogous to that used by M. Mascart to measure amounts of illumination, but which can be completed by the addition of a lens throwing an image of the object to be photographed, or the part of the object specially required, this image being thrown by the side of that given by the adopted standard of light.

Glasses coloured blue, green, and red, resembling those of which M. Lippmann has made use in his recent researches on obtaining photographs in true values,* will be interposed in the paths of the rays from the two sources, following the tint of the objects to be photographed, if it be desired to ascertain the proper effect of parts diversely coloured.

The luminous source will be, as in the Mascart photometer, given by a standard lamp, the rays from which traverse a plate of ground glass and a lens, and which give an image the intensity of which can be diminished at will by means of a screen with a variable aperture.

Under these conditions, this luminous source may also be the flame of the acetate of amyl lamp, either used in its entirety under the conditions indicated by M. Heffner Alteneckt, or better still limited as to its maximum by a standard opening in a fixed screen, which, under the circumstances, will doubtless be of one square centimetre.

IV.—In conclusion, for the two principal objects which photographers have in view, the acetate of amyl lamp appears to be the best to adopt as a standard of light for photographic purposes, and the intensity of this flame limited by a screen with a surface well determined, can conveniently be compared with the standard of light given by incandescent platinum, making the comparison in the region of the spectrum near the line G.

One should also make use, in the measurements, of prisms and lenses made of the glasses ordinarily used in photographic optics, to bring the matter under the ordinary conditions of photographic apparatus in common use.

* See the *Comptes Rendus* of the Academy of Sciences, meeting of April 29th, 1889.

† See *La Lumière Electrique*, vol. xxviii., 1888, p. 414, and vol. xxxi., 1888, p. 109.

Mr. and Mrs. Pumphrey's garden party to the members of the Bath Photographic Society took place on Tuesday, the 23rd inst., and was well attended, considering the unsettled state of the weather. The company inspected the various places of scientific interest erected by the president, and the tastefully arranged grounds. Owing to the frequency of showers, shelter was occasionally taken in some of the many retreats, in all of which the host and hostess had amply provided refreshments. The services of a string band added to the general enjoyment.

The Japan Photographic Society.—There are, already, nearly sixty members connected with the Photographic Society of Japan, of whom very nearly one half are Japanese. A few professional photographers are included, but the great majority are amateurs. His Excellency Viscount Enomoto, Minister of Education for Japan, has been elected President. The Vice-Presidents are Professor D. Kikuchi, M.A., Cantab., Director of the College of Science, Imperial University, and Dr. W. S. Bigelow; the Secretaries are Professors H. Ishikawa, and W. K. Burton; and the Treasurer is Mr. T. Asanuma, of Honcho, Tokio. These are all ex-officio members of the Committee, and besides them there are Professor C. D. West, and Mr. Kajima Masanosuke. All communications concerning the Society should be directed either to Mr. Ishikawa, at No. 5, Minami Nabecho, Ichome, Tokio, or to Mr. W. K. Burton, College of Engineering, Imperial University, Tokio.

TECHNICAL SUBJECTS IN THE DAILY PRESS.

The *Century* calls attention to the decline of the influence of leading articles in the daily newspapers, and to the general incompetence of the writers to deal with scientific subjects; the *Railroad Gazette* and the *Engineer* have joined in the cry, and there is every reason why the photographic journals should add their voice, since the ignorance of the daily newspapers can be played upon and made to innocently introduce swindles to the general public. Even in dealing with their own special subjects the daily newspapers are losing influence, since so many of them now represent not public opinion, and anything but the public interests; they promulgate rather the opinions of London clubs and of the particular lawyers or other good men who write the anonymous articles. After saying that editorials have not the influence of twenty years ago, and that there must be a change in method, the *Century* writer pleads for editorial writing based upon real knowledge of the matter discussed, and instances the longshoremen's strike not long ago, upon which no daily paper published an opinion specially formed through accurate knowledge. There is no need to go back to that strike for an illustration. "Every week," says the *Engineer*, "in the majority of daily papers may be found the crudest opinions upon railroads and transportation. Misstatements of facts and misjudgments upon railroad news are mixed with glittering generalities which have no meaning at all applicable to the case. And all this is gravely printed as editorial opinion. The question often occurs to us why our great journals do not employ specially qualified writers in dealing with such a complicated yet immensely important industry as railroading, one which affects the interest of merchant and investor as does no other. 'The decline of the editorial' may be traced to this ignorance of great subjects discussed. Writing for space will no longer answer."

CHAPTERS ON ELEMENTARY PHOTOGRAPHY.*

BY W. M. ASHMAN.

It has been pretty generally admitted that the wet collodion process, when in skilled hands, is, *par excellence*, the process for transparency work, an opinion also held by the present writer; but it should be pointed out that if the results are superior as to delicacy, the chances of failure are greater than with some other methods. There is no room in which to enter into very full details, but, as the old collodion process has not been touched upon in these chapters, an outline may prove to be instructive to some of our readers. The camera must be employed and the negative placed where it will be illuminated by a mirror, as in enlarging—see previous chapters—gelatine side next to the lens, and the usual precautions taken to avoid any light reaching the prepared plate except that which actually forms the image. Take a glass plate polished with a clean cloth and methylated alcohol. It is clean when, after breathing upon, it dries off evenly. If the edges of the plate are not roughed with a file, it is better to coat a quarter of an inch all round with a weak solution of india-rubber in benzole by means of a brush, or with a one to four solution of beaten white of egg. When dry, brush the plate with a broad camel hair brush, and coat it evenly with a bromo-iodized collodion, in the same fashion as that recommended in varnishing. Remove to dark room with yellow light. When the bottom corner has just set, not later, drop it, collodion side up, into a glass dish containing the silver bath, or into a proper dipping bath by means of the dipper. For preparation of bath see "Year-Book of Photography," page 185, 1888. Let it remain there, rocked, or moved about by the dipper, for three minutes, remove it, drain off excess on blotting paper, and insert in dark slide, which should be of that description suitable for wet work, and not one with merely plain blackened wood rabbets. Varnishing the wood will make it available temporarily. Expose about a minute in a good light, using a medium stop, and a portrait lens of long enough focus; develop with ferrous sulphate, see Year-Book as above, watch the image appearing and, as with other plates, wash off quickly before high lights are all touched; fix in dilute solution of potassium cyanide, and wash again briefly. If the image is very weak it may need intensifying with mercuric chloride followed by sodium sulphite, as described in a previous chapter, but generally it is enough to tone it with a one-grain solution of chloride of gold rendered alkaline by a grain of sodium bicarbonate. A little of the ordinary toning bath for silver prints will answer, if a few drops of gold solution be added to it; keep the plate in until it is black throughout, and intensification is gained at the same time as colour. Dry, and varnish. When all is in readiness, as many as ten or twelve in an hour can be done without much difficulty, once focussing answering for any number of negatives. A favourite process is that before referred to as exhibiting a remarkably fine grain, suitable for enlargement upon a very wide disc. It is called collodio-chloride for development. The pictures produced are of an ivory black, and it can be employed for printing by contact, or for reduction from larger negatives by means of the camera and reflected transmitted light. The manufacture of the emulsion is very simple, and similar to that of collodio-bromide. A formula given by Capt. Abney has worked well in our hands, so we give a brief, practical, working description of the same. Dissolve twenty grains of calcium chloride in half an ounce of strong alcohol (not methylated) by means of gentle heat. Put five grains of easily soluble pyroxyline in a 2-ounce bottle, and pour the above solution upon it. In a few minutes, add to this half an ounce of ether, and shake. Next dissolve fifty grains of silver nitrate in the smallest quantity of water in a test tube, and add to one ounce of boiling alcohol as above: pour this into a 4-ounce bottle in which ten grains of pyroxyline has been placed; then add one ounce of ether, little by little, with continuous shaking. Never mind if a little silver crystallizes out. Take these two bottles into the dark room (yellow light) and pour gradually the calcium chloride collodion into the silver nitrate collodion, and shake between each addition. Coat a plate edged with india-rubber solution, wash, and test by exposing half of it for a second to white light, then develop in order to ascertain whether the protected half shows any signs of fogging. Should this occur, it can generally be cured by adding to the emulsion three or four drops of an alcoholic solution of either chloride of copper or chloride of gold. For immediate use in the camera such plates need only be well washed as soon as the collodion has set, and exposed wet. To make dry plates of them—after washing—they are just flooded once with a solution consisting of beer five ounces, white sugar one moderate lump, pyrogallol five grains, and then dried. Such plates will keep for a short time, and should be quicker than those made with collodio-bromide emulsion, which will be referred to further on. The developer is a very simple one, and recommended by the designer of the formula. Ferrous oxalate, in the form of a yellow powder, can be obtained at any dealer's. It is insoluble in water. Potassium citrate is also to be had at any druggist's. To each ounce of water dissolve from fifty to one hundred grains of the potassium salt by gentle heat, adding the ferrous oxalate twenty to twenty-five grains, which will dissolve and form a reddish-brown solution, which is very active as a developer, and does not require any restrainer. Preserved and dried plates must be well rinsed under the tap before being immersed in a dish containing the developer. With care the developer can be economised by pouring a little over the plates instead of covering them with it in a dish, but it is more difficult to avoid lines and

* Continued from page 485.

markings. Fix in hypo. If a warm tint be required they can be toned in a dish with a solution consisting of

Uranium nitrate	10 grains
Potassium ferricyanide	10 ,,
Water	10 ounces
Gold chloride	½ grain

In this they will warm up and become at last a chocolate colour. Another available developer is hydroquinone and ammonia carbonate.

In addition to those named, there are other processes which are much used for this class of work, but to detail them all would necessitate several articles. Mention should, however, be made of the albumen process, which, though very slow, is noted for its structureless film. A polished glass plate is coated with a solution of potassium iodide in albumen. One ounce of the latter is beaten well, and two grains of the salt are added. When settled, the clear solution is used. It is sensitized in a silver nitrate bath acidified with acetic acid ; the plate is then washed, and dried spontaneously. The printing is done by contact, and the time taken is about ten minutes in a dull light. To develop, two solutions are prepared.

No. 1.—Pyrogallol	2 grains
Citric acid	3 ,,
Distilled water	1 ounce
No. 2.—Silver nitrate	20 grains
Citric acid	30 ,,
Distilled water	1 ounce

Begin with No. 1, adding a few drops of No. 2 as it progresses and the detail is wanted. Fix in hypo and well wash. Toning can be done by mercuric chloride, followed by a ten-per-cent. solution of ammonia, or dilute potassium sulphide.

For those who like to have a great variety of tones without much trouble, from black to almost ruby colour, the gelatine chloride plates are available. They are rather slow, but easy of manipulation for contact printing. Full instructions are issued by the makers. When the preference is given to the colour of an ordinary silver print, the process previously described as citro-gelatino-chloride for printing out, can be employed. Much praise has been accorded to transparencies produced by that process known as collodio-bromide, and those who are desirous of becoming proficient therein, cannot do better than read up the subject in the writings of W. B. Bolton. The following epitomized outline will enable the tyro to judge how far it may suit him. Plain normal collodion is bromised by the addition of an alcoholic solution of a bromide. After the mixture is complete, silver nitrate is introduced, and the whole well shaken. The emulsion thus made is poured into a dish in the dark room to set, and is then cut up and well washed and dried by means of alcohol. It is then re-dissolved in ether and alcohol to a proper consistency. Plates previously prepared with edges of rubber solution are coated thinly and dried in the dark. Exposure is longer than that of wet collodion, or collodio-chloride, and development is effected by pouring upon the levelled plate a solution of alkaline pyrogallol. When the image is out it is fixed in hypo, well washed, dried, and varnished. The preparation of slides by that known as the Woodbury process will be referred to when the leading mechanical methods in pigmented gelatine and ordinary printer's ink are considered.

Celestial Photography.—The chief value and advantage of Miss Bruce's splendid gift to Harvard College Observatory lies in the fact that the lens of the telescope is a compound one of the portrait form. It seems almost needless to point out the enormous advantage conferred by so short a focussed lens in photographing very faint stars and nebula, to say nothing of the greatly extended area of the heavens susceptible of being photographed at once. In fact, each 13 in. plate would cover 5° square of the sky, on a scale of 1′ to ·0394 of an inch ; so that about 2,000 such plates would take in the entire heavens.—*English Mechanic.*

ORTHOCHROMATIC PHOTOGRAPHY.*

BY C. H. BOTHAMLEY, F.I.C., F.C.S.

Reactions.—The various eosin dyes may be recognised and distinguished by their colour, fluorescence, and absorption spectra. They are not affected by alkalies unless the latter are highly concentrated ; but they give with acids a flocculent orange red, reddish brown, or reddish purple precipitate, which readily re-dissolves in alkalies, and also dissolves on adding alcohol. Excess of a soluble silver or lead salt added to an aqueous solution of a salt of an eosin gives a precipitate of the silver or lead eosin, soluble in alcohol. The eosins and their salts dissolve in strong sulphuric acid, forming a pale reddish-brown solution ; but if this is diluted with water, a turbid brownish-red liquid is obtained, and the original colour is not restored (compare quinoline red, p. 180).

The following eosins will be briefly described and their trade names and the anomalies presented by them will afterwards be considered :—

Tetrabromfluorescein (eosin) ...	$C_{20}H_6Br_4O_3(OH)_2$
Dibromdinitrofluorescein (safrosin)	$C_{20}H_6(NO_2)_2Br_2O_3(OH)_2$
Methyl eosin	$C_{20}H_6Br_4O_3(OCH_3)(OH)$
Ethyl eosin	$C_{20}H_6Br_4O_3(OC_2H_5)(OH)$
Dichlortetrabromfluorescein (phloxin)	$C_{20}H_4Cl_2Br_4O_3(OH)_2$
Methyl dichlortetrabromfluorescein (cyanosin)	$C_{20}H_4Cl_2Br_4O_3(OCH_3)(OH)$
Tetrachlortetrabromfluorescein ...	$C_{20}H_2Cl_4Br_4O_3(OH)_2$
Tetraiodofluorescein (erythrosin)...	$C_{20}H_6I_4O_3(OH)_2$
Dichlortetraiodofluorescein (rose Bengal)	$C_{20}H_4Cl_2I_4O_3(OH)_2$
Tetrachlortetraiodofluorescein ...	$C_{20}H_2Cl_4I_4O_3(OH)_2$

Eosin is obtained by treating fluoresceiu with the requisite quantity of bromiuc in presence of alcohol or acetic acid, or by dissolving the bromine in caustic soda, boiling the liquid for some time, and then addiug the fluoresceiu and acidifying. The crude product can be purified by recrystallisation, and is converted into the sodium or potassium salt by treatment with the corresponding hydroxide or carbonate. It comes into commerce as the sodium or potassium salt, in the form of a reddish-brown powder, or in small red crystals with a bluish green metallic lustre. It can be obtaiued in well defined crystals, containing a definite amount of water of crystallisation (usually five or six molecules), or of alcohol of crystallisation, but the proportion of water in the commercial product is variable. Ordinary eosin—*i.e.*, the sodium or potassium salt—is readily soluble in water, 2·6 parts of the latter dissolving 1 part of eosin. It is somewhat less soluble in dilute alcohol, and much less soluble in absolute alcohol. The aqueous solution shows a strong yellowish green fluorescence, and the alcoholic solution, which is yellower in colour, shows a much stronger greenish yellow fluorescence. From the aqueous solutions acids throw down free eosin in the form of a flocculent orange red precipitate, which readily redissolves on adding an excess of alkali.

Methyl Eosin or *Erythrin* is obtained from ordinary eosin by treating it with an alcoholic solution of methyl bromide, or by heating it with methyl alcohol and sulphuric acid. It owes its name to the fact that it contains the radicle methyl in place of one of the atoms of hydrogen. It usually comes into commerce in the form of a sodium or potassium salt, and differs from eosin in that in one of the hydroxyl groups hydrogen has been replaced by methyl, and in the other by sodium or potassium, whilst in eosin the hydrogen in both hydroxyl groups is replaced by a metal. Methyl eosin is sometimes met with in the form of a dark, red-brown powder, and also frequently in small crystals with a green metallic lustre. It is only slightly soluble in cold water, but dissolves more readily in hot water, and is much more soluble in alcohol. It is, in fact, sometimes known as "spirit soluble" eosin. The fluorescence of aqueous and alcoholic solutions is very similar to

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* Continued from page 485.

that of eosin, but the colour of the solutions is distinctly bluer in tint.

Ethyl Eosin differs from methyl eosin in containing the radicle ethyl in place of methyl. In appearance and properties it is almost identical with methyl eosin, but its solutions have a slightly bluer tint. It is obtained by the action of ethyl bromide on ordinary eosin, by heating eosin with alcohol and sulphuric acid, or by the action of bromine on a hot alcoholic solution of fluorescein.

Safrosin differs from eosin by containing only two atoms of bromine instead of four, but it also contains two nitroxyl groups. (See formulæ on p. 427.) It is prepared by the action of nitric acid on dibrom-fluorescein, by the action of bromine on dinitro-fluorescein, or by the action of sodium nitrate and sulphuric acid on eosin. It occurs usually as the potassium or sodium salt in the form of a brown-red crystalline powder, the crystals having a green metallic lustre. The potassium or sodium salt dissolves readily in the water, forming a yellowish crimson solution with a feeble green fluorescence. It also dissolves readily in alcohol, yielding a solution which is yellower in colour and has a much more intense fluorescence. This fluorescence has a decidedly greener tinge than the fluorescence of eosin, methyl eosin, or ethyl eosine. The addition of a mineral acid to the aqueous solution precipitates free safrosin as a flocculent browuish red precipitate, readily soluble in alkalies.

Phloxin differs from eosin in that two of the atoms of hydrogen in the phthalic anhydride residue have been replaced by chlorine (see p. 427), and it therefore contains two atoms of chlorine and four atoms of bromine. In order to prepare this dye, dichlorophthalic anhydride is treated with resorcinol, and the dichlorfluoresceiu thus obtained is treated with bromine in the same way as in the manufacture of eosin. The product is dichlortetrabromfluorescein, or phloxin. The sodium or potassium salt, in which form it comes into commerce, is a red-brown powder which dissolves in water, and yields a cherry-red solution with a feeble yellowish-green fluorescence. It is also soluble in alcoholic, and this solution shows a more intense fluorescence. Acids produce in the aqueous solution a brownish-orange precipitate of free phloxin, readily soluble in alkalies.

Cyanosin, or methyl-phloxin, stands in the same relation to phloxin as methyl-eosin does to eosin, *i.e.*, the atom of hydrogen in one of the hydroxyl groups has been replaced by the radicle methyl. Its preparatiou from phloxin resembles the preparation of methyl-eosin from eosin. Its potassium or sodium salt forms a brownish red powder which is insoluble in cold water and only slightly soluble in boiling water, but dissolves readily in dilute alcohol, forming a bluish red solution with a reddish yellow fluorescence.

Tetrachlortetrabromfluorescein, commonly known as erythrosin B, differs from eosin in that all the hydrogen in the phthalic anhydride residue has been replaced by chlorine, and it therefore contains four atoms of chlorine, and four atoms of bromine. Tetrachlorphthalic anhydride is treated with resorcinol, and the tetrachlortluorescein thus obtained is treated with bromiue, as in the preparation of eosin. The sodium or potassium salt forms a brick-red powder which dissolves readily in water and gives a crimson red solution with a feeble greenish fluorescence. It also dissolves in alcohol, and the alcoholic solution is somewhat bluer in tint, and shows a brilliant reddish yellow fluorescence almost free from the green tinge which is seen in the fluorescence of other eosiu derivatives. When the aqueous solution is acidified, a red flocculent precipitate of the free phthalein is thrown down; it readily redissolves on adding excess of an alkali. Erythrosin B somewhat closely resembles quinoline red in the colour and fluorescence of its alcoholic solution (p. 180).

Erythrosin differs from the preceding compouuds iu containing iodine instead of bromine. It is prepared by adding fluorescein to a solution of the requisite quantity of iodine in caustic soda, and then acidifying the mixture. Free erythrosin is precipitated and, after purification, converted into the sodium or potassium salt. These salts constitute the ordinary erythrosin of commerce. They form brown powders readily soluble in water, with production of a yellowish crimson solution, which shows no fluorescence. They also dissolve readily in dilute alcohol, but are less soluble in absolute alcohol. When the aqueous solution is acidified, free erythrosin is thrown down as a flocculent orange-red precipitate, which re-dissolves immediately on adding an excess of an alkali.

Rose Bengal stands in the same relation to erythrosin as phloxin does to eosin; in other words, it is erythrosin in which two of the atoms of hydrogen in the phthalic anhydride residue have been replaced by chlorine (see p. 427). Its alkali salts form a brown powder which dissolves readily in water and yields a cherry-red solution showing no fluorescence. The colour of this solution is distinctly bluer in tint than the colour of a solution of erythrosin. Rose Bengal also dissolves in alcohol. When the aqueous solution is acidified, a brown red precipitate of free rose Bengal is obtained, and is readily soluble in alkalies.

Tetrachlortetraiodofluorescein is also sometimes called rose Bengal. In this compound all the hydrogen of the phthalic anhydride residue has been replaced by chlorine. Its alkali salts form brown red powders which dissolve in water or in alcohol, producing bluish crimson solutions which show no fluorescence. If the aqueous solution is acidified, a brownish red precipitate is obtained readily soluble in alkalies.

(*To be continued.*)

PHOTOGRAPHIC OPTICS.*

BY W. K. BURTON.

Chapter V. (*continued.*)

Dallmeyer's Diffusion of Focus Portrait Lens.—The use of *diffusion of focus* has been so far pointed out under that heading that it is enough here to further point out that it is more likely to be of use in the case of the portrait lens than in that of any other, and to illustrate the very ingenious arrangement whereby Dallmeyer has contrived to construct a lens in which it is optional to have it or not.

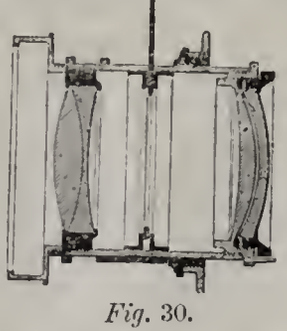


Fig. 30.

It will be seen that in this lens the positions of the two glasses forming the posterior element or combination is reversed. Further than this, they are so arranged that the posterior lens can have its position, with regard to the other of the posterior element, altered without disturbing the rest of the instrument. The adjustment is made by screwing the lens backwards or forwards. When it is screwed home as far as it will go, spherical aberration is reduced to a minimum; as it is unscrewed spherical aberration is increased till the desired degree of "diffusion" is obtained.

The New Steinheil Portrait Lens.—Recently Steinheil introduced a portrait lens which is as great a departure from anything that had been done before as is his rapid landscape lens. I here give an illustration of this lens.

The writer has himself had no experience of the working of this lens; he has, however, heard it well spoken of.

* Continued from p. 491.

The following is what Debenham says of it: "Astigmatism has been wonderfully got rid of, but there is an amount of curvature of field which renders it unfit for

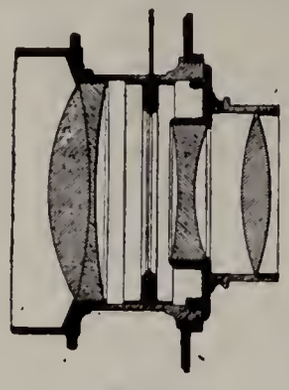


Fig. 31.

working on a large field, for which, however, it is not intended. The construction of the lens is such that the illumination of the plate is more even than with the ordinary form of portrait lens."

Voigtlander's and Dallmeyer's New Portrait Lenses.—This lens, which was introduced as lately as the end of 1886, has already been mentioned. It is simply a lens of the type of the common rapid symmetrical or rapid rectilinear—Steinheil's old aplanatic, in fact—but with the aperture greatly increased. This involves no new principle, but is nevertheless a great triumph of optical skill. It is unnecessary to illustrate the lens here, as the general form of it will be gathered by looking at the cut, showing the lenses just mentioned.

The chief advantages of the lens over those of the Petzval form is that the back combination being cemented as well as the front, there are two fewer reflecting surfaces. It may be well here to point out that the disadvantage of reflecting surfaces does not lie in the actual loss of light, which is trifling, but in the fact that a part of the light so lost is thrown into the camera in the form of diffused light, tending to reduce the crispness of the image, if not actually to produce fog, also distinctly reducing the latitude of exposure. A portion of all light reflected from all surfaces except the first which the light strikes is re-reflected from all surfaces anterior to that surface, and finds its way—or part of it does—into the camera in the form of diffused light.

The Uses of the Portrait Lens.—The portrait lens should only be used where shortness of exposure is the first object. Its usefulness has naturally been reduced as films have become more rapid, and still more as the rapidity of the landscape form of lens has been increased, till it may be said that the portrait lens has almost ceased to be a necessity for any kind of work; specially is this to be said of large sized lenses. With these the depth of focus, if full aperture be used, is so slight that they can scarcely be used except with a stop which makes them as slow as a rapid landscape lens of modern type, and even slower, in which case the landscape lens would be found to be a superior instrument. Still there are circumstances in which a moderate sized portrait lens—say one of 12-inch focus or so—is very useful. Such a lens is really about the largest that can be used with full aperture with any freedom. It will serve for plates of any size up to 6½ by 4¾, and will be found useful in the studio in very dull weather, or at all times when portraiture is attempted in an ordinary room.

It should be said that there are cases where a portrait lens may be useful for instantaneous work. For most instantaneous work rapid landscape lenses are quite rapid enough, but there are cases where it is desirable to give "instantaneous" exposures with dull subjects, or where the exposures have to be extraordinarily short. The best example of the latter is the marvellous work done by Muybridge, in photographing animals in motion, the exposures being said to be as short $\frac{1}{2000}$ part of a second. For such work the most rapid portrait lens will not be found to be too quick. It will, however, be found impossible to use only small plates and short focus lenses. Probably for work of the kinds mentioned the best results will be got with "lantern size plates" (3¼ in. by 3¼ in.), and a lens of about six inches focus.

The common aperture of the portrait lens is f, or somewhat over. Specially rapid lenses have been made with apertures nearly as great as $\frac{f}{3}$. I am not aware that this aperture has actually been reached, but there could be little doubt that, were opticians of the present day to set their minds on such a lens, it could be produced. The time has, however, passed when it would be of any use.

The Group or Universal Lens.—A lens of the portrait form, but of about half the rapidity of the ordinary portrait lens, has been greatly used, where a lens of rapidity between the portrait and the rapid landscape was desired. It was sold under such names as the above. Since the recent increase in the rapidity of rapid landscape lenses, the group lens has in great measure lost its place as a really useful instrument, and it will probably before long become obsolete.

The Use of One of the Combinations of a Doublet Lens.—In the case of most of the lenses of the "rapid" or "wide angle" type, either the back or the front combination may be used alone, the other being increased, where a "single lens" of long focus will be of use. Where the lens is "symmetrical" in the sense of having the two combinations similar, the focal length of one combination will be about twice that of the two. As the combinations of a doublet are not specially constructed to be used as single lenses, it is generally necessary to stop them down to a very small aperture, $\frac{f}{64}$ or so. With such apertures, however, they give excellent results.

Obsolete Forms of Lenses.—There are many forms of lenses which took the place of the "rapid landscape" and the "wide-angle landscape" lenses of the present day before these latter were invented. They have been superseded, because their performance was inferior to that of modern lenses in some respects. Most of them scarcely require notice here. There are two forms, however, of which something should be said; these are frequently to be purchased second-hand, and very cheaply. The photographer who cannot afford expensive lenses will often find a most useful instrument in one of these if it be by a good maker.

The Orthoscopic.—This lens is the twin brother of the Petzval portrait lens, having been invented at the same time by the same distinguished scientist. It was invented

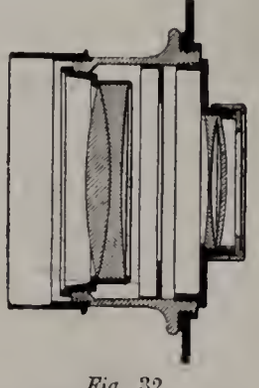


Fig. 32.

at a time when the single achromatic lens was the only one in use for landscapes. It gave a considerably increased aperture (about $\frac{f}{16}$, considered beyond the powers of a single lens in those days), and improved flatness of field. The orthoscopic gives distortion of the inward or "pincushion" nature. The lens has the advantage that the

focus being measured from a point in front of the anterior element, a lens of comparatively long focus can be used with a camera racking out to a given amount.

There are those to be found who still predict a great future for the orthoscopic, when some modern optician of eminence chooses to take it up again.

The Triplet.—The triplet lens of J. H. Dallmeyer is interesting as the first form of non-distorting lens which was at all generally used.

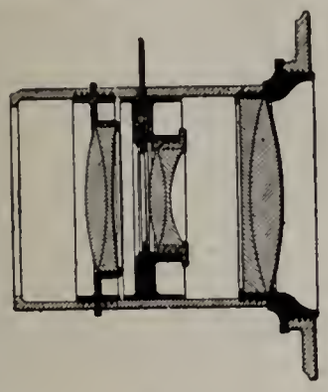


Fig. 33.

It may be said also to have been the first lens of the "rapid landscape" type, as it worked at an aperture of $\frac{f}{10}$, or something approaching that. The performance of this lens is, in spite of the drawback of the six reflecting surfaces, excellent. The angle included is only moderate, but the definition is of the highest order, and the field is very flat. There are some who, even at this present day, prefer the triplet lens to any other for copying.

PHOTOGRAPHING BY MACHINERY.

The time, often spoken of in the past by way of joke, has at last arrived when photographs can be taken automatically by a machine. The following is a popular description from *Inventions* of how the machine in the Paris Exhibition works :—

Whether automatic box photography will prove a serious rival to the photographer may fairly be doubted, but that it is practicable has been proved at the Paris Exhibition. By the apparatus there shown and invented by M. Enjalbert, a person's photograph is taken automatically upon the insertion of the requisite coin in the slot. It is so constructed as to execute the various photographic processes necessary in order to obtain a photograph upon the insertion of the required coin.

On the right side of the apparatus is to be seen the announcement of the coin (*Mettez* 50 *centimes*) necessary to be inserted in order to start the apparatus. At the left a spot upon which to fix the eye during the pose (*Fixez ce point pendant la pose*). Above this is a series of dials divided into sections, over which pass pointers which indicate, at every instant, the operation going on in the interior. A few moments before the pose commences, the needle of the second dial points to the words "prepare yourself," then "attention," and, when it arrives at the black sector bearing the word "pose," the latter commences, and a bell, placed above the dials, starts ringing and continues so during the entire pose, which usually lasts from three to six seconds. After the lapse of some time, in all about five minutes, the portrait comes out at the side finished.

The photographic process employed in this apparatus is what is known as the ferrotype process and needs no further description here, consisting as it does of the preparation of the sensitive film, the exposure, the development, and the drying and varnishing. The whole mechanism is operated by electricity through the medium of storage batteries and electric motors, as well as the action of electro-magnets, which are temporarily energised at the proper time. The operations to which the plate is subjected are performed in four compartments or cases. The first operation, that of covering the plate with a film of collodion, is performed in compartment 1. After this operation it is seized by the carrier actuated by a lever, which passes it to the compartment 2. The plate is then plunged into a bath of nitrate of silver, and remains there about one minute, during which it is stirred about several times. The plate is then put into the position for exposure. The length of time for exposure can be regulated in advance according to the condition of the light; this being accomplished by means of a slide which regulates the length of the electric contact by which the shutter is held in position. After having received the light impression, the plate is again seized and transferred to the compartment 3. Here the plate is developed, washed, fixed, and washed again. The turning action of the support carries the plate under the faucet of a vessel from which the developer shoots in the form of a spray, and is evenly distributed over the plate. The water for washing shoots from the same faucet, and finally the plate is plunged in the fixing bath, containing a cyanide of potassium solution, and is at last drawn out to receive another and final washing. In the fourth compartment the plate is at first washed with alcohol and then varnished. It rests there for some time in order to dry, which is effected by a tube heated on the interior with a special lamp. The plate is then passed to a tube which leads it out of the apparatus. An electro-magnet controls the various faucets for the development and washing of the plate, and another electro-magnet controls the faucets for the alcohol and varnish. The whole apparatus is said to operate with extreme smoothness, and seems destined to a wide application.

"CRAWLING" ALBUMENISED PAPER.*

BY W. H. MYRICK.

In a recent number of *Wilson's Photographic Magazine* I noticed a communication from someone who was troubled by the "creeping" or crawling of the paper in the printing-frame, and consequent double outlines.

This is a trouble I used to have in my early efforts to make pictures by photography; it is one generally more noticeable in dry warm weather, and caused by more or less dampness of the paper when placed in the frame, especially if used soon after being fumed, and not carefully dried. In my practice, if I fear or notice any tendency to crawl, I place the frame with the negative, without the paper, out in the warm sun a few minutes, or, if there is no sun, I heat the negative and back of the frame by a fire until quite warm, and then quickly place the paper in contact with the negative, and lay the back of the frame loosely in, and allow it to remain for about one minute, then fasten the springs, and place out to print. The heat of the negative and back of the frame causes the paper to dry and shrink all it can, so that there is no danger of its "drawing" any more the first time the frame is opened to examine the print. [Mayfield, California.]

Fire-Flies and Luminous Vegetables.—The natives of Vera Cruz, Mexico, do a large trade in fire-flies, which they catch by waving a blazing coal at the end of a stick. The insects fly towards the light, and are captured in nets. The fire-flies of North America differ from those just described, in the fact that they emit their light in capricious flashes, instead of with a steady, uniform glow. This peculiarity has gained for them the name of "lightning bugs." Their light is very similar to that of our glowworm. A story is told of some French peasants who were returning home one night and saw a meteor fall through the sky in front of them; about half a mile further on they came to a glowing mass in a ditch, and rushed away terrified, declaring that a star had fallen upon the earth and was burning it up. On investigation it was found that this burning star was nothing more uncanny than a mass of frogs' legs that had developed phosphorescence. Several varieties of the vegetable kingdom are luminous in a greater or less degree. One of the fungi, which is not at all uncommon on the walls of damp, dark mines and caverns, occasionally emits sufficient light to admit of the reading of ordinary print by it. The emission of light from the common potato when in a state of decomposition is sometimes very striking. Several of the Indian plants and grasses are also luminous, and it is said that in 1845 the mountains near Syree were nightly illuminated by their means. The root stock of a plant from the Ooraghum jungle supposed to be an orchid, possesses the peculiar property of becoming luminous when wetted, while, when dry, it is quite lustreless. The hairy red poppy, the nasturtium, and the double marigold, are also luminous to a certain degree.

* From *Wilson's Photographic Magazine*, July 20th.

Notes.

The latest fashionable craze is the "wedding album." These albums are purchased by the bride, and in them are placed photographs of the bride and bridegroom, the best man, bridesmaids, and officiating clergyman, with the autograph of each under his or her own photograph. This is not a bad idea, but the interest depends entirely on the way the notion is worked out. If the photographs are the orthodox studio productions, then we doubt whether they are worth preserving. What is really needed to make the thing a perfect success is a sort of ecclesiastical photographer who would attend at the church and photograph the principal actors in the scene down to the clerk and the pew-opener. To conceal an operator at the back of the altar and to photograph the happy couple at the moment when the ceremony of placing on the ring is performed might, perhaps, to most clergymen, savour of sacrilege, but no doubt other means could be found of obtaining characteristic portraits. To churches much patronised for matrimonial purposes, a studio with advantage might be attached, and perhaps in certain cases the vestry could be altered so as to render it available for photography.

Apropos of photographs of weddings, a Chicago paper gives a droll account of a very awkward mistake which must have caused no end of annoyance to the parties concerned. A young couple got married, and the reporter of the local paper waited upon them not only to get particulars of the affair, but also to get their portraits for publication. The portraits appeared in due course, but somehow the block of the bridegroom got mixed up with the block of a barber who had been cured of "a lame back and sore throat" by swallowing "twenty-seven bottles" of a certain patent medicine, and whose picture was published to show there was "no deception." The bridgegroom in great wrath waited upon the editor, and the interview was not at all pleasant for the latter.

The information that Her Majesty had "expressed a desire" to have photographs of the members of the Jubilee House of Commons has gone the rounds of the papers, and pretty well everybody knows all about it. It is not, however, so well known that the notice intimating this "desire" was posted up in the members' cloak-room for two days only. During the forty-eight hours that it was suspended a large number of members forwarded their portraits, but, to the surprise of everybody, the notice was suddenly removed. The official explanation is that the notice had been removed "in consequence of an error in the spelling," but the mystery is that the notice has not been replaced by a corrected copy. The question which is now exercising the minds of those who have not sent in their photographs is: has Her Majesty altered her mind?

The story goes that, at the "stone laying" of the Samaritan Free Hospital, Marylebone, some very amusing hide-and-seek play went on in the efforts of the Prince and Princess of Wales and their daughters to avoid the attention of the photographer who wanted to take them. The young princesses, we are told, dodged behind some cactus trees; the Prince first put his head behind his hat, then his programme to his mouth; while the Princess of Wales hid herself behind her husband. However, the photographer had his chance, for when the inevitable prayer, without which a foundation stone cannot be laid, was said, royalty had to stand up, and face the lens.

The reporter who records this thinks it was a little joke on the part of the Prince and Princesses, and no doubt it was, for the Prince is usually very gracious towards photographers. We remember an instance where, on the occasion of some function at Eastbourne, H.R.H. rebuked, through one of his attendants, an over-officious policeman who was ordering a local photographer to "move on," and commanded the carriage to be stopped so that the camera might not be placed in vain, for the Royal family have always looked on photography with a kindly eye.

A West End photographer, to encourage people to enter his studio, puts out a bold announcement that "The light is excellent to-day." The plan is a very proper one, but, to be perfect, modifications of the statement, or even the reverse, should, when necessary, be given, so as to educate the public in the varying actinic values of light. Thus, when the sun is obscured by a yellow mist the information should be, "The light is very poor;" when the sky is overcast and the light is grey almost to blackness, the public should be told, "Photography of no use to-day," and so on. The truth is, the people want telling when not to come, more than the contrary. On fine days they think about anything rather than photography; on dull days, when to take a little country excursion is not to be thought of, it occurs to them to go and have their portraits taken. This is the experience of all photographers—especially with regard to children. At one time ladies thought that a sunny day was the only photographic weather. They have now been inoculated with the notion that sun is not necessary, and as a mere statement this is of course, correct; it is in the nice discrimination between a bright grey light and a dull one where they fail, and hence trial and tribulation to the photographer.

A case in point has just exercised the mind of M. Castellani, the painter of the panorama "Tout Paris," now being exhibited in the French capital. Among the figures is that of the Shah, and how the Shah came to be introduced in the picture is rather curious. Originally the portrait was that of General Boulanger, behind whom was M. Carnot, the French President; but the latter objecting to the arrangement, M. Castellani seized upon the Shah as the next best known personage, and painting out the figure of General Boulanger, substituted that of the Persian potentate. In doing this he was not without justification, for the Persian Ambassador lent him a photograph of the monarch. M. Castellani, however, unfortunately made the Shah chatting familiarly with M. Turquet, a well-known Boulangist. and now that the former is coming to Paris, the ambassador began to be uneasy as to the impropriety of letting His Majesty appear in the company of an enemy of the French Government, and accordingly waited upon the Minister of Foreign Affairs, with the result that the portrait of the Shah has been expunged.

EXCESS OF NITRATE OF SILVER IN THE CYANIN GELATINE PLATE.

BY V. SCHUMANN.

The colour sensitiveness of a gelatine plate coloured with cyanin depends in a high degree on the manner of sensitizing. Years ago I had already shown that the colouration of the liquid emulsion sensitizes almost for red only, whereas a cyanin bath furnishes not only red, but also yellow sensitive plates. Later tests taught me that the cyanin plate coloured in the liquid emulsion obtains also high sensitiveness for spectrum yellow, as soon as the same is bathed in aqueous ammonia. Such plate, with sufficient ammonia (4 to 6 per cent.) in the bath, exposed, wet or dry, may prove even more sensitive for yellow than for red. Such a bath increases also the total sensitiveness and intensity of the plate in a surprising way. Quite lately I have observed that free nitrate of silver is also able to increase the yellow action of the cyanin. If I mix gelatine emulsion, after the washing is finished, with a solution of cyanin in alcohol, and add a few drops of nitrate of silver, I obtain plates which show higher maxima in yellow and red than cyanin alone. The nitrate of silver increases the yellow sensitiveness considerably, and also the intensity of the plate. A plate bathed for one or two minutes in aqueous ammonia (4 per cent. NH_3), its total sensitiveness would experience another increase, particularly in the yellow. The purity of the film after bathing was unfortunately not as good as might have been desired. It tended to cloud formation and fog. Less ammonia gave purer plates, but not such high colour sensitiveness. Notwithstanding the last-mentioned increase of sensitiveness, the plate remained for yellow far behind the red.

All my tests prove now clearly that free nitrate of silver has an essential influence upon the colour sensitiveness of the cyanin plate, but that the advantage of the increased yellow-sensitiveness is too small to be of any value in practical photography. It is, therefore, not my intention to recommend free nitrate of silver with cyanin for the gelatine plate, particularly as the plate coloured in the emulsion with subsequent ammonia bath will give better results. The conditions of cyanin differ essentially from those of eosin and its derivatives. Eosin combines easily with silver; cyaniu, on the contrary, does not. Although eosin silver plates do not contain eosin silver, but to all appearance only the decomposition products of the same, still free nitrate of silver will act upon eosin in gelatine emulsions more favourably than upon cyanin.

My results possess, from all that I can see, only scientific interest. They prove distinctly, as already pointed out in another place, how much the action of optical sensitizers may depend upon other circumstances. According to the kind of sensitizing, one and the same colouring matter may produce quite different effects. This seems to be particularly the case with cyaniu. At least I have observed with no other colouring matter such a spectro-chemical difference as with the latter.—*Anthony's Bulletin.*

THE ACTION OF LIGHT ON IMPERIAL PURPLE.

Dyes of animal origin are exceedingly few in number, and sometimes remarkable for their brilliancy, as in the example of the beautiful colour carmine, of which the finest quality can now be had at moderate cost in consequence of its being almost driven out of the market by coal tar colouring products. Can it be utilised in photography?

Tyrian dye, the imperial purple of ancient Rome, is, it seems, before coming into contact with cloth or a mordant, sensitive to the action of light. This dye in old times was obtained from two different kinds of shell fish, described by Pliny under the names of *purpura* and *buccinum*, and was extracted from a small sac in their throats to the extent of but one drop from each animal. In the days of Augustus a pound weight of the purple wool of Tyre cost £30 of our money, and finally the Roman emperors forbade the use by anyone but themselves of raiment dyed the imperial purple colour. Tyrian dye proved a remarkably fast colour upon cloth, for Plutarch mentions how the Greeks found in the treasury of the king of Persia some purple cloth 190 years old, yet as beautiful as when first made.

M. Augustin Letellier has recently brought under the notice of the French Academy of Sciences some researches made by himself on the purple produced by the *purpura lapillus*, of which researches the following abstract appears in the *Chemical News*:—

This mollusk is very common on the shores of Brittany, and was formerly used by the Bretons in dyeing. The colour is generated in a yellowish white band. The purple is, in fact, produced by three substances, one of them yellow and not photogenic, whilst the two others turn quickly to a blue and a carmine red under the influence of the sun's rays. The yellow substance forms crystals similar to those of uric acid. The substance is soluble in potassa, whence it may be precipitated by weak acids. The two photogenic substances are the one apple-green and the other ash-green. The crystals of the former have the appearance of magenta; light quickly renders them opaque and deep blue. They dissolve sparingly in water, but readily in chloroform and in petroleum ether. The crystals of the third body are very soluble in water. They become red, violet, or carmine on exposure to light, according to their degree of purity. To prepare even a very small quantity of these three bodies, the bands must be detached from several hundred specimens of *purpura* dried at the common temperature in a vacuum over sulphuric acid. When dried they are powdered, treated with ether, which is let evaporate, and the residue is taken up in potassa, which dissolves the fats and the yellow matter. The whole is filtered. The filtrate, on the addition of acetic acid, deposits the yellow matter. The green residue on the filter is treated with chloroform, which dissolves the ash-green substance more readily than the apple-green. If petroleum ether is used the apple-green crystals dissolve more rapidly. All these operations must take place in the dark. When once formed the purple is an impalpable powder, insoluble in the ordinary solvents. Nitric acid and chlorine water destroy it; sulphuric acid converts it into an emerald green substance, which, on the addition of water, becomes an indigo-blue liquid, but in time the matter becomes carbonised. The action of light upon the purple matter suspended in chloroform is curious. It extinguishes the less refrangible red rays, absorbs the yellow, the most refrangible part of the blue, all the indigo, and all the violet. We have a continuous spectrum formed of a dirty orange-red band, contiguous by irradiation with a broad green band edged with blue. The yellow is so well absorbed that it it not perceived. The only radiations which pass through are those comprised between 720 and 613; 535 and 490. The purple seems to take its rise by a process of reduction. The purpurigenous matter, if treated with oxygenated water, hypochlorous acid, or potassium dichromate, remains intact, but in presence of sodium amalgam it turns to a reddish purple.

Coloured Fires.—According to *Südd. Apothek. Ztg.* the following mixtures produce lights of brilliancy equal to that of electricity. The cost of some of the ingredients would be objectionable, and the usual precautions against explosions should be taken. The ingredients must always be pulverised separately, and only mixed by careful sifting together. *White fire.*—Equal parts of sulfonal and potassium chlorate in fine powder are carefully mixed. Two grams furnish an intense light. *Lilac fire.*—Lithium carbonate 5 parts, 20 parts each of sulfonal and potassium chlorate, each in very fine powder carefully mixed. *Violet fire.*—Magnesium metal, powdered, 8 parts; potassium bichromate, 10 parts; and potassium permanganate, 16 parts, carefully mixed.—*English Mechanic.*

The *Boy's Own Paper*, in its summer number, contains an illustrated tour by the Rev. L. Meadows White, M.A., entitled "A Photographic Tour on Wheels," from which we extract the following:—"During the past two years the art of photography and cycle touring have advanced hand in hand. The dry-plate method is so simple, and the whole apparatus can be so conveniently stowed away in a bag, that it commended itself to many tourists on the cycle as a delightful adjunct to the usual holiday tour. The result was that at the beginning of the year 1887 a circular was sent to the consul in each town from the C.T.C. headquarters directing him to inquire whether or no the club hotel in that town could provide a dark room or cupboard for the changing of photographic plates. Accordingly in the club handbook for 1887 all those hotels which could provide this accommodation were distinguished by the letters D.R., D.C, so that the wayfaring artist, if a member of the C.T.C., knows when and where he will be able to change his plates."

EXPERIMENTS IN PHOTO-ENGRAVING.

Mr. Herman Auer writes to *The Lithographer and Printer* :—

It is a great mistake to believe for a moment that the art of photo-engraving is yet in its infancy. It is, on the contrary, an art extensively practised, and with such perfection as can only be found in a process which is in a state of maturity. The reason why photo-engraving, unlike Daguerrotypy or photography, is so slow in becoming the general property of the public, is due mostly to the secrecy practised by photo-engravers, while it must be remembered that the French Academy bought Daguerre's secret for the purpose of making it public.

All efforts to keep photo-engraving processes secret will, however, in the end, prove futile, for it will become a feature of polytechnic instruction, and already numerous works on the subject give to the interested student the necessary theoretical assistance to experiment in photo-engraving. Between knowing the nature of the process through books and experiments, and the knowing how to do it practically, there is, however, a great gap. A great many are very well informed on the subject ; they would, however, not be able to begin making a plate. It is the technical part—the manual work—which really forms the secret which all students would like to unveil. This can only be done by a series of practical experiments, each one calculated to explain the manifold occurrences that are identified with this delicate process.

There is, indeed, no process which offers to the beginner so many puzzles and unaccountable obstacles, and this may be the reason that so many give up in despair, thinking those that succeed possess a "secret." They possess a secret in one sense of the word—that is, the secret of endurance, patience, conscientious and painfully rigid work, and last, if not least, a reasonable amount of brain. The following experiments are almost all taken from my memorandum-book, in which I have carefully noted every trial and experiment during my many years' researches. They will follow in such an order as to bring the different photo-engraving processes in a clear way before the reader. Each experiment will have its moral, which the beginner must try to use to the best of advantage. This is, therefore, no "grammar" of photo-engraving, as books of this kind are already in existence ; but you might call these experiments "practical illustrations," to the grammar of photo-engraving ; as such, I trust, they may be useful.

The material the photo-engraver works with is glue and gelatine ; from the most common carpenter's glue to the finest transparent white gelatine. All glue commercially manufactured is a mixture of bone-glue (glutin) and cartilage glue (chondrin), the former being generally preponderant. Should the latter be in excess, the glue is not fit for our purpose. To find the amount of chondrin in a solution of glue, we add either alum, nitrate of lead, or chromalum, and the chondrin will be precipitated to the bottom. A ten per cent. solution of glue in which chondrin is preponderant, to which has been added a saturated solution of chrome alum, will become set in a very few moments, even if the glue is still hot.

The gelatine which we will use for our experiments is either Nelson's pure white, or the French gelatine in sheets that can be bought at every drug store. There is only one process based on the use of common carpenters' glue, but this has nothing to do with our first experiment, which is the making of a gelatine film, of the necessary thickness and strength to be suitable for our purpose. The nature of glue is exceedingly hygroscopic ; it contains, in its driest state, nine to sixteen per cent. water, which only evaporates at 120° C. Gelatine swells in water to a volume six to ten times the size of its dry state. For our process this quality is utilised, and in this case such gelatine as swells most is selected. Fresh gelatine dissolves in hot water especially readily when soaked before in cold water. A good gelatine that has been soaked for four to six hours previously to dissolving ought to become liquid at about 30° to 35° C. Inferior gelatine dissolves at 20° C.

According to the process chosen, we have to select gelatine that swells most and dissolves hard, or gelatine that dissolves easily and swells less. There are, however, chemical means to make gelatine dissolve quicker—as the addition of sugar or acetic acid.

Another test for the good quality of a gelatine is the fact that hot water containing only one per cent. of it will set solid after getting cold. The photo-engraved relief forms itself on a gelatine film that is exposed under a photographic negative or positive. The film must have a smooth surface, so that it adheres perfectly to the glass ; it must have a certain strength, so that it is not easily broken in handling ; it must retain a little flexibility, so that it will not crack or spring off the plate ; and, finally, it must be made in all sizes, with the same facility. The following experiments will illustrate the subject. The beginner will judge for himself which of the films will come nearest to uniting all of the above qualities.

Take two ounces of gelatine, cut fine ; soak in cold water —that just covers it—four hours, then dissolve by placing the cup containing the gelatine in another cup containing hot water. Divide the solution in three cups equally ; add to the first three drops of glycerine, very little sugar ; to the other add ten drops of glycerine, no sugar ; and to the last add ten drops of a saturated solution of chlorcalcium. Replace the cups in warm water. Take three panes of clean glass (plate glass), lay them perfectly level with the help of an air-level, and pour the warm gelatine on them. The gelatine solution must be of a consistency that it will flow smoothly without being helped to the corners. If too thin, it will flow off ; if too thick, it must be spread with a fine brush, and is liable to get striped in drying. A few trials will give the necessary judgment. The edges of the plates must not be ragged, but even and smooth. The thickness of the gelatine solution on the plate may be made about one-sixteenth of an inch. The student will do well, however, to change the thickness with each experiment. It is only in this way that he will find out which quantity of gelatine will give the best results.

Let the gelatine cool, and, when set solid, remove the plates to a dry, airy room, and wait until the gelatine becomes so dry that it will not stick to your finger. Observe carefully which of the three plates will be first dry ; observe, also, the surfaces of the three plates—which appears to be the smoothest. Cut with a penknife about one-half inch all around from the edge through the gelatine ; lay a smooth cardboard of a size to correspond with the cut on the gelatine, rub it firmly in for awhile, then try to pull the gelatine with the cardboard off the glass. If you have hit the right moment, it will come off easily and without trouble. Only repeated experiments will make you an expert in this. You will find the gelatine film on the cardboard presents a surface as smooth and brilliant as glass.

If you can do this with only one of the above solutions we can go to the second experiment—the adding of the bichromate salts that make the film sensitive to light. A variation to above experiments is to pour the gelatine on the cardboard, which is made damp and laid on a plate-glass ; then when set, the cardboard is turned gelatine side to the glass and squeezed to it, avoiding air-bubbles. When dry, it is easily pulled off, and presents the same glass-like appearance.

The gelatine relief, after being well developed in every detail, has to be hardened, which is best done by immersing it for from five to ten minutes in a weak solution of chrome-alum. The cast must be made while the film is yet damp, because if the film dries the relief will disappear again to a certain degree. How to make casts from such a relief will be treated later on, when we have seen how the relief through washing out of the parts was affected by light is obtained. The so-called washing-out process is, without doubt, the most practical method, and gives far better results in every kind of work. It is, however, more complicated and more liable to failures in the hand of a beginner. It is for this very reason that I recommend beginners to make themselves first familiar with the other method ; this will give them experience enough to battle with the little troubles arising in this method.

We lay the exposed plate again in cold water, but leave it in till the chrome salt has been soaked out of the film. This will get a greenish colour, the insoluble salt having turned to chrome-oxide. Only when in this state the film is laid in hot water, beginning with 42°, and gradually increasing the temperature to boiling heat. The parts that were swollen up in cold water will now gradually dissolve away. A great deal of patience is recommended to the beginner, as it sometimes takes from four to seven hours to form the desired relief. It is here where we can best test the quality of the gelatine we used. Some gelatine will dissolve very slowly, even in boiling water ; some again will dissolve too rapidly, and will tear away parts that ought not to go. It is highly recommended to buy always the same gelatine, for if you once get acquainted with one kind, it is extremely tedious to work with another that never will give precisely the same result. I have found for this process that a mixture of the finest French gelatine and Foxe's English gelatine gives very good results. The first is very tough and dissolves with difficulty ; the latter dissolves readily and is very clean and pure. Unclean matter in the gelatine is the source of great trouble, as is also the appearance of air-bubbles in the film. The first evil may be

avoided by carefully filtering before making the film, and buying from the start only the best brand in the market. The second trouble—air-bubbles—is hard to combat. They will occur, even with the most careful manipulation. They can, however, be avoided to the best possible extent, in shaking the cup containing the liquid gelatine as little as possible, not stirring it up, and in filtering see that the liquid does not drop from a great height. In pouring the gelatine on the plate, it ought to spread by itself, without any help; and if you have to help it, do it calmly and not by nervous jerks. The worst air-bubbles are those which only appear when the plate is dry. There is no remedy for these, and they have to be taken out in the first cast, where they will appear as little, round, raised dots. They can then easily be cut down to the level of the plate, and the drawing retouched so that the finished plates will show no trace. I must remark here that almost every plate needs retouching by an artist, be it for correcting or taking out the big whites. I have not seen a plate yet that did not finally go through the hands of an accomplished engraver. For work of the second class—illustrations for newspapers, and so on—this retouching is generally not necessary. The lights are taken out by the electrotyper, who trims the plate and makes it ready for the printer.

We have now seen the outlines of the two methods of the gelatine engraving process—the "swelling-up" and the "wash-out" methods. On one or other of these are based all the methods in use. All the many different processes are simply various applications of the two foundation processes to some peculiar speciality. Each photo-engraver works to some special end, and he will modify the different manipulations to suit his peculiar aim. While one wants deep plates, another wants very fine reliefs; one again wants engraved plates for printing on copperplate presses; another again makes these processes useful in the reproduction of half-tints, and so on. Thus different aims require different manipulations. But the foundation of *all* the manipulations and methods is in the two processes we have outlined.

THE MAKING OF LANTERN SLIDES.*

BY A. PEEBLES SMITH.

During the past winter I had occasion to make a number of slides for Professor Cromwell when he exhibited at the Grand Opera House. While doing that an old theory, to my mind, was exploded: that is, that the nearer the lantern is to the screen, the denser the slide should be. His pictures, as you may well know, are enlarged up to about seventy-five feet square. The lantern is placed fully one hundred feet from the screen, and the slides which I first made went to pieces; they were too thin. I couldn't account for it, but went to work and made denser slides, with no better results. I soon found out that it was not density which was required, but the colour; the slide should be absolutely clear in the shadows and lights. Since then I have experimented with a great many developers—the effects of five having been shown here by the lantern—and I have decided in favour of antipyrine. I use it the same as I would hydroquinone—that is, take antipyrine, dissolve it in sulphite of soda solution, then make an alkali, the best alkali being caustic potash, the most active. Develop your plate. I have a brass plate about five inches in diameter. This is attached to a wheel, under which is a lamp. The plate is heated, and a centrifugal motion given to the plate; and while the plate is in motion, the gelatine upon the plate is slightly softened, so that all the relief of development entirely disappears, leaving the gelatine free from veiling, which is often present with gelatine slides. After that I used to varnish with collodion, which I have long since discontinued. I take an ordinary varnish, add to it one or two chemicals, which are not commercial and in stockhouses, but which can be obtained in drug stores the same as antipyrine; make a water varnish, and varnish the plate while wet, and then place away to dry, which gives a beautiful clear slide. They are free from grain, and with apparently no density at all; but the lack of density is made up in the clearness of the lights and the clearness of the shadows. The reducing agent, antipyrine, is very slow, requiring at least thirty minutes to produce a slide. This, commercially, would be out of the way, as a man would starve to death making slides as a matter of necessity; but the amateur who wants beautiful work on dry plates can do it.

My next attempt after using this antipyrine was to try acetanelid. This is a very insoluble chemical. I find it reduces much quicker on a slide plate than the antipyrine, but the deposit of silver is much coarser. The formula that I have used with acetanelid is practically the same as the other.

Of late, I have been experimenting somewhat with collodion emulsions. Mr. Newcombe, of the Scovill Company, has been at work all the winter in that direction. He has now an emulsion which more closely resembles the wet plate than any I have seen yet, in which a bath is used.

With the collodion emulsion the great trouble seems to be that the film is too thick, and with it you get too strong a contrast. You take a very thin negative, one slightly under time, and with collodion emulsion you get a negative beautifully clear in the lights, and beautifully clear in the shadows, providing you don't develop the plate too quickly; and the great trouble with the wet plate process is, that you are apt to have the developer too powerful, especially when pyro and alkalis are used. Iron is a little slower in its action, and you are not apt to get this strength in the slide. The objection to iron seems to be that it does not penetrate the collodion, and experiments made lately in that direction seem to be entirely in favour of pyro as a developer. As to hydroquinone being used as a developer for lantern slides, the formula which I use is one containing a great deal of sulphite, the alkalis used being phosphate of soda and caustics. After the slide has been developed, I make a solution of carbonate of barium in water, which is poured over the slide, which acts as a cleaner.

With hydroquinone as a developer for slides, the colour which you get has a tendency more to warm tones, unless the negative be very dense, and for that reason I do not like it. I find that in slides, if you get a brownish-black or a colour with a trace of pink in it, it is much prettier and will show to much better advantage on a large screen with the lantern a good distance from it than one containing the slightly reddish tone which hydroquinone gives. For that reason I use old developer with splendid results on dry plates, getting tones ranging from a warm tone to a blue-black. The blue-black can be obtained by making a solution of iron, say 60 degrees by the hydrometer, and adding to it from two to three drachms of sulphuric acid. Make a solution of oxalate of potash, and add to that oxalic acid, both being put together in the usual way for oxalate developer, and then adding a little more sulphuric to the developer you will get a tone ranging on the green-blue, which gives it apparently no density, but on the screen it has a pretty effect.

If you have a tray of 5 by 8 inches, and you develop in it two slides, you can have the proportion of 2 ounces of oxalate to 2 drachms of iron solution. The sulphuric acid gives the cold, greenish effect upon the Carbutt plate. I have used it on the Eastman plate; but you are not as sure of the tone on that plate, as that is a bromide of silver plate. For that reason the Carbutt plate gives the blue-black tone much easier. The method of developing these slides—quick development—seems to give the best results without graining. The usual method of producing slides has been by daylight; but I discarded that about six months ago, owing partially to my being so placed that I could not use daylight, and partially because I wished to experiment in another direction. I have since been using magnesium light altogether. There is a certain quality of the light used in making slides by magnesium that you don't get by daylight. For instance, you are exposing a plate to daylight. Your lens is slightly stopped down, and you make the exposure. The negative may not be even. You try to cut off the light here and there, and your light penetrates the shadows of the negative quicker than it does the lights, and the light detail is only obtained at the expense of the shadows. When you develop that plate your shadows come first. Your lights lack the detail which we like to see in them, and the result is a sort of halation which runs through the plate and produces a sort of fogginess. Your slide is not clear, and does not show clear glass like the wet plate. The use of the magnesium ribbon prevents this, and you can set the light from any point. You can favour the sky or the shadows. One of the principal causes of halation is the light coming in around the edge of the plate, and working its way into the plate as you develop. This can be prevented by making a mat, which you place in front of the slide before it is finished. This keeps all rays away from the plate, with the exception of those which pass through the negative. The result is that the glass around the plate is perfectly clear, and the light cannot work in where you do not want it.

Now as to the apparatus I employ in producing slides; it is so simple I think I will describe it. In the first place, I use an ordinary camera, as ordinary as anybody possesses. I have the

* A communication to the Society of Amateur Photographers of New York.

kits ranged in a frame in a box 5 by 8, and in case some good-natured friend loans me an 11 by 14 negative, I can reduce that. If I am not using daylight, I take a printing frame, which is the only handy thing I have in the house, 11 by 14; over that I place two or three sheets of cepa skin; behind that is a little box with the negatives in it; just beyond that is the camera with the lens. Now, in using the magnesium ribbon, I use only two or three inches of it. When everything is in readiness to expose, I have two or three little sheets of cepa skin. With the negative in its place, I hold that so as to simply allow the magnesium to come on those portions of the slide I desire. When the slide is developed, you get that tone so much desired on dry plates, and you do not get that fogginess in the lights you would get with daylight, because the exposure is rapid—that is, in comparison to daylight. It is this way: you expose to daylight. If you can do it and take your time, you will get a very good slide free from this fogginess; but if you expose longer, for the reasons named, then the result is contrary.

For focussing, I place a lamp just back of the diffusing screen, and that illuminates the negative sufficient for focussing; any lamp will do. The mat on the slides prevents that halation which I spoke of, and enables you to work without covering your camera or the box which holds the negative. There is light passing between the camera and the negative, but this mat so cuts off outside rays that you only get the light that passes through the camera. In all copying and reducing cameras there is always a place in which you put your hand and remove the cap. There are always rays of light around which are not used. If you will protect by a mat you don't get these on the plate, and you don't get the action of them when you come to develop.

DISCUSSION.

Mr. BEACH: I would like to know if you have tried this method of shading the negative by daylight, and if you do not find it work as satisfactorily as at night?

Mr. SMITH: Yes, I have done so, putting clouds in on the same plate from two different negatives, something the difficulty of which you can realise. That has been done by shading the negatives here and there, and then developing both exposures at the same time.

Mr. BEACH: You use a very large lens?

Mr. SMITH: I use a small 5 by 8 lens altogether in producing slides, and the plates are quickly developed. They do not have time to veil. Then the time is a very essential thing. The beauty of working by this method is for those who do not have much time. If you make slides with magnesium from a certain negative, and get the time, you can mark upon the slide just how much magnesium you use; then the next time, with a certain emulsion you may be using, you can duplicate that, and have the time exactly right.

Mr. BEACH: Do I understand that the screen is placed in front of the negative before your light?

Mr. SMITH: First is the magnesium, then the screen, and then the negative, camera, and plate.

Mr. BEACH: Is the lens in behind the screen?

Mr. SMITH: The magnesium is in front of the screen, and diffusing the light. A number of people who have seen the apparatus which I employ seem astonished. They give me large negatives, and wonder how I reduce them. But I do it by taking a printing frame of the size of the negative, placing the negative in the printing frame, and back of that the diffusing screen, the magnesium close to the diffusing screen, about six inches away from it, keeping the magnesium in motion while I am exposing the plate.

The PRESIDENT: How far is the screen from the negative?

Mr. SMITH: The screen is only about an inch and a half from the negative. Then comes a little box arrangement which shades the negative from any rays that may come in over the top, and then comes the camera. Now, as to dry plates compared with wet plates, there are points in favour of both. The wet plate gives you the clearest slide and the most freedom from grain. Clear lights and clear shadows can be obtained upon the dry plate with a good deal of care and skill and time expended. The wet plate possesses the advantage of being quicker, not in the sense of working, but the slides may be finished more quickly. The wet plate has this advantage, that with it the tones can be varied the same as on dry plates, but you don't preserve a certain tone value that you do in dry plate slides. Myself, I prefer the wet plate. There are difficulties in the way of working it which everybody cannot overcome, and I think if the dry plate were worked up more it could be made to come up to the wet plate standard as regards freedom from grain, which is essential.

Mr. BEACH: Have you seen any slides made by Professor Elmendorf?

Mr. SMITH: I have not seen the slides, but I have seen some very beautiful things from Paris in the way of dry-plate slides, which assures me that they are at the head at present.

Mr. STEBBINS: I would like to ask Mr. Smith first how he dissolves his acetialid. I have handled it a good deal, and my experience is that it does not go with water very well.

Mr. SMITH: I speak of this merely as a result of experiment. In dissolving it I use sulphuric acid and also alcohol, but you have to use them right in connection with it. It precipitates itself; and, by using a strong alkali, I manage to produce the image, and afterwards, by a toning process, which I hope to explain later on in relation to dry-plate slides, I get the density required to make the thing a success.

Mr. STEBBINS: If I remember rightly, you stated that barium carbonate was a very good thing for clearing negatives from stains. I cannot, for the life of me, understand why that should have any action whatever on the plate. Certainly, it is a white powder, and I should think, instead of removing stains, it would have a tendency to produce white specks in the film. If Mr. Smith will explain how he overcomes this I will be obliged to him.

Mr. SMITH: Barium carbonate has been used in the wet process as a cleaner of collodion. That is, from the very fact of its being a precipitate, and precipitating on to the film, it prevents anything that you are using in developing from working into the film itself. It has no cleaning action whatever on the plate.

Mr. BEACH: Do you rub the precipitate off?

Mr. SMITH: It is washed off. Instead of using alum, which has an action, I use that to cover the plate, and do the chemical work while it is covered.

Mr. DUFFIELD: Have you ever tried fast lantern slide plates?

Mr. SMITH: I never have, but I have made lantern slides upon exceedingly rapid dry plates.

Mr. BEACH: I beg to differ a little from Mr. Smith's remarks as to shading the negative in reducing by daylight. I had a little experience last fall in making a number of slides. In two or three cases, I had some negatives which were very clear in the shadows and very dense in the high lights, and the only manner in which I succeeded in reducing the slide equally was to take a piece of paper and hold it up in front of the shadow, allowing an exposure, say, of ten seconds originally for the whole negative, and then shading the shadows by moving in front of them this little piece of paper, and giving the high lights an exposure of perhaps a minute, so as to be sure to have an effect upon the dry plate; and the consequence was, when I developed the plate the details all appeared in the high light just as nicely as they did in the shadow, and I got a very soft and beautiful slide, and I contend that can be done just as well by daylight as at night.

The PRESIDENT: Have you tried magnesium, Mr. Beach?

Mr. BEACH: I never tried it extensively.

Mr. SMITH: One point further. In the use of magnesium on positives, I don't shade with paper. I shade with colour screens, different colours acting differently on certain portions of the plate. That was a point I didn't mean to tell you, but you drew it out.

Mr. STEBBINS: I desire to ask Mr. Smith what means he employs for carrying off the magnesium fumes. It seems to me magnesium light is very nice, but there is one great drawback about it, and that is the smoke, and I would like to ask Mr. Smith how he disposes of it?

Mr. SMITH: I do this work mostly in the evening. I do not make more than eight or nine slides of an evening, and generally by the time it gets too smoky I make my escape.

The PRESIDENT: I think that is very good—eight slides and one escape.

Mr. BEACH: I maintain that with daylight you can obtain just as nice and soft a tone on your slides as you can get by magnesium.

THE architects Herrn. Kempermann and Slevogt have been awarded the gold medal for Art and Science by the King of Wurtemberg; the first-named gentleman is a member of the German Photographic Union. The king has also awarded to Herr J. Reinhardt the silver jubilee medal in recognition of his photographic services.

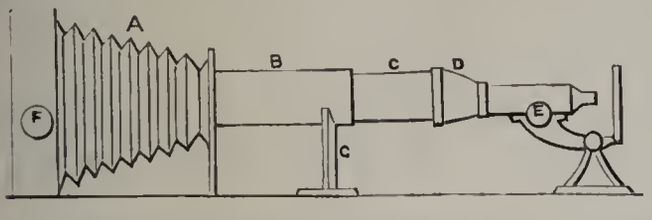
SIMPLE APPARATUS FOR PHOTOMICROGRAPHY.

BY J. C. SHENSTONE.

Noticing in the discussions upon two papers recently read before the Chemists' Assistants' Association, that an interest was evinced in photomicrography, I thought a short description of a simple and inexpensive apparatus which, in my hands, has answered every purpose for some years past, might not be out of place in the columns of this journal.

I may state that the apparatus was devised by myself, and although I believe all new apparatus are recorded in the journal of the Royal Microscopical Society, I know of none so inexpensive, and at the same time so useful, as this has proved itself.

The following diagram illustrating my apparatus is almost self-explaining.



A is the camera; any fairly good quarter or half-plate camera will answer the purpose.

B is a zinc tube, diameter about 2 or 2½ inches, length 8 or 10 inches. It is fixed by a flange at one end to a board made to fit the front of the camera, in the same way that the board which ordinarily carries the lens is fixed to it.

C is a second zinc tube of about the same length as the tube B, and telescoping into it. The joint must be made light-tight by lining the end of the tube B with velvet. The tube C should have a narrow flange at one end. These tubes can be made by any coppersmith.

D is a bag made of at least two thicknesses of velvet. It is fixed, light-tight, over the flange of tube C by means of tape or elastic. It is also fixed light-tight to the tube of the microscope in the same manner.

E is the microscope. Any monocular instrument will do. It is best used without an eye-piece. The better the objective used, the better, of course, will be the photograph.

The *modus operandi* is simple. The object is placed upon the stage in its usual position; when lighted and focussed, the enlarged picture will be thrown upon the screen of the camera.

The adjustment can be made:

1. By the rack and pinion of the camera.
2. By telescoping the tube C into the tube B.
3. By pushing the microscope further into C.

In this manner an enlarged picture of almost any size can be obtained, for the greater the distance between the objective and the screen, the larger will be the picture. If it is desired to produce a series of photos. to the same scale, this can be done by using the same objective at the same distance from the screen in each case.

If one of the objects has been measured, and its diameter compared with the diameter of its photograph, the amplification in each case will be the same if the above conditions are adhered to, and it will be unnecessary to repeat the measurement at each distance.

The fine adjustment can be made by the focussing arrangement of the microscope E, but when photographing to *scale* it would be necessary to make the *tube of the microscope* rigid by fixing it to a support similar to that marked G, so that, in focussing, the objective remains immovable, while the stage is free to move in either direction.

A slight inconvenience may at first be felt in reaching to E in focussing; after a little practice this gives no great trouble, and might be entirely obviated by connecting E with a grooved wheel F, by means of a band, in which case it would be necessary to make both the microscope and the camera rigid.

A strong light is necessary for lighting the object. I have found a good size Hink's duplex lamp answer every purpose. In lighting an opaque object, I direct the light into the object in the same way.

The cost of adapting an ordinary camera and microscope for this work should not exceed half a crown, whilst a quarter-plate camera suitable for the purpose, which would also be useful for general photographic work, can be purchased for a guinea or upwards.—*Pharmaceutical Journal.*

ENGRAVINGS AND PHOTOGRAPHY.

BY WALTER RAY WOODS.

Mr. Foxlee having at the last meeting stated that he had been successful in getting, with the requisite degree of sharpness, photographs from wood-cuts in the earlier numbers of *Punch*, and referring to me as being able to furnish some particulars in respect of engraving upon wood, I felt, on the spur of the moment, somewhat embarrassed how to treat the subject without too much diverging from the point in discussion, which I take to be the most successful means of obtaining, by photography, duplicate copies, with equal clearness of line, of the originals from the line engravings of the present day.

Now it seemed to me, being acquainted with the changes that have taken place in the reproduction of duplicates from wood-blocks, that the original question was still in abeyance, for, although Mr. Foxlee may have been successful in the instance mentioned, at a time when the illustrations were printed direct from the woodcuts, it was inapplicable in this respect—that at the present day electrotypes of engravings upon wood are used, and not the woodcuts themselves, which are carefully stored away until the wear of the electrotype necessitates a fresh re-casting, thus ensuring a clear impression of the illustration as occasion may require. Engravers allow that sharpness of line is most perfectly given by the lines engraved in relief upon boxwood, and that it allows of greater brightness and depths in the blacks, implying, of course, direct contact with the material upon which they are impressed—the paper.

Like other descriptions of engraving, although a large number of impressions could be taken from the wood-block, it had necessarily a limit from the wear exerted on the lines by the repeated press upon its surface serving to thicken the lines, and so render the cut useless. When such was the case—I am now speaking of its earlier history—it became necessary for a fresh drawing to be made, and the whole subject re-engraved. If not too much worn, and rescued in time, a facsimile could be obtained, and a saving of expense effected by a transfer taken in the following manner:—The block having been carefully washed and cleaned, it was again charged with ink, and a proof impression taken from it. So far, it was done with. A box-wood block of the same size was then procured, the face of which was charged with a wash of cyanide of potassium; when it had become sufficiently dry to be only just damp, the proof impression was laid upon it, over which was laid a thin piece of millboard, and the impression rubbed down upon the surface by the aid of a burnisher. It was then placed in the hands of the engraver, who was thus enabled to engrave it facsimile, line for line. Much about this time came the several inventions to improve upon the art, all of them mechanical, and all, from a certain mealiness or rottenness of line, failing ignominously. Then came the first important change—the reproduction of the block by the stereotype process, and afterwards the electrotype process. The first required careful examination from the frequency of microscopical air-bubbles between the lines, which had to be cleared away by use of the graver. The latter process was free from this objection, and for the better class of illustrations has entirely superseded the other.

Assay of Citric Acid mixed with Tartaric Acid.—We have just repeated in our laboratory the experiment of Mr. Salzer, by means of which it is possible to determine the presence of tartaric acid in citric acid, and we can entirely confirm what this gentleman says. With us, pure citric acid is sold at about 80 cents a pound, whilst tartaric acid costs only 60 cents a pound, and we find in trade crystals of citric acid adulterated with tartaric acid. To discover this mixture, it suffices to dissolve in a small porcelain capsule about fifteen grains of the crystals and to add to the solution one drop of the solution of bichromate of potash. This imparts to the liquid a yellow tint. Now, in the case of citric acid, this tint lasts, at the ordinary temperature, several days, whilst if there be any tartaric acid, even one-half of one per cent, the yellow tint disappears, to be succeeded by a violet tint at the end of a short time, which may vary from fifteen minutes to some hours, according to the quantity of tartaric acid present in the mixture. In this experiment the bichromate of potash is reduced, and a violet salt of oxide chrome is formed.—Dr. Phipson, in the *Moniteur.*

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* Communicated to the Photographic Club.

Patent Intelligence.

Applications for Letters Patent.

11,724. J. Cleminson and H. Bloomfield, 9, New Broad Street, London, "View Finders."—July 23rd.

11,923. F. W. Hochheimer, 4, South Street, Finsbury, London, "Photographic Albums."—July 26th.

11,978. C. Föge, C. Griese, and J. Raders, 45, Southampton Buildings, London, "Apparatus for Receiving Payments and Delivering Photographs."—July 27th .

Correspondence.

THE 1889 PHOTOGRAPHIC CONVENTION.

Sir,—Kindly allow me, through your columns, to announce that the Photographic Convention will be opened on the 19th inst., at St. James' Hall, Piccadilly. The exhibits of apparatus and pictures will be of more than ordinary interest, and many promises of papers are to hand. From the numerous enquiries and correspondence that I receive, it does not appear that the objects of the Association, beyond its roll of members, are generally known. I take, therefore, this opportunity to say that the Photographic Convention was established in 1886, on principles similar to those of the British Association for the Advancement of Science. The increasing importance of photography, both as an art and a science, justified the formation of an association devoted exclusively to its advancement.

The first meeting was held at Derby in 1886, and the increased numbers attending the yearly gatherings held subsequently at Glasgow and Birmingham—opened in each case by the mayor of the town—make it clear that the objects of the association need only be made known to be fully appreciated, not only by those specially interested in photography, but by scientific men generally.

The great interest displayed at each meeting in the papers and discussions, together with the exhibitions of pictures and apparatus, have incontestably proved the usefulness of this organization.

Regarded as a means to the development and cultivation of all matters pertaining to photography, the wide and varied experience which such a large and representative body of members can bring to bear, cannot fail to lead to important and practical results in the solution of the various problems connected with the scientific and theoretical, as well as with the practical and artistic sides of photography. J. J. Briginshaw, *Hon. Sec.*

128, *Southwark Street, London, S.E., July 31st.*

The Influence of Colour.—The influence of colour upon the complexion and general tone of the toilet is very striking. Blondes should avoid the lighter shades of blue, which are apt to give an ashy hue to the complexion. The darker shades of blue may be worn more recklessly by the blonde than the brighter shades, because they throw out the complexion in high relief upon an accommodating background, and the darker and more velvety the shade the finer is the effect. Brunettes cannot wear blue becomingly, since this shade, when shadowed by a yellow skin, enters into a composition of green, and the tawniness of the complexion is increased. The florid brunette can risk the wearing of blue. Green is a dangerous colour for brunettes, but well adapted to the fair. A pale brunette can effectively wear red—it heightens the effect of the brune beauty. It is stated by a reliable authority that "crimson should be charily indulged in by the brunette, but crimson may be worn with safety by the blonde. Yellow is highly becoming to the pale brunette, and especially by gaslight." Yellow grows paler and softer in artificial than in natural light; it enters into the olive shade in the brune skin with a softening effect, giving it a rich, creamy tint that becomes beautiful in contrast with brilliant dark eyes and rich dark hair. The artists long ago discovered what milliners are slow to perceive, and that is, that yellow clears everything.—*Detroit Free Press.*

Proceedings of Societies.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 18th inst., Mr. A. Mackie in the chair.

Mr. A. Cowan spoke favourably of a new developer, eikonogen, which he had recently tried. Samples of the eikonogen powder were distributed. He also showed some bromide opals toned with gold, which he contended were permanent. As a test, he placed one of the plates in a fifty per cent. solution of nitric acid, together with an untoned print. The latter was dissolved at once, while the toned print remained until the film was loosened from the plate. To tone the image, it was left on the toning bath all night—a period of twelve hours; but he believed the toning was fully completed in from four to five hours. He had tried all kinds of reagents at different stages without affecting the image.

Mr. A. Haddon did not believe in the thorough substitution of platinum claimed by Mr. Blanchard in his process. As a test, he placed part of a print by this process, together with a platinum print, in a bottle of chlorine water; the image of the former disappeared, whilst the platinum print remained unchanged.

Mr. W. E. Debenham said that Mr. Cowan had clearly proved that the substitution in his experiment had been thorough. He had seen some prints toned by Mr. W. K. Burton, in which the image had been converted into gold so thoroughly as to render the prints quite permanent. In this instance all the free silver had been washed out previous to toning.

Mr. A. Pringle had confirmed these experiments of Mr. Burton's. In using old paper, he added a strong dose of alkali to the hypo bath; this greatly improved the whites of the print.

The Chairman stated that old sensitized paper gave better prints from thin negatives than the fresh paper. He had used all the various alkalies in toning, but could not detect any difference in the print. It had been stated that the salts used in toning gave a distinct characteristic to the print.

Mr. P. Everitt read a paper on the right to the negative, contending that this right lay with the sitter, and that the photographer was bound to give it up when requested to do so.

Mr. W. E. Debenham was not of this opinion.

Mr. A. Cowan said if the sitter expressed a wish for the negative at the time of sitting, a higher rate would have to be charged for the prints to compensate for the same.

At the meeting on the 28th ult., Mr. J. Traill Taylor occupied the chair.

The Chairman referred to the Blitz lamp of Mr. McCollen, of Philadelphia. Blitz powder, a pyrotechnic compound containing a large proportion of magnesium powder, is blown through a flame from a sponge saturated with spirit. A series of portraits taken with this lamp was shown.

Mr. W. E. Debenham remarked upon the excellent arrangement of the lighting of the pictures.

Mr. A. Haddon then gave details of his experiments in desensitising and resensitising albumenised paper. Several sheets of albumenised paper were floated on a fifty-grain bath; when nearly dry, they were floated on three pints of distilled water, and hung up; after which they were again floated on another three pints of water. This formed normal paper, from which all his experiments were made. Two negatives only were used. A large series of prints was shown as the result of his experiments, also some from fumed paper. In all cases this gave good results.

The Chairman said that fumed paper was used very largely in America. He had found samples of paper that refused to tone had, after fuming, given excellent tones. Mr. Anthony, of America, had shown him some charming prints on Brinckerhof's paper.

On August 8th Mr. Friese Greene will demonstrate his process of photographing on opal cards.

Notts Amateur Photographic Association.

A special general meeting was held on July 22nd at the Association rooms, Cavendish Chambers, Market Street, Mr. Henry Blandy, L.D.S. Edin., president, in the chair. There was a good attendance of members.

Several forms of detective camera and prints therefrom having been exhibited, an animated discussion took place on the proposal to admit ladies as members of the Society, which was carried.

Amateur Photographic Association.

A council meeting of this Society was held on July 20th, at 58, Pall Mall, the Right Hon. Lord de Ros in the chair.

The following members were elected :—Monsieur lo Viscomte de Condeixa, Hon. Maude Lawreuce, Rev. George Perram, Messrs. H. C. Lawson, H. O. Hutchinson, and Fred Wrigley.

The Secretary then laid before the council the pictures for the current year, which had beeu arranged and classified by Mr. Glaisher, Vice-President. There were iu the first class 144 pictures, beiug with one exception tho largest number ever contributed iu the first class.

The council, after examining every picture, and confirming in almost every case Mr. Glaisher's marks, awarded the following prizes :—T.. F. S. Schwabe, the first prize, a large silver goblet ; Mrs. Hobsou, second prize, a silver goblet ; R. Laventhorpe, a silver goblet ; W. Muller, a picture in frame ; R. O. Milne, for a series of large views, a medal ; W. S. Hobson, a medal ; W. Gadduiu, a picture in frame ; F. Griffith, a handsomely bound albuin ; L. Ashburner, for a very difficult Indian iuterior, a medal ; W. Dumergue, a small silver goblet ; the Right Hon. Lord de Ros, a medal ; Sur.-Gen. Foster, a handsomely bound album ; M. de Dóchy, a medal ; R. Murray, a medal ; P. Gunyon, a medal ; Mrs. Benson, for artistic portraiture, a medal ; F. G. Smart, a portrait album.

Hackney Photographic Society.

The gossip night, last Thursday, was devoted to development by pyro, quinol, and eikouogen. The manipulators were Messrs. Dr. R. Smith, Hoddle, Biss, and the Hon. Secretary. A portrait of a lady taken half a dozen times, under precisely the samo conditious, was developed by each developer, and then compared. Pyro was a little hard, quinol and eikonogen much better, the latter, tho much spoken of new developer, showing up very fairly. Neither of the two latter showed any trace of stain.

Mr. Carpenter thought portraiture should only have half the usual quantity of pyro.

Mr. Hodder had a large lamp covered with yellow paper, but it was generally thought that it was unsafe. The same gentleman showed a detective camera of his own construction.

Ten new members were elected.

Liverpool Amateur Photographic Association.

The monthly meeting was held on the 25th inst., at the Associations room, 3, Lord Street, Mr. A. W. Beer in the chair.

Mr. Harry Holt, member of the Ceylon Amateur Photographic Society, was duly elected a member.

Mr. W. Tomkinson reported upon the excursion to the Bollin Valley on Saturday, 29th June. The party numbered sixteen, including two ladies, and on arrival at Manchester was met by Mr. Davenport, vice-president of the Manchester Photographic Society. At Rostherne Village, operations with the cameras began, and were continued until 5 o'clock, when tea was served in one of the cottages, after which the party proceeded to Ashley Mill, where the prize picture was obtained. Two groups were taken as a conclusion. The weather was all that could be desired, the work of the day resulting iu 106 exposures.

Respecting the excursion to Chester on 13th July,

Mr. Tunstall reported that owing to the unfavourable weather, only a few members attended, and operations were confined to the Cathedral. Facilities are granted to photographers at Chester, which he hoped could be obtained at other cathedrals. The full muster was seven, and twenty exposures made.

The President announced that he had much pleasure in stating that the judges, Messrs. Sayce, Atkins, and himself, had unanimously awarded the medal to Mr. William Tomkinson for the best picture taken at the Bollin Valley excursion.

The Hon. Secretary read a circular note from Mr. J. J. Briginshaw, calling attention to the Photographic Convention of the United Kingdom, to be held from the 19th to the 24th August inclusive. Another letter related to the Exhibition of the Photographic Society of Great Britain to be held iu the Gallery of the Royal Society of Painters in Water-Colours, 5A, Pall Mall East, from the 30th of September to the 13th November ; and another to the Exhibition iu the Town Hall, Cardiff, by the Amateur Photographic Society, from the 9th to the 19th October.

Attention was drawn to Oldham's patent dry powder developer (quinol), a sample of which had been tried, and proved very satisfactory.

The President, referring to Dr. Backslandt's patent water developing dry plates, said he could not give a very favourable report.

The Hon. Secretary had also tried a sample (kindly sent by Messrs. Boune) with similar results.

After exhibits of apparatus and complimentary acknowledgments, the meeting closed.

Society of Amateur Photographers of New York.

June 11.—President Canfield in the chair.

The first thing on the programme was a paper by Mr. James H. Stebbins, Junr., on "Suggestions as to the Use of Certain New Organic Reducing Agents as Developers."

Mr. Beach then exhibited a new camera, of which he gave the following description :—The camera which I have the pleasure of explaining to you this evening is a view camera, made by Messrs. S. Wiug & Co., of Boston. This size is adapted for 5 by 8 plates, and has a reversible back, so that the plate can be used up or horizontally. I notice one improvement is in the method of fastening the folding bed. In some cameras the method used is an ordiuary thumb-screw to lock the bed ; in others there are two pivoted hooks, which, in being pushed dowu, clamp the bed. This construction is based somewhat on the same plan, but in a different way. A flat spring hook is attached to the under side of the centre brace of the bottom of the bed. The brace is pivoted to inside of the rear cross bar of bed, and when the bed is turned down the spriug underneath still stays up above the central cross bar until the central portion of the folding bed is pressed down with the thumb. When that is doue, the bed is clamped by the hook and held rigid, permitting the rear of the camera to be drawn out. Then I should call attention to another poiut, and that is, that in the front portion of the camera, at the top, are inserted two levels—one for the up aud down adjustment, and the other for the side adjustment of the camera. The intention is that the camera shall be placed exactly level, no matter if the object which you are going to photograph is on a high hill. Another peculiar feature is the compound rising front. Ordinarily, a rising front is made on one board, which is raised and put in place, and fastened with a thumb-screw. In this case, it is divided into three sections, so that one slides upon the other, and this allows the lens to bo pushed almost to the bottom or nearly to the top of the camera. Another feature of this adjustment is that the lens is held in both the first and second sections of the rising front, and it is because the rising front has to be so thick that it is divided into these different sections. Now I will proceed to level the camera, and then show the adjustment of the lens, which is another novel feature. We will suppose that we are levelling the camera. I have always adopted the method, in taking a view, of having the camera legs spread out well ; then you have a better base, which lowers the camera enough. The point about the adjustment is, that the lens is inserted in a ball and socket joint, and now is pointing up as if one were takiug a view of a house on a hill. If it is desired to change the adjustment, all that has to be done is to rotate the flange ring in front on the risiug front, and in thus loosening the ball and socket joint, the lens can be tilted horizontally, and then, by screwing up the flange, it is locked and held in position. The object of that is to do away with all the swing-backs iu the camera, and the view is adjusted by raising the front and tilting the lens either up or down. It works very easily. In regard to the back attachment, there is simply a frame, something like the Blair camera, and it has opposite the ground glass the arrangement similar to that which is used in an ordinary plate-holder. The ground glass is forced forward by two springs, and on the extreme end, opposite to where the plate-holder is inserted, is an ordinary flat spring, which has a little pin attached to it, which passes through here and operates on the plate-holder. The plate-holder itself is quite a novelty, and quite a radical change ; it is a metallic plate-holder. It is scarcely any thicker than the ordinary plate, and is composed simply of a sheet of tiu which is nicely varnished, and the plate itself is carried on another sheet of tin stamped out the thickness of a plate. At one end of the septum is a spring. The plate is simply pushed in against that spring, and then allowed to slide back until the two little wire fingers ou opposite end of the holder overlap the plate aud hold it. The septum, with the plate in, is then slid into the outer sheath. The operation of exposing a plate is quite simple. After the plate has been inserted in the septum, it is simply pushed home, and the plush on the

outer end of it makes a light-tight joint. There is also a little hole in the end of the septum, into which the spring on the back of the camera catches. After pushing the plate-holder into the back of the camera, when the slide is drawn to make an exposure, the outer sheath is simply drawn off, leaving the plate exposed, the sheath put over again, and it is all done. Now I will show how easy it is to put the plate in. There is a special light valve in the end of the ground glass frame. The little spring on the outside end locks the septum after the plate-holder is pushed in. The lens is capped, and all there is to do is to draw off the sheath, and one can tell by the bright tin of the septum, seen through the ground glass, that the slide has been drawn sure. After exposure, it is simply pushed back, the flat spring lifted with the finger, the plate-holder pulled out, and it is all exposed. When I first saw it I thought it was quite an idea, and quite a radical change from what we have been accustomed to. The only point against it that I made was that the weight of the metal was too heavy; but I believe the makers claim that the weight of the tin or the metal is not more than the weight of an ordinary wooden plate-holder; but I should rather try some experimental tests in weighing before I accepted it as being true.

The PRESIDENT remarked that Mr. Wing was a very ingenious man, and away back in the sixties, Wing's multiplying camera was a very well known article and the subject of a very bitter lawsuit, which was, in the photographic world, a remarkable thing, and was reported all over the country.

After the transaction of routine business, Mr. A. PEEBLES SMITH exhibited a few pictures on the screen, illustrating different developers, and read a paper on "The Making of Lantern Slides" (see page 507.)

Talk in the Studio.

THE *Deutsche Photographen-Zeitung* for July 31 presents as its pictorial supplement an illustration printed from an instantaneous photograph by Ottomar Anschutz of a tiger in the Zoological Gardens at Breslau. The photographic work was attended with much difficulty, and necessitated special arrangements, the animal being taken in a place in which it enjoyed comparative freedom.

A VARNISH FOR NEGATIVES.—M. C. Fabre gives in his *Aide-mémoire de Photographie* the following formula for a varnish that can be applied to photographic films without being obliged to dry them; it suffices simply to allow them to drain: Dissolve 8 grammes (123 grains) of borax and 2 grammes (31 grains) of carbonate of soda in 160 c.c. (5 fl. oz. 3 drachms) of warm water; add 32 grammes (8 drachms) of broken gum lac, stir until perfect solution, filter, then add from 1 to 2 c.c. (16 to 32 drops) of glycerine, and enough water to bring the volume to 320 c.c. (10 fl. oz. 6 drachms). In a few hours a deposit is formed which is caught on the filter, and the varnish is ready for use. Varnishing is done by either immersing the negative in the varnish, or coating it with the liquid; in the last case it is necessary to repeat the operation at least twice. This varnish costs but a mere trifle.

RECEIVED:—From Marion and Co., a sample of their new graduated woollen background material, which, it is claimed, will be found useful in portraiture for both professional and amateur photographers. From Mr. Fallowfield, a sample bottle of his hydrokinone developer, which is said to keep well, and, being in one solution only, easy to carry about and use, and economical, inasmuch as at least half-a-dozen plates can be developed in the same solution. Still another sample of a portable developer comes from Wyleys and Co., in the shape of a tube of so-called "photopel," a hydrokinone developer, the speciality of which is claimed to lie in the fact of its being a compound of that substance with restrainer and preservative; the alkali used with the pellets is potash. Mr. W. F. Stanley forwards a descriptive circular of a changing box for celluloid and other films, being instructions for the use of Ferrero's patent film-carriers, of which Mr. Stanley is the sole maker.

PHOTOGRAPHIC CLUB.—The subject for discussion on Aug. 7th will be "Purifying Water for Photographic Purposes." Bank holiday outing at Godalming; trains from Waterloo at 9.45.

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper and Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

R. J. (Royston).—Since writing to you last week, we have taken occasion to refer to the *Comptes Rendus* of June 17th, containing M. Guignet's paper, but there is no address given; nor, after searching for the patent, No. 1702, July, 1858, is there either name or address. The Guignet green paint is simply put down to "William Armand Gilbee. A communication." Sorry we cannot help you; there is no other course but that already suggested, viz., write to M. Gariel, 4, Rue Antoine Dubois; or to the Editor *Comptes Rendus*, 55, Quai des Grands-Augustins, Paris.

IPSWICH.—If not from one of the three causes already specified, the purple colouration may be due to the action of light upon opalescent chloride of silver vastly stimulated by the presence of gold.

BARYTA.—We cannot see any advantage in using chloride of barium instead of common salt, for if the paper contains, as it usually does, some gypsum among the mineral constituents, this becomes converted into sulphate of baryta, leaving the very deliquescent chloride of calcium in the pores of the paper. Again, the use of barium salt is inconvenient, as causing the wash waters to become turbid, and introducing a quantity of precipitated sulphate of baryta into the silver chloride residues.

PERMANENT.—Is it really worth while going to the trouble of using zinc white for your studio sashes and wall? Remember that the paint requires special dryers (manganese sulphate), and unless you are very vigilant it will be mixed in the usual manner with lead dryers, and then there will be little or no advantage over the ordinary white lead paint.

C. E. (Aberystwith).—Magnus's green platinum salt is obtained by passing sulphurous acid gas through a warm solution of tetrachloride of platinum until it no longer gives any precipitate with sal-ammoniac. An excess of ammonia is then added, when the green crystalline salt is gradually deposited in needles. For further details refer to Gmelin's "Hand-book of Chemistry," vol. vi., p. 304. Its constitution shows it to be an ammonio-platinous chloride.

L. A.—Having heard no more about the matter, we are inclined to think it has fallen through. If you will take the trouble to call upon us at Canonbury, we will show you the later correspondence. We coincide with your remarks about the weather since the 7th July.

PHILOS.—Stamped copper hemispheres can be got at Messrs. Stanton Bros., Shoe Lane. One of these would serve exceedingly well for boiling down alkaline liquors, but must not be used with salt or acid.

M. P. S. (Malvern).—You will find Baekelandt's water-developing dry plates quoted in Mr. J. Fallowfield's circular, July, 1889. We have not yet tried them, but they are said to develop simply in cold water. About their permanence we know nothing.

STATE PHOT.—The Belgian *Bulletin*, No. 6, for June, has a very interesting article by M. Bertillon on police photography, well illustrated, from which you ought to be able to gather some useful hints. A pair of plates show the same young prisoner on first and second conviction, and another demonstrates the English system of taking both profile and front face on the same plate.

R. D. (Southport).—The photo sent is undoubtedly an ordinary silver print on albumenized paper, and answers to all the chemical tests.

STRIPPING FILMS.—The gelatine skins for transfers of your size cost a penny each, and for rubber solution and plain collodion about another penny.

RECEIVED WITH THANKS—Associate-member's ticket for the Paris Congress, August 6th to 17th.

BLISTERS.—We agree with you as to the probable cause of blistering. In hot weather, when the paper is unusually dry and horny, the penetration of any liquid is more likely to loosen the attachment of the coagulated film. If this be so, the remedy ought to be a short exposure of the paper to a damp atmosphere before proceeding to sensitize it. We should be glad to know your experience, for as you find there is no difference whether an acetate or borax toning bath be employed, it is useless to modify this part of the process. You might also try the addition of a little methylated spirit to the silver bath.

SILVIO.—The substance called "ivorine" is much the same as xylonite. Try a small piece to see whether it is highly inflammable.

THE PHOTOGRAPHIC NEWS.

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SKILLED LABOUR IN PHOTOGRAPHY.

A FORTNIGHT ago a wail arose from the side of the Thames, and found its way into these pages, from an unfortunate photographer accustomed to the production of pictures of the crews of boats, who finds his means of subsistence gradually disappearing, as those crews, in these days of cheap apparatus and easy processes, reappear as amateur photographers with their quarter-plate camera on board. They even ask the hopelessly expectant photographer to release their shutter for them, that all their party may appear in the picture. As the wheels of the car of civilization roll onward, it is hard that the weakest are crushed thereby, although the many are the gainers; but, in such cases, the sufferers seldom consider to what extent their position is their own fault. The world is a great market, and he who wishes to obtain much wealth therein—which, by the bye, is a low and mean object for which to devote the best energies of a life—must take into that market things which the purchasers most desire to buy. A trade which can be learnt in two or three months is evidently one of no great value, and liable to be depressed by the action of amateurs and numberless professional competitors. What right, however, has a man who sacrifices but two or three months in learning some simple work, to expect the world for that reason to keep him in food and clothing for the full term of his natural life? If he had spent five or six years in learning some skilled handicraft, necessitating also the exercise of brains, the position would be different, and by his own exertions he would thereby have rendered himself independent of all but an inappreciably small number of amateurs.

"The ease of the gelatino-bromide process has ruined numbers of professional photographers," say those who suffer. Not at all. The more just way in which to put the matter is, "We are so little skilled in our work, that any amateur may become level with us after, say, six or twelve months' experience." Really clever men at their profession—such as Van der Weyde, for instance—have nothing to fear from the amateur; only second and third-rate men are in danger.

If present photographic processes are so easy as to invite overwhelming competition, why do professionals adhere thereto? Why not take up processes more difficult than the much regretted wet-plate process of the past? Ceramic photography, for instance, produces valuable and beautiful results: why not, by personal industry and experiment, become a master thereof, with the certainty that but a minimum of amateurs will tread the same difficult path? Very few photographers in this country can produce passable burnt-in enamels at all, and not one, so far as we know, can produce any to equal the magnificent specimens which Messrs. Bencque and Co., of Paris, put on view two or three years ago at the exhibition of the Photographic Society of Great Britain. The point now desired to be inculcated is, that a man who desires to make his mark in the world must sacrifice some few years of his life to steady work, making himself a skilled labourer, and thereby freeing himself from the competition of all but those few who similarly sacrifice several years of their lives. Although individual cases of suffering are painful to the observers, the world is usually more just than the sufferers are prone to think, for they rarely pause to ask the question whether their work deserves more recognition by society than it receives.

DEFINITION.

BY H. P. ROBINSON.

THERE is a great deal of misconception at present afloat on the subject of definition and detail as it is used in art. This has been caused in a great measure by the publication of Dr. Emerson's book entitled "Naturalistic Photography," in which he endeavours to prove that all photographers, with the exception of one or two, of which he himself is one, have never understood the right use of lenses, or where to introduce definition; and, at the same time, his object seems to be to show that photographers know nothing of their art, and are uneducated, ignorant, and untrained, and he says this notwithstanding his own dictum that "it cannot be too often repeated that artistic criticism is not authoritative unless made by masters of the several arts," of which he can scarcely claim to be one.

It is not my intention here to defend photographers from the injurious aspersion of being as a body a set of ignoramuses; indeed, I should consider it an impertinence to suggest that they want defending from such a false accusation; but a word or two on definition just now may be in season.

In addition to the uneducated condition of photographers, Dr. Emerson seems to have got into his head—for he writes on the hypothesis—that all photographers strive to get their works *sharp*, and sharpness seems to be connected, in his mind, with hardness. This mistake, perhaps a natural one, could only arise from a very limited knowledge of the works of photographers. Every photographer knows that softness is quite compatible with the utmost sharpness, and that for many years the best photographers have known, and worked on the knowledge, that the utmost degree of sharpness was not desirable, and that when undesirable sharpness was apparent, it was caused by stopping down the lens, not for the purpose of obtaining sharpness, but in order to get depth of focus, so as to get rid of that fuzziness and distortion which is the defect of the optical lens, and in which it differs so much from the

lens of the eye, with its iustantaneous adjustment which enables it to have true depth of focus, and optically to render all planes alike ; not sharp in one plane, aud fuzziness in all others, as Dr. Emersou would recommend, but in tolerably even, well-defined focus throughout.

By his definition of "depth of focus" it is evident that Dr. Emerson does not know the meaning of the term. He says :—"By 'depth of focus' is roughly meant the *sharp* rendering of the different planes of a laudscape or auy object with more than one plane iu one plane. Needless to say, this quality, greatly sought for in lenses by photographers, is a thing to be carefully avoided iu artistic work." Depth of focus does not necessarily mean the *sharp* reudering of the different planes ; it simply means that the differeut planes shall be in moderate focus without fuzziness or distortion. In practice, this is usually produced by the construction of lenses which distribute the focus, and which those photographers whom Dr. Emerson accuses of such inordinate affection for sharp pictures, forced opticians to produce against their own optical judgment ; lenses in which the sharp plane of focus is broken up and spread over different planes as far as their means would allow. Perhaps, however, I have misunderstood Dr. Emerson iu the sentence I have quoted, for, I confess, I have not been able to understand the words, "or any object with more than one plane in one plane." There may be an occult meaniug in this beyoud my compreheusion.

It may be taken as an axiom that every portiou of a photograph that is out of focus is distorted and uutrue. It may be of no consequence in practice artistically when present to a small exteut, but that does not alter the scieutific fact. This may not be visible to Dr. Emersou, for he cries out for strict truth, and yet puts his pictures out of focus, and it takes the eye of a trained artist to know whether his work is true or false, especially in the more delicate and subtle portions. "To appreciate falseness in drawiug requires cousiderable training," as Dr. Emerson has himself well said. This falseuess could be easily proved by the laws of optics, but it is so well kuown by those for whom I write, that it is not worth while going further into the subject here.

Now Dr. Emerson recommends that *all* the picture should be out of focus, not equally, but in various degrees, so that it would be not only not true to nature, but false in various degrees. He recommeuds the student to "focus for the principal object in the picture, but all else must not be sharp ; and even that principal object must not be perfectly sharp." This is the kind of representation of nature which profanes the name of naturalism !

Yet it must be confessed that some amount of scientific falsity must be admitted into photography. Nothiug in the world is perfect, aud art is but a series of compromises. We work with imperfect tools. The lens is not a perfect instrument. While the eye adapts its focus instantaneously to all planes, the optical instrument has a fixed focus, or one only. Dr. Emerson's photography will be seen, therefore, by its having one plane sharper thau all the rest, to give what might be called the truth as it is in the lens, which, like Laucelot's faith, is only falsely true, and the name "naturalistic" is only an assumption. What photographers, who are also artists, want, is as uear a represeutation of nature, as seen by the uaked eye, as they can get ; and knowing how far from nature, even under the most favourable circumstances, that really is, they take carc not to boast of how very natural their pictures are. They accept the fact that the lens does not sce as the eye does, but they do not try to persuade themselves that the eye is an imperfect instrumeut, as the impressiouists do, but they seek to make the lens imitate nature—it must be confessed afar off—and not to degrade the eye to the level of the lens to suit their theories. For this end, they make their lenses distribute the focus over as great an extent of plaues as they can, not for the purpose of obtaining hard-biting sharpness, but that they may imitate nature more exactly as seen by the eye. In this they have often to admit much that is not absolutely true, because they cannot get all the planes of au extensive scene in focus. They admit the force of the proverb "needs must when the devil drives," but they avoid much of the distortion and untruth of a naturalistic picture.

The whole of this part of the subject may be summarised as follows :—

Artistic photographers endeavour to make their lenses represent nature as seen by the eyes. Naturalistic photographers degrade nature to the level of what the lens sees.

Artistic photographers say that the eye practically sees all planes at once, and try all means, such as diffusion of focus and the use of the swing-back, to represent her as she appears, but it is a mistake to say they want everything microscopically sharp, as Dr. Emersou would have us believe. The naturalistic says we must represent nature as she would appear in a theoretical instant of vision when the centre of one plane only is in focus, and the rest coufusion. The artistic photographer says this could not practically happeu, and he cares not for theories of the invisible in a matter of practical art.

THE REACTIONS OF OILS WITH SILVER NITRATE.

Raoul Brulle says that if we treat 10 c.c. of au oil with 0.5 c.c. of fuming nitric acid in a porcelain capsule, aud heat the mixture, with brisk stirring, until froth appears, different colourations are produced according to the oil used. The treatment is continued, adding 5 c.c. of a solution of silver nitrate at 2½ per cent. in alcohol at 90 per cent. If we continue heating, there comes a moment, about 115°, when the silver nitrate is suddenly decomposed and metallic silver is deposited. We continue heating so as to let the first reflectious disappear, and we observe on the sides of the capsule the colour of the thin oily layer seen on inclining the capsule and the metallic reflections on the surface of the liquid. On saponifying the oils, and treating them in the same manner, we obtain quite different colours, as obtained in the table :—

1.—*In the Natural State.*

Oil.	Oily Layer.	Reflection.
Olive	Olive greeen	Green
Cotton	Green	Ash green
Sesame	Chrome green	Light Sèvres blue
Earthnut	Yellowish green	Emerald green
Camelina	Persian lake	Light blue
Linseed	Dragon's blood	Emerald green
Colza	Persian lake	Cyprus green

2.—*When Saponified.*

Oil.	Oily Layer.	Reflection.
Olive	Mars orange	Cyprus green
Cotton	Terra di Sienna	Cobalt violet
Sesame	Gold yellow	Cobalt violet
Earthnut	Persian lake	Light violet.
Camelina	Deep chrome	Blue
Linseed	Black	Green
Colza	Burut carmine	Ultramarine

The names of the colours are those used by artists in water-colours.—*Chemical News.*

Popular Newspapers and the Technical Press.—Last week a uotice was printed in this journal about the ignorance displayed in relation to scientific subjects in average leading articles in daily and other popular newspapers. *The East Cumberland News* of July 13th contains an example of an editor writing a leading article on a subject he does not understand, although apparently fortified by a scientific book at his elbow at the time of writing. He gives his readers the valuable information that light is transmitted by vibrations of air, as follows : —"The sun, which is now bestowing its special fevours upon us, is the source not only of light and heat, but of growth, and life, and motiou. Everything in nature is in a state of unrest, or vibration ; and the external world would be invisible to us but for this vibration making itself evideut through the medium of the air. The heat of the sun, causing the vibration, is therefore the source of light also; it, as Mr. Lockyer says, is the producer ; it affords the medium along which the vibrations of distant objects reach our sight ; reflecting substances auywhere, whether they be clouds in Jupiter or a tree or a ceiling, are the distributors."

PHOTOGRAPHIC JOURNALISM IN INDIA.

[From the July number of the *Journal of the Photographic Society of India.*]

Readers of the journal will be pleased to learn that an able judge has been chosen to determine the merits of the original papers which, before long, I hope to see presented in competition for the prizes to be awarded under the resolution of the committee :—

"Resolved that the journal be published monthly in a more useful and attractive form, increasing the number of copies to at least 1,000 per issue; that honorariums for valuable original literary matter be grauted; that rewards iu money, medals, and certificates, be offered from time to time for the best papers on subjects to be named by the editor, and the prize papers published in the journal; that periodical rewards be offered for the best photographs on purely Indian subjects, and arrangements made to have these prize pictures reproduced in the journal by some of the photogravure processes now in use; that prizes be given at stated intervals for the best series of lantern slides illustrative of excursions and tours in India; that advertisements for the journal at fixed rates be accepted."

It would appear as if our project to reproduce the prize pictures in the journal is to be a Herculean task. To be done at all it must be done well. The art is one requiring great skill and knowledge of photoglyphic engraving—one, indeed, which is carried on in England and elsewhere with great secrecy as regards the processes. But it is difficult to believe that, in the whole of India, the photographic branch of the Surveyor-General's department is the only institution capable of producing work of the kind we want. Unfortunately this department has already in hand as much work of the kind as it can undertake, so that our one chance of having our pictures engraved there has had to be abandoned. I wish this paragraph would meet the eye of an enterprising individual skilled in the mysteries of photogravure, or, better still, of our Calcutta publishing firms. I am told there is a great field for work of this kind in India. Meanwhile, it looks as if we must send our negatives to England to be reproduced, and wait, like the great Micawber, for something to turn up.

These pictures, like Indian carpets, have to be paid for according to their size and the skill displayed on them. Every square inch will cost a sum which I fear to mention in the hearing of any of the committee. In this new venture, therefore, the utmost caution must be exercised. Indeed, in this matter, I feel much in the position of the cat on the wall. Once upon a time a Scotch padre, preaching to his flock on the moral aspect of heedfulness, espied a cat daintily picking her way amongst the broken glass which studded the wall of the kirkyard. "Do you waunt to knoaw hoo to walk circumspectly?" said he solemnly, pointing through the window at her cautious movements—that caut (*trouncing the pulpit and looking severely at his congregation*), my dear brethren, that caut (*here breaking into an air of triumph*) waulks circumspectly."

So readers will observe that the dimensions of the journal have been reduced somewhat since its last issue. It was an unexpected blow to my ideas of what symmetry and size in a photographic journal should be to learn that they were bounded by some unknown and unwritten laws of the photo-lithographic art, which determine the proportions of a photograph. All will be glad to read that Colonel Waterhouse intends to contribute to its columns from time to time, and that other able writers on photographic subjects have signified their willingness to send me original papers for publication. Already, therefore, there are indications that our little venture is winning its way towards a useful place in the photographic world.

Being a Scotchman, I am "aye pickin' up." In the last number I asked for contributions of prints for our club album, and members will be pleased to know that Mr. Apjohn has promised to send me some of those so much admired at our last Thursday evening meeting. The club is also in want of some good books, works of reference on photography, and kindred subjects. As much of our money is being applied at present to the development of the journal, I have no hesitation in asking readers for donations of their spare books to form the nucleus of a library.

THE PHILADELPHIA PHOTOGRAPHIC EXHIBITION.

The Third Annual Joint Exhibition of the Society of Amateur Photographers of New York, the Photographic Society of Philadelphia, and the Boston Camera Club, recently held in the galleries of the Pennsylvania Academy of the Fine Arts, Philadelphia, has been reported upon by its managing committee, and the following extracts from the report show that influences felt in England are also at work in America :—

Your Committee believes that critics generally recognised a marked improvement in the quality of the pictures exhibited by all participants. The increased proportion of bromide and platinum prints was noticeable over former exhibitions, and indicates a change of taste from the warm tones and glossy surface of the albumen print to something more permanent and more pleasing to the eye of the artist. An even greater revolution may be expected within the next year, owing to the introduction of the cold process in platiuotype printiug, and iu the new toning of plain silver prints with a platinum salt.

The aristotype and prints made from negatives on orthochromatic dry plates, and prints from celluloid films, were among the newer features of the exhibition. The exhibits of pictures made with detective cameras were interesting iu many respects, and no doubt furnish valuable studies for an artist; but, in close comparison with larger and direct prints from negatives made with time exposure, they suffer in respect to technical qualities and the careful composition so important to a photographic picture. It is to be hoped that the ease and fasciuation of hand-camera work will not induce photographers to neglect the use of the larger plates or films, which, though entailiug more cost, care, and labour, repay it all in more satisfactory and pleasing results. We are informed by one of our foreign exhibitors that among landscape photographers of England who aspire to pre-eminence in their art, larger plates are now in use than ever before.

THROUGH JAPAN WITH A CAMERA.

BY W. K. BURTON.

Chapter VIII.

Shirakawa—The Total Eclipse—A Japanese Castle—The Japanese Feudal System—Earthquakes—Fires—Sendai Black Wood.

The 16th of August saw us at Sendai, where we had business, and where we should have stopped. I was determined, however, to be at Shirakawa on the 18th of August, so as to see all the preparations made by the Americans for the observation of the total eclipse. So I decided that we should travel to this place, and come back again to Sendai for our work. I have already sent to England a note on the arrangements made for the eclipse. Had we stayed at Sendai we should have seen it fairly well. We would not, however, have seen the arrangements made for observing it, and, moreover, would not have seen the beautiful country surrounding Shirakawa, so that I by no means regret the extra distance travelled, or the time taken.

The country around Shirakawa is, as I have said, beautiful. It is of hill and dale, valley and rice field. Various of the party, myself included, made several photographs of bits of it, but I don't think that any of them convey a good idea of the nature of the scenery. To me the most interesting place was the castle, which had been selected as the observatory by the Americans, and from which the views just mentioned were taken.

It is a thing difficult to appreciate of this now eminently constitutional and peaceful land, that only twenty years ago it was regulated by a feudal system as complete as that which existed in England in the middle ages; that only twenty years ago there were feudal lords, or daimio, who

had their crowds of retainers, fighting men, called Samuri, a set of swashbucklers, who went about armed with two swords each, who were scarcely amenable to any law, were continually quarrelling and brawling and chopping off each other's heads in a gay and festive sort of manner, not to mention their habit of performing hara-kiri, or of committing suicide by the very nasty method of disembowelling themselves with a knife, very often for no very palpable reason other than, perhaps, "to encourage the others." Of the Castle of Shirakawa, it is also almost as difficult to believe that it was only twenty years ago a stronghold of one of these same daimio, and was in actual service. So quickly does the exuberant vegetation of Japan spread and cover every spot left open to it, that the walls of this castle are now clothed in such a profusion of trees, bushes, plants, underwood, creepers, and moss, that they look as if centuries must have passed over them since they were in active service, and must have been kept clear of all vegetation except, perhaps, the large trees.

A Japanese feudal castle is a very different affair from an English castle of the middle ages. The tall, square castle and keep, with which we are familiar in a ruinous condition at home, would have been impossible in Japan, on account of the earthquakes, if nothing else. The so-called Japanese castle would be better understood if it were described as a fort or fortified hill. So far as I have seen, a piece of elevated ground is always chosen for the castle, and this is fortified by heavy embankments faced with stone, and moats constructed in a complicated manner around it.

It is rather less than twenty years since the revolution took place which resulted in the complete and sudden overthrow of the feudal system. Before that time there had been a double rule in Japan, the power being shared in a way too complicated for most foreigners to understand, much less to describe, between the Mikado and the Shogun. The former espoused the popular or anti-feudal cause; the latter adhered to the old system. The daimio took different sides, according to the opinions or sentiments they held. Shirakawa was the scene of much fighting. The castle was, at first, in the hands of a daimio who favoured the Mikado, but it was attacked and taken by the Shogun's soldiers. It was, however, retaken within a week by the Mikado, who was finally victorious everywhere.

The evening of the day after the lamentable 19th we made our way from Shirakawa as far as we could by rail on our way back to Sendai; but this still left us nearly ninety miles to do in jinrikisha. By getting up before daylight, however, and by having frequent changes of two men, we managed to do the distance within the day. Dr. Goto had left us at Shirakawa, so that I had only Nagasakisan with me now.

Of the town of Sendai two things particularly remain in my mind. One is a street corner where there are several houses exhibiting the more florid style of ancient Japanese architecture. These houses are, I was assured, over three hundred years old. This, it must be understood, is a very rare thing in Japan, the prevalence of earthquakes and of fires, combined with the fact that the flimsy wooden houses that the Japanese build are naturally not very permanent structures, reduce the average life of a house in this country to something comparatively very short.

A word on the earthquakes. There are, in Japan, something approaching 1,000 earthquakes in each year. The vast majority of these, however, are quite local, and are so feeble as to be observable only by delicate instruments. Perhaps about once a month there is in any one place in Japan an earthquake distinctly perceptible to those who happen to be awake. I have perceived only one as yet, and that was at Sendai. Shortly after I had gone to bed it came. There was a shock—not violent, but much sharper, more like a blow than I had imagined an earthquake to be—which made the joists of the house creak loudly. Then for about thirty or forty seconds there was a perceptible trembling.

Of course such earthquakes as this do no harm to wooden houses; they slowly disintegrate brick and stone houses, unless certain precautions are taken in building; but since there has been any record of such things in Japan, there have been an average of three or four terrible earthquakes in each century. These have levelled even wooden Japanese houses. The ground is said at the last of these to have opened and swallowed up thousands of people. The loss of life in Tokio alone is said to have been, on the occasion of the last of these, some 20,000 souls.

Naturally, with wooden houses having charcoal fires in them, such an earthquake is generally followed by a conflagration; but leaving the occasions of great earthquake out of the question, there are continual fires in all towns in Japan. In fact, if one considers the tinder-like nature of the houses, and the way in which they are heated and lighted with mineral oil lamps, and that the means of fire extinction are of the very crudest, the astonishing thing is that there are not more fires than there are.

It will now be understood how rare a thing it is to see a really old house in a Japanese town.

The second thing that I remember Sendai for is a very beautiful black wood-ware. The wood is, I understand, fished up from underneath the river which passes through the town. It is quite black; and very beautiful objects are fashioned out of it. The most extraordinary thing about it is its weight. Dr. G. Cargill Knott has taken the specific gravity of one of the carved trays that I bought, and finds that it is very nearly 1·3.

THE BRITISH ASSOCIATION.

This year's meeting of the British Association for the Advancement of Science will be held at Newcastle, from September 11 to 19. At the first general meeting, on September 11, at 8 p.m., Sir F. Bramwell, F.R.S., will resign the chair, and Prof. Flower, C.B., F.R.S., the President-elect, will assume the presidency and deliver an address. The different sections will assemble on the following morning for the reading and discussion of reports and other communications. The following are the Presidents of the Sections:—(A) Mathematical and Physical Science, Captain W. de W. Abney, R.E., C.B., F.R.S.; (B) Chemical Science, Sir I. Lowthian Bell, F.R.S.; (C) Geology, Prof. James Geikie, F.R.S.; (D) Biology, Prof. J. S. Burdon-Sanderson, F.R.S.; (E) Geography, Col. Sir F. De Winton, K.C.M.G.; (F) Economic Science and Statistics, Prof. F. Y. Edgeworth, M.A.; (G) Mechanical Science, Mr. William Anderson, M. Inst. C.E.; (H) Anthropology, Prof. Sir W. Turner, F.R.S.

On Thursday evening, September 12, there will be a *soirée*; on Friday evening, September 13, Prof. W. C. Roberts-Austen, F.R.S., will deliver a discourse on "The Hardening and Tempering of Steel"; on Saturday evening, September 14, Mr. B. Baker will deliver a discourse on "The Forth Bridge"; on Monday evening, September 16, Mr. Walter Gardiner will deliver a discourse on "How Plants Maintain themselves in the Struggle for Existence"; on Tuesday evening, September 17, there will be a *soirée*; and the concluding meeting will be held on the afternoon of Wednesday, September 18.

Excursions to places of interest in the neighbourhood of Newcastle-on-Tyne will be made on the afternoon of Saturday, September 14, and on Thursday, September 19.

The Local Secretaries for the Newcastle meeting are Prof. P. Phillips Bedson and Prof. J. H. Merivale.

The Reception Room will be opened on Monday, September 9, at 1 p.m., and on the following days at 8 a.m., for the issue of tickets to members, associates, and ladies, and for supplying lists and prices of lodgings, and other information to strangers on their arrival. No tickets will be issued after 6 p.m. In the Reception Room there will be offices for supplying information regarding the proceedings of the meeting.

Good photographs are always instructive to the artist; the drawing is so beautifully correct in details. After turning over many, if they be well selected, it seems almost impossible to look at sketches, except by the very first masters.—Tristram J. Ellis, *Sketching from Nature.*

THE EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF INDIA.

The third annual exhibition of photographs and photographic apparatus will be held by the above Society in Calcutta during December, 1889.

The committee of the Society consists of the president, Surgeon-General Sir Benjamin Simpson, M.D.; vice-president, Nawab Ashanallah Khan Bahadoor of Dacca; J. G. Apcar, P. Donaldson, N. Giannacopulo, J. McDowell, H. C. Pinkerton, A. Tocher; A. Flemming, hon. sec. Exhibition committee: W. M. Osmond, G. J. Stavridi, G. J. R. Leeson, N. Giannacopulo, A Flemming. Judges to be appointed hereafter.

The prospectus sets forth that an International Exhibition will be held under the auspices of the Photographic Society of India, in Calcutta, during the month of December next. The Exhibition will embrace every branch of art and manufacture connected with photography, and will thus afford to those who make a study of the art science, whether professionally or otherwise, an opportunity of becoming acquainted with all the most recent improvements and developments introduced by home and foreign firms. The Society's medals and certificates of honourable mention will be awarded to the best exhibit or exhibits in each section of photography, including photographic apparatus, provided the judges deem such exhibit or exhibits of sufficient merit. From the decision of the judges there shall be no appeal. The exhibits of *bonâ fide* amateurs in India will be classed separately. Preference will be given to those which are certified to be entirely the exhibitor's own work.

The following classification has been adopted :—

Division A. Photographs.—Class I: Section 1, landscapes, architecture, interiors; Section 2, portraits, groups, studies; Section 3, genre-pictures, animals, still-life; Section 4, instantaneous photographs; Section 5, combination pictures; Section 6, stereoscopic pictures. Class II: Section 7, astronomical photography; Section 8, micro-photography; Section 9, other scientific photographs. Class III: Section 10, pictures of machinery and other industrial art objects; Section 11, lantern slides; Section 12, photographs on wood, glass, linen, china; Section 13, reproductions and enlargements. Class IV: Section 14, miscellaneous negative and positive processes; Section 15, heliotype, and photo-engraving. Class V: Section 16, photographs taken by artificial light.

Division B. Photographic Apparatus and Appliances.—Section 17, tourist, studio, copying and hand cameras, tripods, and studio stands; Section 18, laboratory furniture and miscellaneous appliances; Section 19, lenses; Section 20, instantaneous shutters; Section 21, enlarging apparatus, and optical lanterns; Section 22, stereoscopes, graphoscopes; Section 23, dry plates, positive and negative paper; Section 24, frames, mounts, albums.

The following regulations have been drawn up :—

I.—Particulars of exhibits are to be sent on the enclosed form to the executive committee not later than October 15, 1889. English and European exhibits should be dispatched not later than October 1st, and those from America a fortnight earlier.

II.—All goods and pictures, carriage paid, should be addressed to the Exhibition Committee, Photographic Society of India, 29, Chowringhee Road, Calcutta, and must reach the executive committee not later than November 15th, 1889.

III.—At the close of the exhibition each exhibitor or his deputy must pack and remove his goods at his own expense. The Society will, if desired, undertake this work for exhibitors.

IV.—The executive committee will assign spaces, and determine the arrangement of exhibits.

V.—A non-transferable admission ticket will be supplied to each exhibitor, which will pass the holder into the exhibition without payment.

VI.—No exhibits shall be removed before the close of the exhibition. The executive committee will have all exhibits insured against fire; but, while exercising all reasonable care, will not undertake any responsibility for other damage or loss.

VII.—Five per cent. of price received for any articles sold at the exhibition must be paid to the exhibition fund.

VIII.—The catalogue will have an appendix of advertisements, for which the rates will be :—For a whole page Rs. 15 (£1), half a page Rs. 8 (11s.), a quarter of a page Rs. 5 (6s. 8d.), and eighth of a page Rs. 3 (4s.).

IX.—All communications and remittances to be addressed to the Chairman of the Executive Committee, Photographic Society of India, 29, Chowringhee Road, Calcutta.

X.—The executive committee reserves the right of issuing further rules.

FRENCH CORRESPONDENCE.

Universal Exhibition—Carbon Process without Transfer—Phototypographic Process—Automatic Printing—International Photographic Congress.

Amongst the most interesting things brought to light by the Universal Exhibition is Artigues' new process. The name is already well known in the photographic world by means of a paper covered with a mixture of gum and china ink for the purpose of reproducing line drawings, but not adapted for rendering half tones. The son of M. Artigues, following in the footsteps of his father, has perfected a carbon paper in such a way that it may be employed directly for the production of carbon prints in half tone. I say directly; that is, that there is no necessity to have recourse to the transfer of the image to any other support, either rigid or flexible. The paper is sensitized in a bath of bichromate of potash at two per cent.; then it is exposed with the coated side next to the negative. The length of exposure naturally varies with the intensity of the negative. The development is carried on in a way which, together with the preparation of the coated paper—on which I shall have more to say—constitutes the originality of the process. The exposed paper is suspended by American clips to a straight-edge; it is thus maintained in a vertical position; then it is washed from top to bottom with water at a heat of 26° Cent., holding in suspension very finely-sifted sawdust. There is thus formed a sort of soft pencil, which removes from the paper the particles of carbon not required for the formation of the image. The development must be carried on very slowly, and occupies about a quarter of an hour, but it is possible to treat several prints at the same time by hanging them from the same straight-edge, and washing them all with the water-brush just described. Little by little the image appears, and at last we have a proof which, when dry, has the velvety aspect which is characteristic of the results of this curious process. The method thus differs essentially from the well-known ordinary carbon process, which yields more or less glossy images, and which requires one or two transfers, according to whether the image is to be reversed, or seen in its natural position. The principle on which the process is based is not indicated by the author; he does not say how he prepares his coated paper, and I am thus reduced to forming my own hypothesis without fear of indiscretion, since nothing has been confided to me. In my view, the paper is prepared by sprinkling the powdered carbon upon a coat of gelatine previously laid upon the surface of the paper, and rendered moist before the application of the powder, which may be either black or of any other colour. The powder adheres to the gelatine, and, after drying, the surplus is removed with a soft brush or with a pad of cotton-wool. The appearance of the paper resembles that of velvet or flock paper. After exposure, the particles retained by the insoluble gelatine are more or less numerous, as they correspond to the more

or less transparent portions of the negative. Where the luminous action is most intense, a greater number of the particles are retained, and the colour is black ; on the other hand, where the light has acted feebly, only a faint tint is seen, the number of imprisoned particles being, in fact, less, and the same result takes place as in the phototypographic processes with the aid of a network, or of naturally grained particles. Assuredly we might, with the aid of this process, arrive at a practical method of preparing plates for engraving, or of vitrifiable photographs, if we substitute metallic oxides for the powder used in the process of carbon printing. Interesting experiments may be made in this novel direction, the operation in which is inverse to that ordinarily carried on with the help of network or interposed granules.

Photographic novelties are far from being as numerous in the Universal Exhibition as there was reason to anticipate ; I have certainly studied the display, being a member of the jury, and have found very few interesting facts to be gleaned. There are a good many beautiful results of scientific and industrial applications of great interest, but what is lacking is invention—things which are original. Although I have followed step by step the march of photographic progress, I expected to find some new ideas spring forth—some ideas, applications, or apparatus not known before the Exhibition, held, as it were, in reserve until the present moment, in order to take us by surprise.

There is certainly the automatic exposing apparatus of M. Dessendier, of which something should be said. This instrument is, it must be admitted, of so complicated a character as to render its pratical employment very difficult ; the manipulations necessary for setting it to work are of extreme delicacy, but there is not the less the solution of a problem which an inventive and enlightened mind might cling to with extreme tenacity—and this is what M. Dessendier has done. The instrument consists of two distinct parts ; firstly the photometer, and secondly the working of the exposing frame. A third organ is the electric motor, which transmits the action of photometer to that of the frame by means of clockwork, destined to put in action the movement of the frame each time that, an image being printed, the paper is replaced by a fresh supply. The photometer employed by the author of this curious apparatus is based on the well-known phenomenon of the combination of chlorine and hydrogen under the influence of luminous rays. It is known that if a mixture of these two gases is suddenly exposed to the direct rays of the sun, an explosion is produced by the fact of the rapid combination of the elements ; but if the light only acts in a diffused state, and in restrained quantity, the combination works gradually and in direct proportion to the intensity of the luminous rays. M. Dessendier utilises the vacuum resulting from the combination of the two gases, which are led in a pure state into a vessel conveniently placed, to produce by the aid of a metallic index an electrical contact. Electro-magnets worked by accumulators operate in their turn upon the clockwork movement that works the printing frame. The whole is regulated beforehand according to the amount of luminous action which may be required for each print, as the negative is more or less intense. It would occupy too much space to say more of an instrument the time for the practical application of which has not yet arrived, but it is well known that in the matter of invention the march is always from the complex to the more simple, a reflection which bids us hope that it may be thus with the instrument of which I am speaking. To sum up, it works, and I have seen the automatic operation carried through, with much precision, the fresh paper being substituted for that which has been sufficiently exposed, and the whole following the immediate direction of the light, transformed into a sort of regulator of unparalleled delicacy. I will add that this photometer might be employed with success in the meteorological laboratories for registering the sum of the daily luminous intensity. Of all the instruments for this purpose that I have studied, this is certainly the one which ought to lead to the best results.

Amongst the processes of photogravure in relief, or typogravure, I hoped to find many, and better ones. Besides those processes which have become current, we find ourselves in the presence of the pretended invention of M. Klary—a feat of skill, at the most—and of which I think we are able to indicate the principal points. A web is interposed between a negative and a sensitive gelatino-bromide plate ; it is developed with pyrogallic acid, which renders the gelatine insoluble, or rather contracts more in the parts that have been acted upon by the light. It is then washed in water sufficiently hot to dissolve all the gelatine that has not been acted upon by light, and we thus obtain a proof having reliefs which it is easy to transform into an engraved plate. Bichromate may certainly have its place in the process. The method is not new, but a commercial industry based upon it does not yet exist. Variations of this kind are numerous, and although I do not say it with regard to the case in question, they are too often but a pretext for seeking capital.

We are on the eve of the International Congress of Photography ; the preparatory announcements have been published, and points of departure for the discussions have been arranged, whether well or without sufficient importance does not matter ; it is the Congress which has to put everything in place, if it happen that among the proposed solutions there are points not very practicable, or that there are omissions to be filled up. Amongst these announcements are some that appear to me to go beyond the limits of the theoretical science of many, and it seems to me that it would be well to enter upon a less theoretical and more practical course. The eminent scientific men whose participation in this Congress cannot fail to contribute to its éclat and add to its authority, ought not to exercise upon its decisions an influence of a character to lead it too much from the practical paths in which, above all, it is desirable to see it engaged.

Leon Vidal.

PHOTOGRAPHING A MIRAGE.

A special despatch from San Francisco, California, says :—"A wonderful photograph of an Arctic mirage has just been received from Professor Richard D. Willoughby, the pioneer miner scientist of Alaska. It was taken at Glazier Bay, and represents a mysterious aerial city. The view is apparently taken from some spot on a hill. In the foreground is a gravelled walk, a stone fence, a rustic seat, and a child at play. Beyond the stone wall are the roofs of houses, with clumps of trees at the sides. In the distance are the half-completed towers of a cathedral and several tall public buildings, while far away, enveloped in what appears to be a cloud-like atmosphere, are tall smokestacks and towers of churches. The style of architecture is decidedly modern.

"A hundred people or more were shown the photograph yesterday. Some regarded it as a fraud, while others believed it the genuine photographic result of a mirage. The mysterious town has been named the Silent City. The best informed people in San Francisco say the picture may be that of either Victoria, B. C., Halifax, or Montreal—most likely the latter, as there is a cathedral there resembling the one in the view. Some photographic experts think that the picture was produced by a trick similar to the so-called spirit photographs. This, however, is stoutly denied by those who know Professor Willoughby. He was the first American who found gold in Alaska, and for fifteen years has been a prominent resident of that territory.—*Philadelphia Evening Bulletin.*

Upon another page will be found the names of the Newcastle local secretaries to the British Association. We offer them our sincere condolences. No man who has been local secretary once has ever accepted the same post again. A careful study of the Book of Job may prepare and encourage the two innocents for that which lies before them.

A PHOTOGRAPHIC TELESCOPE.

They are not doing things by halves in the States when they give their mind to it. Photography is rapidly changiug the older methods of astronomical study. It gives an accurate reprcsentation of many objects at the same time : and, since copies may be easily made, it permits the results to be studied at leisure at any place and time. In a recent paper before the National Academy of Sciences, Professor Edward C. Pickering, of Harvard College Observatory, recommended the construction of a large photographic telescope with a lens like that used by photographers, rather than like that of an astronomical telescope.

In November of last year Mr. Pickering published a circular giving his ideas on the subject, and making an appeal for the money necessary to make this instrument. In this circular he suggested that the photographic telescope should be placed on one of the mountains of the southern part of California, where climatic conditions especially favourable exist. He stated that it was proposed to establish in that section an astronomical observatory, and hoped to see the form of instrument suggested become a part of that observatory. He called attention to the fact that in California the interest in astronomy is widespread, and the atmospheric conditions are excellent. It seems that this appeal of Professor Pickering has met with a ready response. The astronomical observatory of Harvard College has just received from Miss C. W. Bruce, of New York, a gift of 50,000 dols. to be applied "to the construction of a photographic telescope having an objective of about 24in. aperture, with a focal length of about 11 feet, and of the character described by the director in his circular of November last ; also to secure its use under favourable climatic conditions in such a way as in his judgment will best advance astronomical science."

This will undoubtedly insure another large photographic telescope for California, this time under the managemeut of Harvard College. This instrument, Professor Pickering states, will differ from other large telescopes in the construction of its object glass, which will be a compound lens of the form used by photographers and known as a portrait lens. The focal length of such a lens is very small compared with its diameter, and much fainter stars can be photographed in consequence. The advantage is even greater in photographing nebulæ or other faint surfaces. Moreover, this form of lens will enable each photographic plate to cover an area several times as great as that which is covered by an instrument of the usual form. With the 24in. aperture each photograph will be 13 inches on a side, and will cover a portion of the sky five degrees square, on a scale of one minute to a millimetre. The dimensions will be the same as those of the standard charts of Chacornac and Peters. The entire sky would be depicted upon about 2,000 of such charts. It is argued by the *Mining and Scientific Press* that in Europe and in the eastern portions of the United States, where nine-tenths of the principal observatories of the world are situated, it is cloudy for a large portion of the year. Great advantages are expected from a location where clouds and haze are seldom seen. All the stars north of 30 deg. can be advantageously photographed in the latitude of Southern California. This region, covering three-quarters of the sky, has an area of 30,000 square degrees. There are 3,600 hours of darkness in a year, aud even allowing one-half for clouds and moonlight, and one-third of the remainder for imperfect plates, it would not take a very long time to do the whole work. By usiog a prism to cover the lens, the spectra of all the stars may be taken in the same way and at the same time. When this work is completed, it should be repeated, since we ought to have a complete map of the sky at intervals of about five or ten years to detect changes.

The faintest stars photographed with the 8in. telescope at Cambridge are invisible with the 15in. telescope. The inner satellites of Uranus have been photographed at Cambridge with a 13in. lens, although they are among the most difficult test objects known. We may therefore expect that stars too faint to be detected with any other instrument might be photographed with the 24in. lens. We thus see that any person could obtain at a comparatively small cost a map of a portion of the sky showing stars too faint for him to observe in auy other way. Many investigations have been carried on by means of these plates ; for instance, a search for double stars, for nebulæ, for asteroids, for variable stars by comparison of plates of the same region taken on different nights, for stars having large proper motion when we have the plates repeated after a considerable interval of time. In all these cases the plate furnishes an accurate measure of the object discovered. The number of the stars photographed on the chart would be vast. In some cases it is estimated that 20,000 or 30,000 stars have been photographed on a single plate.

It is hoped that an endowment of 100,000 dols. will be made, which will keep this instrument permanently at work. California now has the largest and most poweful astronomical telescope in the world, and this action gives it also the largest telescope to be used for solely photographic purposes. It seems about time that British astronomers should bestir themselves.—*Invention.*

META-BISULPHITE OF POTASH.

BY DR. JOHN H. JANEWAY, U. S. ARMY.

Some months ago I began a series of experiments to determine satisfactorily to myself whether the claims made for the meta-bisulphite of potash, as a perfect preservative for pyrogallic acid in solution with other alkaline salts usually composing a developer, were well founded or not. The article which I obtained after considerable difficulty, and which was and is now used in my experiments, it is but fair to state, is a compound of acid of bisulphite and meta-bisulphite, the latter being in excess. The developer used was Ripley's pyro-potash without the citric acid. Several solutions were made in the proportions of 1 meta-bisulphite to 1 of pyro, 1 of meta to 2 of pyro, 1 of meta to 2½ of pyro by weight, and so on. Immediately upon the solution of the meta-bisulphite in the pyro and sulphite solution of the developer, the solution assumed a light straw colour, and has maintained that colour to the present time, though some of the bottles have not been unstopped, and others freely used from, and all exposed to various changes of light and temperature (34 to 78 degrees). So far its claims as a very good preservative of pyro in solution have in my hands been maintained. In the proportion of 1 to 1 of meta-bisulphite and pyro it was found to be a very powerful retarding agent, and oftentimes rendered development very tedious. In 1 to 2 of pyro it also exerted a strong retarding action at first. Finally, the proportion of 1 to 2½ of pyro was settled upon, and though apparently a retarding influence was at first noticed, the developer soon became very energetic, and the development was concluded in about the usual time. The addition of the potash solution to the pyro and meta-bisulphite to complete the developer changed the latter from a light straw colour to a bright ruby. After developing from four to six plates in the same developer, a pellicle frequently formed upon it, and it appeared to become cloudy and slow. Do not on this account throw it away, but put it into a glass-stoppered bottle, and you will fiud it the next day clear, and a very valuable developer to usc on an over-exposed plate, or to begin on a plate the amount of exposure of which you are uncertain.

This developer has not as yet stained any plate in my hands, though I have frequently pressed the development much longer than I have dared to do before. The resultant negatives, as a rule, are of a warm brown colour, and are quick printers. It is, I think, decidedly advisable to continue the use of the sulphite of soda in the developer, and, at the same time, dispense with the various acids and also the bromides. Should an over-exposcd plate suddenly flash out, remove it at once to a tray of water, and watch the development as it proceeds. When it ceases, return it to the developer and obtain all the density you require without trouble. An accident revealed to me another result of the addition of the meta-bisulphite to the developer, much to my surprise and gratification : one that removes the reproach so often thrown on pyro. In endeavouring to save a plate from an upsetting and falling tray, my hands were covered by the developer and my linen cuffs bountifully sprinkled. (Mental remark : "Cuffs gone up, and beautiful hands to-morrow.") But the hands presented no stains on the morrow, neither did the next week's wash show any ruined cuffs. I then immersed a linen cuff more than one-half in the developer, letting it remain there between three and four minutes, removed, and dried it. It was superbly stained. Some hours after I soaked it in water for one hour, when almost all the stain had disappeared. Not having any boiling water at hand, consigned it to the weekly wash, and it was returned to me without a stain or blemish. Generally developing after 3 p.m., and having no longer any appreheusion of stained hands or dirty finger-nails, I freely plunge my fingers into the developing tray to remove the plate for examination or final abstraction, resting assured that the morrow will find no stains.—*Anthony's Bulletin.*

PATENT OFFICE LIBRARY.

Notes.

Taking out a pencil and paper at the French Exhibition appears to be as risky as it used to be at the South Kensington "Inventories." We recorded at the time how an artist attached to an illustrated paper was "run in" and detained two hours for making a sketch of a portion of the grounds, and it would appear that similar regulations are in force at Paris. The correspondent of the *Scientific American* relates how, while taking notes of some of the exhibits of the French Industrial Schools, he was interrupted by the attendant of the exhibits of the *Ecole Nationale d'Arts et Metiers*, of Chalons-sur-Mer, who fetched a sergeant, and caused the correspondent to be hauled before the *Commissionaire de Police*. The latter happened, fortunately, to be a sensible man, and, when he heard the object of the sketching, he decided that it was for the public advantage. "But," said the discomfited attendant, "he was all day yesterday and again this morning examining every machine, and moving some of the handles to try their working." This, instead of convincing the commissionaire of the heinousness of the crime, only made him more determined, and, observing that the police had exceeded their orders, he released the correspondent.

We congratulate the *Scientific American* upon the escape of their correspondent. At the same time we take the opportunity of warning our readers that what may be done with the pencil may not be done with the secret camera. The regulations as to photography are very stringent, and already one English visitor has come to grief through inattention to the conditions laid down by the Exhibition authorities.

The advantages of photography both to the artist and to the public are well seen in the exhibition of the works of the English humourists now open at the Royal Institute. But for photography, the drawings of Du Maurier, Keene, Furniss, and other modern men could not have been exhibited. Had they lived in the time of John Leech, they would have drawn on the block, and their original work cut away, nothing would have been left for the public but the translation at the hands of the engraver. A set of the original drawings of John Leech would have been invaluable, but nothing remains. It is true the artist reproduced in colours, and in an enlarged form, a good few of his principal pictures in *Punch*, but in their coloured form they are vulgar and unnatural. The possibility of selling the original adds considerably to the income of the artist who draws on card.

In examining the interesting collection of the works of the old humourists, the thought is suggested that the points in the pictures least appreciated at the time have now become the most valuable. In the great majority of Rowlandson's, of Gillray's, and of Cruikshanks' caricatures, all meaning, and even humour, for the public of to-day have disappeared, but, in a good proportion, the local surroundings are extremely interesting to the antiquarian. Take, for instance, Rowlandson's drawings of old Vauxhall Gardens, Richmond Bridge, Tattersall's in 1800, Barnet in 1812, and a host more. These are all careful drawings, and in all essentials supply the place of photographs—in other words, the caricaturist did what the photographer does now. Art in the beginning of the nineteenth century, as represented both by the portrait and landscape painter, was, in a large degree, affected and unnatural. Truth, on the other hand, was the basis of caricature, or the caricature would lose its effect. Thus the "whirligig of time" has brought about its revenge. The men to whose work our great-grandfathers looked for fancy and exaggeration we turn to for reality.

A singular instance of the value of photography reaches us from France. In July, 1885, some young Californian salmon were placed in the river Seine in pursuance of the plan for the acclimitization of fish. Two years after, M. Dupuy, a well-known angler, fishing at Marly, caught a fish of great size which somewhat puzzled him. It could not be taken for a trout, and was not exactly like a salmon, but was sufficiently near to pass for the latter, and accordingly a salmon it was called. At the time, M. Dupuy was ignorant of the acclimitization experiments. The fish was cooked, but when the carver proceeded to what the chronicler of the circumstances delicately calls the *autopsie culinaire*, everyone was surprised to find that the flesh was white with just a slight tinge of yellow—a colour which does not belong to the common salmon, but is the precise characteristic of the Californian variety. The fish was eaten and enjoyed, and no more was thought of the matter. Recently, however, M. Dupuy became aware of the acclimatization experiments, and mentioned the matter to M. Courcy, a member of the Aquarium du Trocadero, under the auspices of which the experiments were made. M. Courcy came to the conclusion that the salmon was one of the Californian species which had in three years attained an enormous size, and doubt was set at rest by a photograph which M. Dupuy had taken of the fish immediately after capture.

The mania which exists in America for advertising brands of cigarettes by means of photographs of good-looking actresses has got into serious trouble a firm which appropriated the portrait of Miss Gracie Wade, and reproduced it on their show cards, a piece of assurance which the lady deeply resents, not on the ground of the portrait itself, but because the artist has represented her in tights—a species of attire which she has always refused to wear. She estimates the damages to her feelings and reputation at £2,000.

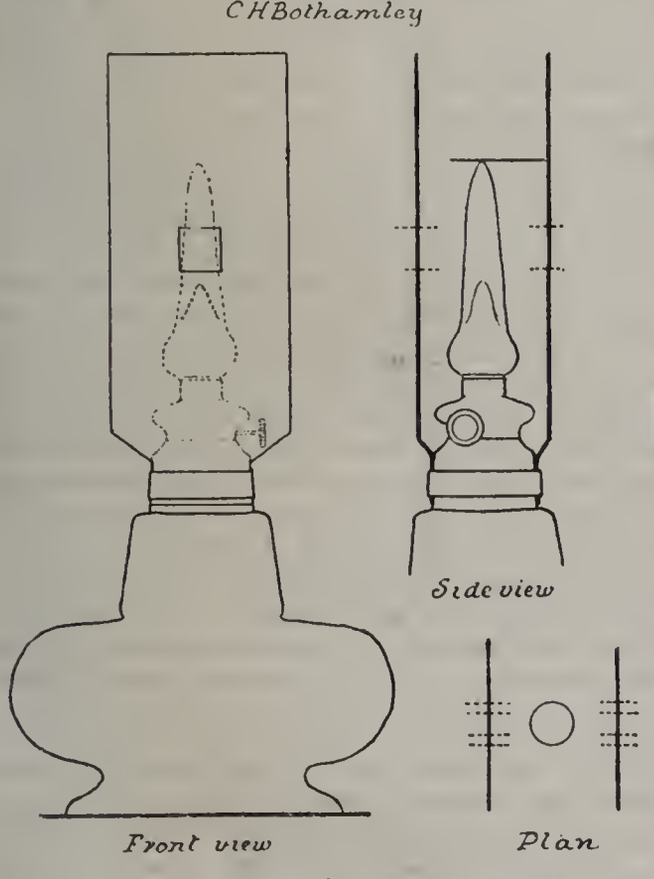
It must be confessed that she has just cause for complaint, because it appears that the artist, while selecting her face as one attractive portion of the picture, has joined thereto the body and lower extremities of another lady, and though we do not know what may be Miss Wade's statement of claim, she certainly has, it seems to us, two distinct grievances: one is the particular attire, and the other that by putting forward somebody else's anatomy as hers, a fraud is committed on the public, and an injustice done to the original.

MODIFICATION OF THE AMYL ACETATE LAMP.

BY C. H. BOTHAMLEY, F.I.C., F.C.S.

The fact that the Paris Congress will take into consideration the question of a standard light for photographic purposes, and that some modified form of the amyl acetate lamp is suggested in the preliminary report (this vol., p. 497), makes it necessary for me to describe at once a modification of this lamp which I have devised for use in the photometric experiments which form part of my investigation of the action of dyes on photographic plates. I had intended to include a description of the lamp in the detailed account of the experiments which I hope to publish towards the end of the year, but immediate publication is necessary in order to secure priority for whatever may be novel in this particular form of the apparatus.

The investigations of the British Association Committee on Standard Lights (B.A. Report, 1888), and the researches of Mr. W. J. Dibdin, Superintending Gas Examiner to



Modified amyl acetate lamp

the Metropolitan Board of Works (*Journal of the Society of Chemical Industry*, 1888, p. 367). have proved that the amyl acetate lamp ranks with the Harcourt pentane lamp (PHOTOGRAPHIC NEWS, 1888, p. 668) as a constant and trustworthy standard light. It has the advantage over the latter of being simpler in construction and very much cheaper; it has the disadvantages that the flame is comparatively poor in blue and violet rays, and relatively rich in yellow, orange, and red rays, and that the brass fittings of the lamp are somewhat rapidly corroded, owing to the formation of basic cupric acetate. This corrosion is not due to the liberation of acetic acid during combustion, but results from the action of the liquid and vaporous amyl acetate on the brass. When the glass cap which protects the lamp when not in use is put on, the space above the wick-holder is soon charged with vapour of the amyl acetate, and this seems to act very rapidly on the metal. So far as my own experience goes, combustion is always complete, and no acid vapours are liberated whilst the lamp is in use. Another disadvantage is the very powerful smell and well-marked physiological action of the amyl compound, which render its use decidedly objectionable to many persons. At the same time the convenience, cheapness, and constancy of the lamp make it undoubtedly the best standard light at present in existence for ordinary photographic purposes.

I have already used in a number of experiments (PHOTO. NEWS, 1888, p. 509), and still continue to use for certain classes of work, the amyl-acetate lamp in its original form, *i.e.*, with the full size of the flame. I soon found, however, that when used at a distance of one metre, which is the longest distance convenient in practice, the light is too powerful for photographic work, and the exposures required are too short to be measured with sufficient accuracy. Moreover, slight variations in the size of the flame, although not appreciable to the eye, are readily detected by the more sensitive photographic plate.

The principle of the Methven slit being once known, its application to this or any other form of lamp is so obvious that it can scarce be claimed as any novelty. Broadly stated, the principle is as follows :—Variations in the size of any given flame alter the total illuminating power of the flame, but do not appreciably affect the illuminating power of each small section of the flame s surface, especially if such a section is taken at the brightest part of the luminous zone of the flame. It follows, therefore, that if a screen, in which is a small aperture, is placed before a flame so that the aperture is in front of the most luminous part of the flame, small variations in the size of the flame do not affect the illuminating power of that small area of it which is visible through the aperture in the screen. The constancy of the results obtained is thus very greatly increased.

With a view to applying the Methven slit to the amyl-acetate lamp in such a way that it might gain general acceptance as a standard for photographic purposes, I determined to make the dimensions of the various parts as simple as possible, and to accommodate them, as far as circumstances would permit, to the centimetre—gramme—second system of units. The more important dimensions affecting the illuminating power of the whole flame are the diameter of the wick-holder and the height of the flame, whilst the dimensions which determine the illuminating power of any section cut off from the flame are the distance of the screen from the flame, the size of the aperture, and the position of the aperture with reference to the top of the wick-holder and the top of the flame. Other conditions—such as the purity of the amyl acetate, the texture of the wick, and the temperature and pressure of the surrounding atmosphere—are, of course, independent of the particular form or dimensions given to the lamp.

In the first place, with a view to avoid corrosion, I had a screw wick-holder made of fine silver; not standard silver, which contains copper, but pure silver. The internal diameter of the wick-holder should be exactly one centimetre. The wick should be solid, circular, and not too tightly woven, and should completely fill the holder without being so tight that the height cannot be readily adjusted, or that the flow of the combustible liquid is impeded. The standard height of the flame is five centimetres. A height of six centimetres can be obtained with a wick of the diameter given, but with any greater height than this there is a tendency for the flame to smoke.

The screen is placed at a horizontal distance of one centimetre from the front edge of the top of the wick-holder. The brightest part of the flame, and therefore the part to be used, is situated immediately above the top of the dark inner zone. Actual measurement proved that with the dimensions already given the tip of the inner zone was somewhat less than two and a half centimetres from the top of the wick-holder. It was therefore decided that the aperture in the screen should begin at a vertical height of two and a half centimetres above the top of the

wick-holder. The vertical height of the aperture is exactly one centimetre, and its breadth is likewise one centimetre. Since at this point the flame is only about one centimetre across, it follows that the whole breadth of the flame is seen through the aperture from a short distance, though at a distance of one metre the aperture seems to be completely filled with light. An aperture of the same vertical height, but only 5 m.m. in breadth, can also be used, and has the advantage that it cuts off the edges of the flame. I have no comparative measurements with the two apertures, but the amount of light which passes through the aperture, 5 m.m. broad, is more than half the amount which passes through the larger aperture. The screen, which consists of fairly stout sheet brass, but may also be made of aluminium, has a total breadth of 4 centimetres, and extends to a height of 4 centimetres above the top of the aperture. It is attached to the lower part of the wick-holder of the lamp by a brass collar which does not interfere with the use of the screw for adjusting the wick. At a vertical distance of exactly 5 centimetres above the top of the wick-holder is a small hole, into which is fixed (not soldered) a small piece of moderately stout platinum wire, which projects horizontally, and indicates the proper height of the flame.

It was found that with a screen as thus described on one side of the flame, it was difficult to keep the flame steady. There was also a peculiar "suck" of the flame towards the screen, and especially towards the aperture, caused doubtless by the unequal draught on the opposite sides of the flame. This difficulty was overcome by putting a precisely similar screen on the opposite side of the flame. The flame is thus shut in back and front, but is open at the sides, in order that air may have free access. Under these conditions the flame is very steady. The two screens may be fastened together at the tops by two pieces of stout wire, the length of these pieces being exactly three centimetres. The back screen *need* not be so accurately made as that in front, but it is better that they should be precisely similar, since they are then interchangeable, and may even both be used at the same time. It is perhaps advisable to point out that the luminosity of the flame when partially boxed up in this manner, is not strictly comparable with that of the same flame burning with free exposure.

For actual use the lamp is enclosed in a box provided with a chimney, and a large area of entrances for fresh air, so that the box does not become heated. A thermometer fixed with the bulb in the box and the stem projecting outside, indicates the temperature of the box. The lamp should be allowed to burn for a short time before any observations or measurements are made, in order that the temperature may become constant. In the front of the box, exactly opposite the aperture in the screen of the lamp, is an opening which is closed by a shutter. The latter is opened by means of a chain attached to a lever, and the length of time during which it remains open of course determines the exposure.

The drawing shows the lamp and its parts in their true relative proportions. For convenience the principal dimensions are given in tabular form.

Diameter of wick-holder	1 centimetre
Height of flame, from top of wick-holder to tip of flame	5 centimetres
Horizontal distance of screen from the front edge of the top of the wick-holder	1 centimetre
Vertical distance of the bottom of the aperture from the top of the wick-holder ...	2·5 centimetres
Vertical height of aperture	1 centimetre
Breadth of aperture (1)	1 centimetre
Breadth of aperture (2)	5 millimetres
Total breadth of screen	4 centimetres
Height of screen above the top of the aperture ...	4 centimetres

Last Monday M. Albert Londe, chief of the photographic service of the Salpêtrière, lectured in the Salle de Variétés in Versailles on "Photography and its Instantaneous Applications."

THEORIES OF LIGHT AND MATTER.

BY D. WINSTANLEY.

The subject of light, upon which W. K. Burton has commenced a series of articles, is to my thinking one of the most difficult which anyone could select. I have myself many of the works in which that subject is treated most ably, but in none of them is the treatment satisfactory. In some of them there are statements as to fact which are erroneous; in others, there are examples of erroneous reasoning; some contain theoretical views which are inconsistent with each other. All in my possession bring us into a haziness of idea, and cannot be regarded as lucid explanation. For instance, the statement is very common that white light consists of various rays which can be prismatically dispersed into seven, at any rate, which differ in their colour. However true this statement may be as regards the white light of the sun and other incandescent bodies, it is not true of all white light, as, for instance, that which is built up of certain only of the seven conspicuous spectrum colours. The statement that rays which differ in their colour differ also in their refrangibility is not always true, nor is the converse of it, that rays which differ in their refrangibility differ also in their colour, yet both statements are very often made. In treatises on astronomy, it is usual to propound the law of gravitation by the affirmation that every particle of matter in the universe attracts every other particle with a force which varies directly as the mass of the individual particles, and inversely as the square of their respective distances. It is also customary to explain the phenomena of light by the operation of an imponderable medium which it is asserted "fills" all space. Now these considerations are not consistent with each other. If every particle of matter in the universe attracts every other particle, an imponderable medium cannot exist, for such a medium would consist of particles which are not attracted, and which do not attract. If, on the other hand, there is an imponderable and luminiferous ether, then it is not a fact that every particle of matter in the universe attracts, and is attracted by every other.

I do not propose, by any means, to encroach on the ground which Mr. Burton intends to cover, but I would point out that his remarks on "potential" energy land us at once into a region of haziness and obscurity. Mr. Burton evidently believes that bodies "attract" each other, for he speaks of the *energy of position* being due to distance. It is this doctrine I desire to assail.

Although we are indebted to Newton for the celebrated phrase concerning "every particle of matter in the universe," we are *not* indebted to him for the idea that one body can act upon another which is at a distance from it. We say the sun rises at such and such a time, and that at such and such another it will set, yet "nobody" supposes the statement to be true. It is a convenient phrase, and that is all; the fact being that at such and such a time the sun will come within the range of vision on the one side, and disappear from the range of vision at such and such a time upon the other in consequence of the axial rotation of the earth. So Newton's phrase, although convenient, is not true, and this Newton himself distinctly pointed out. Here are his words as given in a letter which he wrote to Bentley:—"That force should be innate, inherent, and essential to matter, so that one body may act upon another at a distance through a vacuum without the mediation of anything else by and through which their action and force may be conveyed from one to another, is to me so great an absurdity, that I believe no man who has in philosophic matters a competent faculty of thinking can ever fall into it."

Newton was born in 1642, and, according to Grant's *History of Physical Astronomy*, a work of incomparable excellence, it was in 1684 that he first contemplated publishing to the world his conclusions respecting gravitation; and yet it is a fact that men of science as a body are only now beginning to realise what it was that Newton thought, and what it was his intention to have taught. They are beginning to recognise at last that the idea of action at a distance is absurd; but even in recognising its absurdity they seem to think that the gravity-producing medium, whatever it may be, acts by a sort of "suction," and they thus veer round again to the exploded and ridiculous idea that "nature abhors a vacuum." Nobody supposes, now, that a mass of matter may take a fancy to move here, or take a fancy to move there, and, having taken such a fancy, that it is able to so move; yet those who "believe" in the existence of attraction do imagine that a body having no power of motion in itself is able to confer that power upon some other body which is far away.

Professor Challis advocated the idea that there is no other form of "force" than the pressure by contact of one body on another, and this is an idea which I thoroughly espouse. To me it seems that with particles of matter, perhaps not varying in their size, perhaps not varying in their form, but varying indefinitely—I might almost say infinitively—in their velocity, we have a sufficient basis for an hypothesis which, with the exception of consciousness, shall account for all the phenomena of the whole universe. There is only one theory I have come across in my reading which gives a clear and intelligible account of the cause of gravitation, and that is the theory or hypothesis of Le Sage. Le Sage assumed that all the "solid" bodies of the universe were "porous," and consisted of aggregations of material particles more or less numerous, but not in contact. He assumed that the infinity of space was "filled" with other particles, moving in every direction in right lines, and with every order of velocity, and that these in their passage through the interstices of the "solid" bodies produced a tendency on the part of those bodies and their particles to move.

It will be seen that a body placed alone in space, and subjected on all sides alike to the incessant bombardment of these gravity-producing particles, could not as a whole, if the operation of the bombardment were uniform in its intensity, exhibit any motion as due thereto. But let there be two such bodies, separated by an interval of space, and we have at once the fact that the stream of particles which had passed through each in the direction of the other would be weakened in its velocity, and that accordingly the side of the other body which received the weakened stream would be less pressed upon by impact with these particles than would the opposite side which received the bombardment in full force. Hence the bodies would tend to move towards each other, and with an energy directly in proportion to the obstruction they had offered to the bombarding particles, and which capacity for obstruction may be called the body's "mass." It will also be seen that as these bodies neared each other, the thickness of the weakened stream would continually increase, and with it the thickness of the stream of motion producing particles beyond, and also that this thickening of these streams would result in an increase of their effective areas in a proportion inversely as the distances of the bodies squared. We thus see that Le Sage's particles suffice to give us an intelligible account firstly, of the facts of gravitation, and secondly, of its law.

To suppose that the kinetic energy of visible movement which a stone exhibits when thrown straight up is somehow or other converted into a *potential* energy which will be re-exhibited in the form of a movement downwards, should the conditions for the movement happen to be favourable, is only to suppose that we have lost all clue as to what in reality has become of the energy we no longer see, but which we are certain cannot be destroyed. If, however, we suppose the stone to have been projected in the same direction as the weakened stream of gravity-producing particles which has already traversed the body of the earth, and in direct opposition to the stronger stream striking on that portion of the terrestrial surface from which the stone was thrown, the cessation of its upward movement must inevitably occur when it has, and from the latter source, received a mechanical equivalent of its original visible energy, in excess of that bestowed upon it by the weakened stream. And it is no less evident that upon its return to the place of its projection, the stone will have received another quantity of downward visible energy, equivalent to the upward visible energy with which it was started on its career.

There is one consideration which follows as a corollary of the theory of Le Sage, a consideration which I first published in 1874, but which, so far as I have seen, has been alluded to by no one else, and it is that the bombardment of Le Sage's particles, in so far as it is unable to produce in bodies the energy of visible translation, must produce some other movement of their atoms, and probably in chief the form of motion we describe as heat. If we take this view of it, we have in the gravity-producing particles of Le Sage, not only an explanation of gravity and its law, as well as a rational account of what is now hazily described as the energy of position, but a sufficient cause for the generation of solar light and heat, apart from the theory of bombardment by meteors of appreciable size, and apart from the theory—a weak one it seems to me—of the shrinkage of the solar bulk. Both these theories, unsatisfactory as they are, do often call out loudly for gravitation as the ultimate cause of solar energy, but thus far they seem to have called for it only in the form of that action at a distance which, being granted, is sufficient to account for anything, but which it is logically absurd to grant.

I admit at once that the acceptance of Le Sage's particles does after all but drive our difficulty one step further back, for the question promptly occurs to one, "Whence come the gravity-producing particles we accept?" Le Sage himself answered the question in a curious way. He imagined the entire universe, the aggregate of material nature inclusive of the remotest bodies of the stellar depths, to be enclosed within a sort of adamantine shell, from which the gravity-producing particles would of necessity rebound, to reproduce a series of phenomena similar to those produced before. Such a supposition appears to me untenable, but without it, the ultimate result attainable by Le Sage's particles would seem to be, not the accumulation of material nature into a single lump, but its distribution throughout the abyss of eternal space in particles of dust altogether ultra-microscopical in size. To me, at present, all is philosophic darkness here. The return of Le Sage's particles is the point at which I should look for my *Deus ex machina* to commence his work.

I look forward with interest to the continuation of Mr. Burton's articles, and I hope he will succeed in making clear the objections to the emission theory of light which have resulted in its present, and perhaps only temporary, overthrow.

The emission theory, it should be remembered, was accepted by Newton as a sufficient explanation of his facts.

PHOTOGRAPHIC OPTICS.

BY W. K. BURTON.

Chapter VI.—Measuring the Focus and Aperture of Lenses—Estimating the Rapidity—Testing Lenses.

Comparing the Rapidity of Lenses.—It has already been mentioned that the rapidity of a lens is determined by the aperture and the focal length. It is, in fact, decided by the relation of the former to the latter. Thus, the focal length is divided by the aperture, and it is common to state the result in the form $f/4$, $f/16$, $f/22$, &c., these expressions meaning that the apertures are respectively $\frac{1}{4}$, $\frac{1}{16}$, and $\frac{1}{22}$ of the focal lengths. *The relative rapidities are directly as the squares of their fractions; the exposures required are directly as the squares of the denominations.*

Thus squaring the fractions, the rapidities of the lenses represented by them will be relatively $\frac{1}{16}$, $\frac{1}{256}$, $\frac{1}{484}$. In practice, however, it is customary, in comparing lenses, to compare the exposures required by them rather than the relative rapidity. The exposures required by our three hypothetical apertures, whether they belong to the same or to different lenses, will be in the square of the denominators of the fractions, namely as 16, 100, and 484, or dividing all by 16, and leaving fractional parts out of consideration as 1, 6, and 30. To put this result in words, if we have three lenses with apertures respectively one-fourth, one-tenth, and one twenty-second of the focal length, or if the same lens have three different stops of these apertures, the exposures required for the second and third apertures will be respectively six and thirty seconds if that for the first is one second.

Some years ago, the Photographic Society of Great Britain proposed that a certain angular aperture of lens (aperture in terms of focal length) should be taken as a standard, and that all other apertures should be compared with this, the other apertures having attached to them figures representing the exposure that would be required with them, when that required with the standard or unit was 1. Thus a stop requiring twice the exposure of the standard would be numbered 2, one requiring three times 3, and so on.

The standard taken was $f/$. This was called No. 1, and it was advised that stops be cut to such diameters that each one would need twice the exposure of that which went before it. The numbers would then run :—1, 2, 4, 8, 16, 32, 64, 128, 256, &c., and these numbers are generally termed the U.S. number or "universal standard"

numbers. Thus if we speak of a stop as No. 8, U.S., we mean that it is a stop with which will be needed eight times as long an exposure as with a lens working at f.

The diameter of No. 1 aperture for any lens is got simply by dividing the focal length by 4. That of No. 2 stop is got by dividing the diameter of No. 1 by $\sqrt{2}$, or by dividing the focal length by $4 \times \sqrt{2}$, which is 5·657. These two diameters having been decided, those of the stops Nos. 4, 8, 16, &c., are easily got, No. 4 needing simply half the diameter of No. 1, No. 5 half the diameter of No. 3, and so on. If a lens has not so large an aperture as $\frac{f}{4}$, there is of course no aperture as large as No 1, and the numbers begin at whichever of the standard apertures happens to coincide with that of the lens. Thus rapid landscape lenses generally have a maximum aperture of No. 4. What are called group lenses (really slow portrait lenses) No. 2, with angle lenses No. 16, &c. Some lenses have maximum apertures larger than No. 1. These are represented by fractions as No. $\frac{1}{2}$, &c.

It does not by any means always happen that the maximum aperture of a lens coincides with any of the standard numbers. In such case it is inadvisable to lose any of the available speed of the lens by reducing the aperture by a fixed stop merely to make the full aperture representable by a whole number, and a special number is got by squaring the denominator of the fraction representing the aperture in terms of the focal length, and dividing by 16. Thus if a lens have a maximum aperture of $\frac{f}{4}$, we take $\frac{5^2}{16} = \frac{25}{16} = 1{\cdot}562$. We would in this case stamp on the mount of the lens 1·562, expressing the fact that with this lens 1·562 times as much exposure was needed as with one working at $\frac{f}{4}$, or about half as long again.

Recently Mr. Dallmeyer has suggested that the standard

$$\frac{f}{4} \text{ should be replaced by that } \frac{f}{\sqrt{10}}.$$

The result of the adoption of this standard would be to simplify some calculations in connection with lenses, and to complicate others. The writer is not prepared to say whether the general result would be complication or simplification, but he has little hesitation in expressing the opinion that any slight simplification that might arise from adopting the proposed new system would by no means compensate for the disadvantage arising from the disturbance of a system which has already taken considerable hold with the photographic public.

Measuring the Focal Length of Lenses.—It is evident that before we can enter on any of the calculations just described, we must have some way of measuring the focal length and apertures of lenses.

Let us say at once that for many purposes it is sufficient in the case of simple lenses, the ordinary forms of rapid landscape lenses, double combination wide angle lentes, and portrait lenses, to proceed as follows :—A distant object is focussed—say the sun—in the case of the single lens the distance between the front surface of the lens and the ground glass is measured. In the other cases the distance between the diaphragm and the ground glass.

For many purposes, and with the form of lenses mentioned, the measurements thus got will be accurate enough, but they will not be at all accurate with some other forms of lens—notably the orthoscopic and Steinheil's new forms of lenses—and in no case is it really precise. The following two methods are very popular for estimating, with a nearer approach to accuracy, the focal length of a lens.

In front of the camera is placed a foot-rule, or other convenient object. The distance between the foot-rule and the lens, and that between the lens and the ground glass, are so adjusted that the image on the ground glass is of the same size as the object. The distance from the foot-rule to the ground glass is now measured. This, divided by 4, is the equivalent focal length.

Example.—When we draw out a camera till the image on ground glass is equal in size to the object, we find that the distance from the object to the ground glass is 32 inches. One-quarter of this, or eight inches, is the equivalent focus.

The following method may be adopted when the camera will not rack out to twice the focal length of the lens. It is capable of giving very precise results, but requires a slight knowledge of mathematics.

d = distance from object to ground glass when a near object is focussed.

o = length of object focussed (preferably a measuring rod).

i = length of the image of this rod on the ground glass.

F = lesser conjugate focus—that is to say, the distance between the point where the axes of pencils of light in the lens cross each other, and the ground glass when a near object is focussed.

f = equivalent focus.

$$F = \frac{i \times d}{o + i}$$

$$f = \frac{F(d - F)}{d}$$

Example.—A 5-foot rod is focussed. The length of the image on the ground glass is found to be 6 inches. The distance between the rod and the ground glass is found to be 10 feet 1 inch.

$$F = \frac{6 \text{ ins.} \times 10 \text{ ft. } 1 \text{ in.}}{5 \text{ ft. } 0 \text{ in.} + 6 \text{ ins.}} = \frac{6 \times 121}{60 + 6} = \frac{726}{66} = 11$$

$$f = \frac{11(12111 - -)}{121} = \frac{1210}{121} = 10$$

Equivalent focus therefore = 10 inches.

The methods just given are quite accurate enough for all practical photographic purposes, but even they are not mathematically precise. The following is a method which is (leaving out of consideration, of course, manipulative errors in measuring, &c.) absolutely correct.

An object, such as a foot rule, is placed in front of the camera, and the latter is racked till the image is of precisely the same size as the object. The distance of extension of the camera is now carefully noted, and afterwards a distant object (say) the sun is focussed. *The amount that it is necessary to rack in the camera to focus this distant object is the precise focal length.*

Example.—We so adjust the camera that the image on the ground glass of a foot rule is precisely one foot long. We now take the camera and find that we have to rack it in $11\frac{3}{8}$ inches to get the image of a distant object sharp. The precise focal length of the lens is $11\frac{3}{8}$ inches. Various ways of accurately measuring the distance that the camera has to be racked will suggest themselves to the reader.

The following mechanical method, devised by the writer some six or seven years ago, is quite accurate. A very brightly lighted object is focussed. Two conspicuous distant objects, one near each end of the ground glass—or at any rate at some distance from each other—are observed, and the precise distance between them is measured either by a foot rule, or better, with a pair of dividers. The cells of the lens are now unscrewed, and into the diaphragm slit is inserted a diaphragm with an opening of about $\frac{1}{32}$ of an inch diameter, or in the case of short focus lenses even less than this may be made for the purpose of blackened cardboard. An image will be got on the ground glass, which will certainly not be very brilliant, but will permit of the measurement of the distance of the two objects. The lens tube is racked in or out till this distance is precisely what it was before the lenses were unscrewed. The distance between the temporary diaphragm and the ground glass is the focal length of the lens.

(*To be continued.*)

PHOTOGRAPHY IN GERMANY.

BY HERMANN E. GUNTHER.

Chlorophyll Plates—Combined Album and Fixing Bath—Sodium Sulphite in Developing—New Gold Bath for Gelatino-Chloride Paper—Eikonogen.

Preparing Chlorophyll Plates for Taking Sun Photographs.—With regard to the notice I gave some time ago about Dr. Zenger's method of taking sun photographs, I have been asked by which process these photographs are best taken. I shall therefore shortly describe the method which is employed by Dr. Zenger and other scientists, and which in my hands has always given satisfactory results. Plates of the size of 6 by 8 centimetres are sufficient for this purpose, and the operations required are so easy to perform, that amateurs may in this way devote themselves to the interesting study of meteorology. The plates used are collodion plates stained with chlorophyll; these are prepared as follows:—At first, pyroxyline is produced by cutting good tissue paper into narrow strips and adding one part of it to a mixture of eight parts nitric acid of 1·38 to 1·39 specific gravity, and twenty parts sulphuric acid of 1·83 specific gravity. The mixture should be previously heated before the paper is added to it; instead of the latter, pure cotton-wool may be used, and it should be added so that it becomes entirely saturated by the acid; then it is again slightly heated, and finally the whole allowed to stand for twenty-four hours. Then the solid mass is removed and washed out with distilled water until blue litmus paper is no longer reddened by it. Then the following solution is prepared:—

Pyroxyline	2·80	grammes
Ether	135	„
Methyl alcohol	75	„
Calcium chloride	0·50	„
Cadmium bromide	3·25	„

In a test-tube 0·78 grammes of silver nitrate are now dissolved in seven drops of distilled water by the aid of heat, and 11·25 grammes of absolute alcohol added to it with stirring and by the aid of heat; it should be warmed until the whole of the silver salt has dissolved, which solution is poured, in the dark-room of course, in small portions and with much stirring, into 26·25 grammes of the above pyroxyline solution; a milky-white, thickish liquid is obtained, to which finally 5 drops of a concentrated syrup-like solution of lactate of ammonium are added. The liquid is allowed to settle for twenty-four hours in the dark-room, when it is decanted from the sediment into another bottle. To this liquid are then added three to five per cent. of a concentrated dark blackish-green chlorophyll solution in ether, which may be prepared in the following manner. Any quantity of dried and cut up leaves of "Mentha piperita" (peppermint), as they can be bought at the apothecary's, is taken and poured over with ether; they are placed into a stoppered bottle and allowed to stand until the ether has attained a dark blackish-green colour. The above operations, excepting the preparation of the first and of the last liquid, must be carried on in the dark-room. When finished, the liquid will be greyish-green, spreading very easily and uniformly over the glass plate during coating. The glass plate must be well polished with diluted nitric acid. The above-mentioned chlorophyll solution contains three colouring matters—the green chlorophyll, the blue cyanophyll, and a small portion of xantophyll. The plates are used freshly prepared, *i. e.*, before they are quite dry. The exposure in the camera requires one-fourth to one second, according to the conditions of the atmosphere. After exposure, the plates are placed, in the dark, into the following solution:—

Distilled water	240	c.c.
Pure English glycerine	3	grammes
Sugar	2	„
Tannin	5	„

Care should be taken that the plates are entirely covered with the solution. The developer, with which the plates are now treated, consists best of a saturated solution of chemically pure soda, which is diluted up to three times its volume with water, and to which about five per cent. of a concentrated solution of hyposulphite of soda are added. If the development goes on too slowly, 2 to 3 drops of spirits of sal-ammoniac may be added as an accelerator. Fixing is done with a ten per cent. solution of hypo.

A Combined Alum and Fixing Bath which keeps clear.—To prevent blisters and frilling of the gelatine film, a combined alum and fixing bath is often employed. It is prepared by mixing 1,000 c.c. of the ordinary fixing bath with 500 to 2,000 c.c. of a concentrated alum solution. Unfortunately, this combined fixing bath, after being mixed, becomes so muddy that it cannot be used before it has clarified. Now Herr A. Lainer has found that a solution of sulphite of sodium may be successfully employed in combination with the mixed bath. If a saturated sodium sulphite solution is added to a concentrated alum solution, a precipitate is formed, which, however, dissolves again; on adding more of the sulphite, a limit is reached at last where the precipitate ceases to dissolve. If an alum bath of this kind is mixed with an equal volume of fixing bath, the latter remains clear. As the author has observed, it is not even necessary to proceed with the addition of the sodium sulphite solution to the alum bath to the limit mentioned above; he mixes 1,000 c.c. of a concentrated alum solution with 200 to 300 c.c. of a concentrated sodium sulphite solution, and adds to this mixture about 1,000 c.c. of fixing bath. The combined alum and fixing bath thus obtained kept perfectly clear for fourteen days. If only 100 c.c. of the sulphite solution were added, the bath did not keep clear as long. It should, however, be mentioned that according to the quality of the alum, the addition of the sulphite must be increased, or may be diminished. In one case 40 c.c. of the sodium sulphite solution (1 : 4) were sufficient to prevent muddiness of the fixing bath within eight days.

The Use of Sodium Sulphite in Developing Gelatine Plates.—The following observations, made by Paul Poiré, a member of the French Academy of Sciences, are published in our German periodicals:—Since the analysis of a great number of commercial sulphites sold as *pure* has shown that this substance always contains carbonate, this scientist has operated with a specially prepared sulphite, which contained no trace of carbonate of soda; 100 c.c. of a 25 per cent. solution of this salt, mixed with 1·5 gramme of pyrogallic acid, developed the image under normal conditions, though a little slower than the commercial sulphite or a bath containing carbonate of soda, but, with time, the desired density was always obtained. This developer is said to never produce the fog which is caused in the ordinary baths by the prolonged action of the carbonate on under-exposed plates. Negatives taken in exceptionally bad light remained eight to nine hours in this bath without fogging or detaching themselves. The bath may be repeatedly used, as it keeps for a long time without change in well-stoppered bottles. Mr. Poiré has kept a solution, in which eight to ten plates had been developed, for five months. At the end of this time it was still almost colourless, and had preserved all its strength. These experiments lead, therefore, to the conclusion that, with commercial sulphites, the above-mentioned proportions are the best for the developing bath, and that carbonate of soda should only be added in cases where the development is too slow.

A New Gold Bath for Gelatino-chloride Paper.—The following gold bath, with which excellent results may be obtained, will be welcome to all who print their negatives on Obernetter emulsion paper. It gives beautiful and fine tones, and may be made to act absolutely uniform, which, as is known, is not at all the case with all gold baths.

The following solution is made up two to three days before use :—

Distilled water	1,000 c.c.
Champagne chalk (finely shaved and rubbed down)	7 grammes
Saturated solution of chloride of calcium	6 drops
Sulphocyanide solution (20 : 1,000)...	250 c.c.
Chloride of gold solution (1 : 100)...	50 ,,

The tones obtained become finer after the gold bath has been used for some days. The prints should be left in it only until the reddish tone becomes a little darker by transmitted light. The fixing bath consists of 100 grammes of hypo in 1,000 c.c. of water. Three to five minutes are sufficient ; then the prints are washed for an hour, and placed for two to five minutes in an alum bath, consisting of 50 grains of alum in 1,000 c.c. of water. The gold bath may be strengthened by additions of 50 c.c. of sulphocyanide solution (20 : 1,000), 30 c.c. of chloride of gold solution (1 : 100) to 1,000 c.c. of the gold bath. After it has been used two to three times, 1 to 2 points of a knife full of chalk and one drop of concentrated chloride of calcium solution are added. The bath thus strengthened suffices for forty to forty-five cabinet cards.

Development with Eikonogen.—As to the new developing agent "eikonogen," the judgments of the operators who have tried it in this country considerably differ from each other as yet. By the one, it is declared the best developer in existence ; whilst by others, it is placed after hydroquinone or pyrogallic acid. The eikonogen has been discovered by Dr. Andresen, of Berlin ; it is a new naphtol derivative, the sodium salt of amido-β-naphtol-β-monosulphonic acid, the chemical composition of which is represented by the formula :—

$$C_{10}H_5\begin{cases}SO_3\,Na\\OH\\NH_2\end{cases}$$

In the prospectus sent out by the manufacturers it is stated that the new material acts much more energetically than ferrous oxalate and hydroquinone, and even more than pyrogallic acid ; it is stated further that, in consequence of its many advantages, the new agent must supplant all other developers. Now, as to its quickness, I have observed that it is about equal to pyrogallic acid, not quicker. With a normal exposed plate the image comes out in half a minute, and is finished in about three minutes. The negatives show a beautiful bluish-black colour, together with a very fine precipitate, which renders all the fine details. I have obtained the best results with the following formula, recommended at first by Herr E. Vogel, jun., of Berlin :—

Solution No. 1.

Crystallized sodium sulphite ...	40 grammes
Eikonogen	5 ,,
Distilled water	500 c.c

Solution No. 2.

Carbonate of potash	60 grammes
Distilled water	500 c.c

For use, equal parts of No. 1 and No. 2 are mixed, which mixture may be used for several plates. In the case of over-exposure a few drops of potassium bromide (1:10) may be added, or the development may be commenced with a solution which has been already used. To develop instantaneous pictures, the following formula may be used :—

Sodium sulphite	10 grammes
Eikonogen	5 ,,
Carbonate of potash	5 ,,
Water	150 c.c

I have observed that the best results are obtained only with the freshly-mixed solution, to which a few drops of the following accelerator may advantageously be added : hyposulphite of soda 1 part ; potassium bromide 6 parts ; water 70 parts. For a half-plate 6 to 8 drops of it should be added. Eikonogen serves well also as a developer for gelatino-bromide paper, and I think to revert to this subject in my next letter. At all events, eikonogen is an excellent developer, but whether it will surpass all others—"Nous verrons !"

CLOUDS.*

BY DR. MORTON.

THE subject is one of considerable interest to photographers, and hardly has received the attention which it deserves ; at least, I have not met with much written concerning it. It is the wish and delight of the landscape photographer to obtain a fine cloud effect in his picture by one and the same exposure ; but how often does this occur ? The reason, if not fully understood, should be ascertained.

When you have a deep blue cloudless sky with brilliant sunshine, or a light blue with faint haziness, or thin cirrus cloud, I need scarcely say the resulting negative is dense and valueless as regards the sky. The clouds have to be printed in, or a certain tone given the paper, according to the composition ; but even if fine, bright, cumulus clouds are present, when exposure is made, they most frequently become obliterated during development before the foliage, rocks, or other dark objects have reached a proper printing density.

If we could safely stop development of the sky at an early stage, the clouds would be evident in many cases. This fact being recognised, points to unequal lighting as a cause of clouds being absent from the negative. The foreground is under- and the sky over-exposed comparatively, and if one could differentiate the developer—*i.e.*, give more to foreground and less to sky—much would be accomplished ; but in this lays the great obstacle.

I possess a number of negatives in which clouds are present, and print fairly through without any dodging. Some were taken by drop-shutter, and others with an exposure of as much as six seconds. Now, on reference to my note-book, and a recollection of the views, how they were lighted, I have come to the conclusion that even illumination was in most instances the cause of success ; for example, dark round masses of cloud with just a silver margin here and there, and a bright, open foreground and few shadows, also some views without direct sunshine, but well lighted, are good. I may say that in nearly all the sun was behind or either to right or left of the camera.

In seascapes clouds are often caught, as the sea is generally well lighted and is a reflecting surface. The sky being rather more dense in negative than the sea, the latter has to be masked when printing. Cautious development is essential to the securing of cloud and landscape—a solution of pyro, medium strength, with not too much ammonia as a start, carefully watching that the sky does not get too opaque.

I find that keeping the developer well on the foreground by tilting the dish upwards, relieving the sky of its action, has a marked good effect. Of course a thin sky can be made by over-exposure or a weak developer.

In taking cloud negatives specially, a drop shutter exposure—if light is strong—lens at $\frac{f}{16}$, rapid plate, will answer. A developer rich in pyro, say 3 grains to ounce, and 1 drop of ammon. fort., 1 grain of bromide in each two ounces of solution ; develop until the cloud contrasts are just overdone. Wash and fix. Some photographers have recommended a slow plate and rather long exposure, but this would bring matters almost to the same condition as in the former method.

The ever-varying light intensity of clouds, the position of the sun, and time of day, will always need discrimination in exposure, but any rules or suggestions that could be made to facilitate securing clouds in our views without combination printing would be hailed with satisfaction.

"THE public is a great baby, which craves amusement and excitement. It is easily pleased with what is given it, but show it something else better, and it understands and makes comparisons at once."—GEORGE SAND, in *Consuelo*.

LAST month 82,124 British subjects crossed the Straits of Dover *en route* to Paris, proving the immense attraction of the Paris Exhibition.

* A communication to the Sheffield Camera Club.

Patent Intelligence.

Applications for Letters Patent.

12,010. W. J. Payne, 186, Fleet Street, London, "Portable Camera."—July 29th.

12,117. G. Mattioli, 1, Queen Victoria Street, London, "Lens Shutter."—July 30th.

12,309. J. Williams, 24, Southampton Buildings, London, "Preparing Paper or Fabrics for Photographic Purposes."—August 2nd.

12,343. D. W. Noakes, 9, Billingsgate Street, Greenwich, Kent, "Mounting Photographic Lenses."—August 3rd.

Specifications Published.

12,006. *20th August*, 1888.—"Gas Supply Regulating Apparatus for Magic Lanterns." James Edward Anderson, 35, Meredith Street, Clerkenwell, Lantern Maker, and Louis Edmond Perken, Frederic Louis Perken, and Arthur Rayment, trading as Perken, Son, & Rayment, of 99, Hatton Garden, London, Wholesale Opticians.

This invention relates to improvements in taps or cocks, or gas supply regulating apparatus or appliance of a novel character, and is applicable to a number of purposes, but is especially adapted for regulating and controlling the supply of gas to magic lanterns.

For this purpose we will describe the present invention as adapted for a "six-way" gas supply regulating apparatus—though it can be arranged for a greater or less number if desired—for a "treble" magic lantern.

In a block of brass, or other suitable material, are arranged longitudinally the main supply pipes for oxygen and hydrogen gases respectively.

Between these are arranged three valves or plugs, each such valve having a slot or groove formed on two sides thereof, opposite to each other, which, when brought opposite a suitable pipe or opening from the main supply pipes, will allow the oxygen gas on one side, and the hydrogen gas on the other, to pass to an outlet hole or pipe, respectively, on each side whence it is led to the point of ignition.

A "bye-pass" from each outlet pipe on one side to the main supply pipe on the same side is provided, so that the light in each individual lantern can be turned up full at any moment, and a screw or other convenient appliance is provided to each "bye-pass," so that both gases may be shut off entirely from any lantern or lanterns independently of the others, and thus prevents any escape of gas or fear of explosion taking place when any one or more lantern is not being used with the other or others.

For further security, the valves may be formed with any convenient appliance to lock and secure the same in position when turned "off" and out of use—as, for instance, a small lug or projection on the valve or plug, through or on to which a set screw acts to rigidly secure same.

No. 13,082.—*September 10th*, 1888. "Box for Photographic Plates." Frederic Barrett, 165, Queen Victoria Street, London, Publisher.

This invention relates to the manufacture of an improved box for containing photographic dry plates, the main object of the improvements being to provide a box which, while being light, shall be strong and light-proof.

In manufacturing his improved box he forms the ends thereof of wood provided with a number of vertical grooves placed a suitable distance apart, and adapted to receive the edges of the plates, the outer grooves serving to receive the sides of the box, also made of wood, and adapted to be slid in or out. The permanent sides of the box, as well as the bottom thereof, are made of cardboard, or the like. The space between the removable wooden sides and the permanent cardboard sides of the box serves as a cushion against the effect of blows, or pressure, during transit or otherwise.

In practice he finds it advantageous to provide the upper edges of the box with a flap of non-actinic paper, to be folded over the edges of the plates before the lid is placed over the box, as a further protection against the entrance of light, particularly after the box has been once opened.

The lid of the box is made of cardboard, and is adapted to fit over the top of the box as usual. The bottom of the box, as well as the inside of the lid, is advantageously strengthened by means of a thin piece of wood or of corrugated paper packing.

By this improved construction of box he says that he obtains absolute security against the entry of light, combined with rigidity, at the same time that the plates can be placed in and removed from the box with facility, and efficient protection against injury is afforded to the plates during transit and otherwise.

Proceedings of Societies.

Sheffield Camera Club.

An ordinary meeting was held in the room of the Society, New Surrey Street, on August 2nd, the President, Dr. Morton, in the chair.

Mr. Hardy, Hon. Sec., exhibited some excellent instantaneous studies taken by Mr. J. O. Arnold; the prints had been toned with chloride of gold and soda carbonate, which he thought was superior to soda bicarbonate, as used generally.

Mr. Harvey Rawson introduced the topic of the evening, "Clouds," and said that early in his photographic experience he saw the necessity of having clouds in landscape pictures; there could be no comparison between views with clouds and those without. When they were absent, he printed them in from a special glass cloud negative, and preferred a thin image, but with contrasts. Having shaded the foreground, clouds were soon printed in the plain sky. Masking required skill to avoid showing evidence of double-printing. Clouds were not easy developing, and he thought that the use of yellow-tinted glass placed behind the lens would obviate or reduce during exposure their intense brilliancy. A pin-hole camera might prove effective.

A number of cloud negatives were shown as illustrations, also capital prints of scenes in Derbyshire, and stereoscopic views.

The President read a short paper on the subject (see page 526).

Mr. Newsholme observed that he had taken several views recently, short exposure with lens stopped down, and obtained good clouds, but the foreground refused to develop.

Mr. Hardy thought that Dr. Vogel had recommended a tinted glass screen.

Madras Amateur Photographic Society.

This institution, which has been in existence for about two years, intends holding its first exhibition about the 30th Dec. next, when the prizes mentioned below will be awarded. Though the monthly meetings, which are held in the Masonic Rooms in the Mount Road, are not always so largely attended as might be wished, yet the persons who find, or make, time to be present thereat are generally rewarded by the interesting nature of the proceedings. At each meeting some subject is chosen for photographic treatment, such as a group, foliage, cloud effects, interiors, exteriors, and so forth, and the specimens, which have to be sent in at the ensuing meeting, frequently exhibit considerable talent. The photographs are criticised by those present, and the vote of the majority decides as to which is the most artistic and worthy of honourable mention in the Society's proceedings. Papers on subjects photographic are also occasionally read, while lantern slide exhibitions form an additional attraction. Besides these monthly meetings, at which no prizes are awarded, the Society holds two private Exhibitions in the course of the year, when medals and certificates are awarded to those deserving thereof. At the last Exhibition the competition was very poor indeed. It is to be hoped, however, that at the Exhibition in December next all amateurs in the Presidency, at all events, will be represented. The exhibits will be divided into three classes, A, B, and C. The first class is open to all exhibitors, amateur and professional, and the prizes to be awarded are as follows:—The Society's gold medal for the best photograph in the Exhibition, a silver medal for the best set of photographs of landscapes, a silver medal for the best set of four photographs of a figure subject, and a silver medal for the best set of twelve lantern slides produced by any process, the subject being left to the option of the exhibitor. Class B is open to amateurs throughout India, and the following prizes are to be awarded:—A silver medal for the best photograph, and bronze medal for the second best photograph; a silver medal for the best set of four photographs, whole-plate and upwards; a silver medal for the best set of four photographs under whole-

plate; a bronze medal for the best set of twelve lantern slides by any process; a bronze medal to be awarded by the judges for any special subject. Class C is open only to members of the Amateur Photographic Society of Madras, and the following are the prizes:—A silver medal for the best photograph, landscape; a bronze medal for the second best; a silver medal for the best photograph figure subject; a bronze medal for the second best, and a bronze medal for the best photograph produced by any member who has begun to practise photography since 1st Jan. last.—*Englishman.*

Talk in the Studio.

THE *Journal* of the Photographic Society of India, price eight annas, is issued by the Law-publishing Press, 57, Bow Bazaar Street, Calcutta.

PHOTOGRAPHIC CLUB.—At the meeting on August 14th the subject for discussion will be "Blisters." Saturday outing at Broxbourne.

THE latest issue of our Japanese namesake—the *Photographic News*—contains a half-plate silver print by way of illustration. The excellence of the literary portion of the paper, printed, of course, in Japanese characters, we must take for granted on the repute of its editor.

THE MAYBRICK TRIAL.—The value of the testimony of one witness for the defence was dependant solely on photography; for we read in the daily press that Mr. Edwin G. Heaton, chemist and druggist, now retired from business, said that he had carried on business in Exchange Street, East, Liverpool, close to the Exchange, for seventeen years, giving up in April, 1888. He recognised deceased by his photograph as a frequent customer, though he never knew him by name.

OUT OF THE QUESTION.—"Fix your eyes on that sheet of paper hanging on the wall," said the photographer, "and assume a pleasant expression."—"Hold on," exclaimed the sitter, in some excitement. "Isn't that an official list of the Louisiana Lottery drawing?"—"I think it is."—The young man hastily left the chair and went over to examine the document.—"Mister," he said, as he took his hat and moved slowly toward the door, with a sad, hopeless, another-$2-gone-to-thunder look on his face, "I'll come in some time next week and have this picture taken, if it will suit you just as well."—*Detroit Free Press.*

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper and Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

EPSILON.—The Leclanché battery usually employed for actuating electric bells is composed of a carbon element embedded in granulated manganese (black oxide) charged into a porous pot, and generally closed over with a top layer of pitch, set within a larger vessel containing a rod of zinc immersed in sal-ammoniac solution. After a time the battery requires cleaning by soaking the inner pot in water and starting it again with freshly-made solution, the zinc rod being scraped to remove the adhering lead sponge, and the connections brightened. It is usual to rub the top (inside) edge with bees'-wax, or coat with melted paraffin, to prevent the salt creeping over the top of the battery jar.

F. C. S.—The account given of the method of producing De Chardonnet's artificial silk is anomalous in respect to the treatment of the collodion threads with nitric acid of specific gravity 1·32 "to effect the denitration." One would have thought it impossible, but we are assured by those who have seen it at the Paris Exhibition that the new artificial silk is *not* explosive or unduly inflammable.

F. W. B.—You cannot do better than get Mr. W. T. Wilkinson's book, and for estimates of apparatus for photo-mechanical printing, apply to Messrs. Waterlow and Sons, Finsbury Works, E.C.; or to Messrs. Bemrose and Sons, Chetwynd Street, Derby.

TEMPLE.—Commercial glycerine varies in specific gravity from 1·15 to 1·25, but the price is regulated to a great extent by the colour.

E. L.—Horn and gelatine are invariably stained by contact with nitrate of silver; you might try the effect of cyanide of potassium to remove the marks; but, if they are deep, success is doubtful.

ASS. MINOR.—The illustrations in the *Art Journal* are mostly done by the photo-mechanical processes. "East Anglia," from negatives by Mr. Payne Jennings, are good, but the Paris Exhibition series are still better. The weekly illustrated journals are slowly adopting the new methods.

S. A. H. (Crewe).—Will not pure tin answer your purpose, this metal retaining its lustre after long atmospheric exposure? The zinc-tin alloy is also very permanent.

ACID.—Phenol-phthaline is a very good indicator for point of neutrality, and is often employed where the old tincture of litmus is inadmissible.

LIBERTY.—Many of the photos in H. Fox Talbot's *Pencil of Nature* have become unstuck. This is due to their having been mounted with india-rubber paste, which later experience has shown to be perishable.

J. C., JUNR.—Water purification for photographic purposes is the subject to be discussed at the Club meeting of the 7th inst. Look to the report when published; or, better still, send Mr. Dunmore a note of your ideas.

ELECTRON.—Plaster casts are said to be hardened by washing with borax solution or a weak silicate, but they will not even then bear long immersion in water. Why not soak them in melted stearine or paraffin, and proceed to electrotype after applying a thin film of black lead?

VIEW LENS.—If it be possible, Mr. Wray, of Laurel House, North Hill, Highgate, will fit an iris diaphragm to your present lens. We cannot give you an idea of the cost; send a rough sketch, and the optician named will probably be able to give you an estimate.

OLD HAND.—If you have any difficulty in procuring Bates's black varnish, apply direct to the maker, Mr. W. Bates, Chertsey, Surrey.

M. S. A.—The right to the negative has been frequently disputed, but our notion is that unless a stipulation was made at the time of the sitting, and extra price paid, it would undoubtedly belong to the photographer. You have probably seen the discussion in last week's NEWS, page 510.

S. BROOKS.—The blue spots appear to be due to unequal toning at the blisters.

OPERATOR.—You are entitled to use either of the designs, and No. 3 would, in our opinion, look best. Mr. Jabez Hughes always took No. 2, but it is altogether a matter of taste.

E. O. C. (Boston, Mass.)—The colour of periodide of mercury is scarlet, turning to bright yellow when strongly heated nearly to the point of volatilization. We never saw or heard of a *green* periodide, and therefore cannot say for what purpose it is used.

J. T. (Windsor).—The alcoholic solution of pyro is fairly permanent, and so also is an aqueous solution when mixed with citric acid and a sulphite.

NOVICE.—A gramme is equal to 15·434 grains. We note your mode of spelling the word "gram," which is beginning to have the sanction of custom, and especially in America; but as many people fail to dot their i's in manuscript, there will always be a doubt whether grain or gram is intended—hence our objection to use the abbreviated form of orthography in this instance. The word programme has never been altered: why should not the French *gramme* be allowed to remain intact?

Several other correspondents in our next.

The Photographic News.

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For Advertisement Scale see page v.

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THE PHOTOGRAPHIC NEWS.

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SCIENTIFIC SPECIALISTS CONSIDERED AS ARTISTIC PHOTOGRAPHERS.

UPON another page will be found a leading article quoted from that excellent journal *Anthony's Photographic Bulletin*, dealing with the education of photographers, and stating what that periodical deems to be necessary to properly suckle and rear the choicer specimens of the fraternity. The budding photographer, it seems, should be taught arithmetic, algebra, optics, physics, and chemistry. "With a knowledge of mathematics," says the trans-Atlantic writer, "the mind appreciates perspective and proportion in form much better than without it. With a knowledge of physics, all those phenomena of sound, heat, light, and electricity, with which we are daily becoming more and more surrounded, no longer remain objects of bewilderment; but each is understood and appreciated, many of them being intimately connected with the photographic art." These remarks bring to mind the fact that many, and probably the majority, of the more celebrated photographers of this country, whose merits have been recognised by the awarding of a multiplicity of medals at exhibitions, or by the patronage awarded them in portraiture by the more cultured section of English society, do not profess to be experts in the various branches of education which the *Bulletin* thinks so necessary, and in some cases the said photographers know little about them; moreover, they do not complain of being "bewildered" by sound, heat, and electricity, but take their meals regularly. A story is told that one celebrated photographer never touches a camera or develops a plate, asserting himself to be an artist, and not a mechanic or scientific pedant, and says that he pays such people to do their commonplace work for him; but he poses his sitters with the genius of an artist, and works up the negatives to suit his ideals. This tale may be true or otherwise, but it is not outside the realms of possibility. Near the tail of the article in the *Bulletin* is a little and but partial saving clause, to the effect that the photographer "must be an artist; and by this," says the writer, "we mean that he must appreciate and note those combinations of form and colour that make the pictures we see and that please us. Much of this knowledge can be acquired by reading, but by far the larger and more valuable portion of it comes from careful observation; in other words, it is truly scientific. It is the acquiring of a knowledge of those combinations that please or distress the eye in nature, and the storing of them in the mind for future use. The just appreciation of these forms and the union of them into compositions gives us the artist."

This little saving clause is but a poor one, for great artists are born and not made; genius cannot be drilled into a common-place man by any amount of the plodding work just specified. Too deep an absorption of the mind in physical science is usually adverse to the development of the artistic and emotional side of a man's nature, so that the scientific specialist is sometimes but a poor stick as an individual—ill-bred in manners, overflowing with what is now known as "scientific arrogance," and who considers himself the superior of everyone who cannot enter into his jargon about atoms and molecules, the clashings and interactions of which his rich intellect assumes to have produced the genius of a Shakespeare by processes of physical evolution. There are, among the more eminent members of the scientific world, many of more modesty and intelligence, and who deserve all respect, but a wide gulf separates them from the vulgar specimens of their order just described. *Punch*, a few months ago, did good service by publishing some engravings tending to take down scientific conceit, and to cause society to chuckle with satisfaction thereat, although it is rather hard upon the scientific world that the many should suffer for the sins of the few, the latter including the too prominent specimens of self-assurance herein under criticism.

That marvellous man the Reverend Josiah Postlethwaite was a wonderful specialist; he wore green spectacles with a tortoiseshell rim, and his head was sheeted inside with learning mystical and grand. He had written sixteen folio volumes on the words "*di, do, dum*," but he did not understand the commonest things of common life when they took place under his nose. The scientific specialist is sometimes of the same type, and totally destitute of artistic genius, or any power but that of drearily plodding in the particular little groove in which he has been trained, and upon which he thinks the universe depends. Schopenhauer thus sums up this class of men:—"The gentlemen of the crucible and the retort must bring it home to themselves that mere chemistry may enable a man to become an apothecary, but that it does not make him a philosopher. Certain kindred spirits among the naturalists, too, should understand that a man may be a consummate zoologist, have the sixty sorts of apes strung together in perfect order, yet, knowing nothing besides, except a few scraps of his catechism, be on the whole an ignorant man, merely one of the vulgar. This, however, is a common case at the present day. People set themselves up as teachers of mankind. They have studied chemistry, or physics, or mineralogy, or zoology, or physiology, but have studied nothing in the world besides. They put alongside this the only other knowledge they possess, the little bit of catechism that has stuck to them since their school days. If the two pieces will not fit well together, they immediately set themselves to scoff at religion, and by-and-by sink down into insipid, shallow materialism. That there was once such a man as Plato or Aristotle, or Locke or Kant, they have perhaps heard at school; but then these men did not handle a crucible, nor did they ever stuff an ape; it is not, therefore, worth while becoming

better acquainted with them. So the results of two thousand years intellectual labour are flung out of the window, and from their own abundant mental resources, with their catechism in one hand and their crucible, retort, and list of monkeys in the other, they set themselves to preach philosophy to the public. They deserve to be told roundly that they are ignorant, that their discourse cannot be listened to until they are better instructed. In fact, all these silly childish Realists who come forward to dogmatise about the soul, God, the origin of the world, atomism, and so forth, just as if 'The Criticism of Pure Reason' had been written in the moon, and no copy of it had ever reached the earth, belong to the uneducated vulgar. Let them to the servants' hall, and there make show of their wisdom."

Rejlander was not a scientific expert such as described by the *Bulletin*, and although experts of that kind, versed also in photography, are fairly numerous in Europe, not one of them has succeeded in turning out pictures of the artistic power of Rejlander. Had anyone accused him of being a scientific expert, and ascribed his success thereto, he would probably have passionately resented the imputation. The question may be raised whether physicists and advanced mathematicians are not, as a general rule, failures as artists, and it would be interesting to ascertain whether any man who has hitherto achieved great fame for artistic powers in photography has possessed more than an accidental smattering of knowledge of physical science.

AMERICAN WORKMEN AT THE PARIS EXHIBITION.

Private enterprise in the United States has sent a deputation of American working men to the Paris Exhibition; the whole enterprise is known as "The Scripp's League American Workingmen's Expedition." A little pamphlet, illustrated with likenesses of the selected "sons of toil," has been printed by Messrs. John F. Eby and Co., of Detroit, and the only person described in it who concerns our readers is Mr. Henry L. Wilder, the working man photographer. Of him the pamphlet says :—

"Mr. Wilder is an expert in the art of picture making. He was the first to use the gelatine or dry-plate process, which he improved, until now it is known as the lightning process. He has travelled all over the country gathering the pictorial beauties of the world, being connected with the leading wholesale picture publishing company in the United States, and his work is noted for its artistic effects and clearness of detail. For the last fifteen years his time has been spent in effecting improvements in his art. He is thirty-six years old, and a native of Michigan."

Whoever furnished the materials for the writing of the foregoing pamphlet is skilled in the use of an ancient instrument of warfare known as the long-bow. However, Mr. Wilder has as much claim to have been the first to use "the gelatine or dry-plate process" as some others whose true merits will come out when we have a school of historical photographic criticism.

In order to moderate the light of electric lamps without losing too much of their lighting power, the *Polytechnische Notizblatt* recommends to paint the lamps over with a solution of a salt, whereby they are covered by a coat of fine crystals. These innumerable crystals effect a diffusion of the light without materially diminishing its intensity. Salts of lead or tin are thought to be the most suitable for this purpose, but other materials may be found more convenient.

Another Great Exhibition.—It is proposed to hold a World's Exposition in the United States on the anniversary of the discovery of America—1492-1892. Four committees, each of 25 members, have been appointed to settle the preliminaries, and the New York Chamber of Commerce has appointed a committee of 69 to co-operate. It is proposed to arrange the Exhibition on a gigantic scale, under Government auspices, and it will be international, in the sense that all nations will be invited to take part in it.

THROUGH JAPAN WITH A CAMERA.

Chapter IX.

Sendai—Matsuma—The Japanese Race.

On our return to Sendai the second time, we were informed that "a lodging had been prepared for us," and were taken, on the morning after our arrival, by a deputation from the local government board, to the best tea house of the town.

From what has already been said of the tea houses, it will be understood of those which the Japanese would describe as "number one houses," that they are much more pleasant places of residence than hotels; but it is not customary—in fact, I believe it is strictly illegal—to permit travellers to reside at the former places; that is to say, to stay over night. They are only intended as places of rest and amusement for the daytime. The local authorities have the power, however, of making an exception in the case of those who are on public business. So, in Sendai, we found ourselves in what was altogether the most comfortable and convenient place of residence that we had been in since we had started on our journey, especially as we had the whole house, which was very large, practically to ourselves, any guests who came in the daytime being, whilst we were there, entertained in a sort of offshoot from the main house, and there being no visitors in the evening.

Two young ladies of the establishment were deputed to attend on us. These were the adopted daughters of the owner of the house. To be childless is considered in Japan the greatest misfortune, and those who have no children of their own almost always adopt one or more of the children of their friends who may happen to be poor, or to have a very large family.

O Takisan (or Miss Bamboo) and Okikusan (or Miss Chrysanthemum) were the names of our especial guardians. They were both full of fun and frolic, and entertained us most royally. They had a number of tricks and games that they showed us. Okikusan, who was only twelve years old—by Japanese reckoning, which means eleven years by our reckoning—could juggle with an apple, a two sen piece, and a piece of paper, keeping them all going in the air at the same time. Both could construct the most marvellous forms out of paper. The frog that they made was, in particular, so remarkable a work of art, that I wish I had kept him. There was a great folding and twisting of paper, which appeared at last to be reduced to a formless mass, but a sudden puff of air from the mouth into a hole that had been left somewhere distended it, and, lo! there was a frog standing on its four legs, with its head so impudently cocked up, that one expected it to jump from the table. But the crowning accomplishment of both young ladies was that they could stand on their heads. This performance they went through with evident pride; first, it is necessary to mention, arranging their garments, so that they took very nearly the form of the nether garment worn by men in Europe. They were very anxious that I should emulate this performance. I am generally loth to refuse anything to the fair sex, especially when represented by young and pretty girls, for all of whom I have a tender feeling; but, really, one must draw the line somewhere, and, at my time of life, to stand on my head for the edification of two little Japanese girls—well! Besides which, I can't stand on my head if I try ever so hard, and, if I did try, I am not going to confess the same to English readers.

Our business was soon done in Sendai, and we made our way one day to a place about twelve miles off, called Matsuma. It is on the sea shore, and is one of the most beautiful spots that I have seen in Japan. A large bay is dotted over with innumerable little islands of rocks with what looks like a tuft of pine trees growing on the top of each. The stone constituting the islands is soft, and the water has undermined it into all sorts of fantastic shapes and forms. I had taken my camera with me, but just as I

was about to set it up, the sky, which had been clear, suddenly overclouded, and we had scarcely time to run for shelter when a thunderstorm began, which made all photography out of the question for that day.

As we made our way home, we observed a curious custom of the country. In front of every house (it was now fair again) was erected a bamboo tree, decorated with strips of brightly-coloured paper and garments of the same material, very like what we find in children's crackers at home.

This is, it appears, an ancient custom which is observed yearly on a certain day. The girls of the family make the paper garments which decorate the tree, and, in return, are gifted with the capacity to sew neatly. The boys write mottoes on the strips of paper, and thereby secure a good handwriting. It seems a pity that this simple means of securing a decent "fist" was not known to the writer's parents some twenty-five years ago. It would have saved a world of subsequent trouble to contributors and others.

The day was, it appeared, a sort of festival, and, as we got towards our lodgings, when it was darkening, the houses were all decorated with coloured lanterns and other devices. In front of our own tea-house there was hung up a huge strip of transparent paper lighted with candles in the inside. As was to have been expected, it caught fire, causing no little excitement.

Our tea-house looked out on a sort of square park surrounded with shops and booths, which were all decorated with strange devices, for the most part of paper, with candles burning in the inside of them, and the little Miss Crysanthemum, who had become quite tyrannical by this time, insisted on being carried pick-a-back all about the place to see the sights. She apparently looked on the writer as a sort of good-natured barbarian, to be treated with some consideration so long as he behaved well; but to be kept strictly under control.

In the evening, a third young lady, O Minesan (or Miss Mountain-top) appeared on the scene, and the good lady of the house herself favouring us with her presence in our sitting-room, there were games of hide-and-seek and blind-man's buff, and other childish follies that I had not indulged in for many a year. The great old house rang with peals of merry laughter till, I think, the small hours of the morning; the old lady, the meantime, continually smiling with good nature enough to make her look pleasant, spite of her blackened teeth.

The custom of blackening the teeth of women at the time of marriage has, by the way, almost entirely gone out in Tokio, the capital, but is still practised in the country. There is a great misconception on the part of many foreigners as to the object of the blackening of the teeth. I have seen it repeatedly stated that the Japanese blackened the teeth and erased the eyebrows of the women at marriage so as to disfigure them. A strange idea, surely, that a man should wish to disfigure the woman he takes for his wife, even supposing the woman would submit to it; but the truth is that the two practices alluded to—the blackening of the teeth and the erasure of the eyebrows, false ones being painted in higher up—were supposed to add to the charms of a woman. This is conclusively proved by the fact that, before foreign customs were adopted, the most fashionable courtesans in Tokio had their teeth and eyebrows treated in a similar manner; but, however this may be, the blackened teeth are, to the eye of a European, a frightful disfigurement, and the custom of keeping the natural colour of the teeth is a foreign importation that few will regret.

I made a few exposures on the young ladies, and am very sorry indeed that one of them resulted in failure, as I intended to use it to illustrate some remarks.

When a European first comes to Japan, he can see but little distinction between one individual and another. The differences between the different Japanese is lost in the great difference between them and Europeans; but, after a little time, he begins to see that the Japanese consist of two distinct and clearly-marked races. There is the aristocratic and the plebian type. There is a real and actual class difference, so that, whereas in England, if a thousand children of the poorer classes and a thousand of the upper classes were taken at birth, and were similarly educated in every way, it is doubtful whether the two sets would show any marked difference; and it is certain that of the majority of individuals it would be impossible to say from which class they had sprung—in Japan, if the same had been done before the feudal system was abolished, the difference would have been clearly noticeable in every, or nearly every, individual case.

It is a question—and one which it would be most interesting to have solved—whether these two classes represent two originally different races, a conquering, and therefore presumably superior, and a conquered race, or whether the difference has grown up by degrees through centuries, during which the habits, food, surroundings—in fact, the environment—of the one class was totally different from that of the other, and in which—so strictly was feudalism enforced—the two classes were kept totally separate, to pair from the one to the other being impossible.

Students of Darwin will perceive in the fact that the distinction is not perceptible at an early age some evidence in favour of the latter supposition. On the other hand, however, it may be argued that all babies are precisely like one another; they are all like so many dabs of putty.—Mothers please take note.

O Takisan—or, as I have called her, Miss Bamboo—had a typically aristocratic face, and it was when photographing her in profile that I for the first time understood why so many maintain that the Japanese aristocratic class is Jewish in its origin—"lost tribes," of course, some hold. Leaving the head-dress out of the question, O Takisan's profile might have been that of a Jewish maiden of quite pronounced national type. There was the same delicate aquiline nose and slightly pouting lips; in fact, a Jewish face.

The other class much more closely approximates to that of the Negro. There is a low squat nose, and very thick lips of a coarse nature.

This question is a very interesting one, and is one that might probably be elucidated to a certain extent by composite photography. I am glad, therefore, to hear that Professor Hitchcock, of the Smithsonian Institute, whom I have already mentioned as at present in Japan, contemplates attempting some work of the kind. It will soon be too late to do it, as with the overthrow of the feudal system the barrier between the classes was broken down, and the distinction between them will, doubtless, soon disappear.

At Sendai, the good people entertained us in "European style." Those who have read the description of the Japanese style of entertainment will probably think with me that, as an entertainment, the English dinner is flat, stale, and unprofitable compared with it; but I must say that after three weeks on Japanese food, I enjoyed the actual feed immensely, and ate so much that I am surprised that I was not very ill afterwards.

Several numbers of the *Caxton Railway Guide and Pictorial Magazine* have been sent to us, presumably because each number is illustrated with a silver print of some local celebrity. The magazine is made up of clearly arranged tables of the local train services connected with Southampton and Bournemouth, and a variety of very readable matter.

The Action of Light in Oceanic Depths.—The expedition to explore the submarine flora and fauna of the ocean, under the supervision of Geh. Medicinal-Rath Prof. Hensen, M.D., which is to last for several months, has been subsidised by the Emperor William to the amount of 80,000 marks. A special subject of investigation will be the effect of light on the oceanic fauna, and Dr. Hensen, it is understood, will undertake a series of experiments with this object by means of the electric light. The east coast of Greenland is the first cruising ground.

ARTISTS AND PHOTOGRAPHERS.

BY C. HANMER CROUGHTON.

THERE is, and has been from the first, a tendency on the part of a certain class of photographers to decry the criticism of their productions by artists.

This comes, first, from the ignorance of the photographers as to the standpoint from which artists view their productions; and secoudly, from the ignorance of the majority of artists as to the photographers' standpoint.

Thus seeing photography from opposite points of view, it is the old story over again of the silver and the gold shield. Both were right, because the shield was gold on one side and silver on the other, and both were dogmatic because each saw only his own side.

A photographer attending one of the recent exhibitions was astonished at a favourable notice by one of the outside press of a picture which he regarded as a very dirty plate, badly manipulated, aud he came to the couclusion that the writer of the favourable criticism was a friend of the amateur who produced the picture.

Another man, an artist, was disgusted at a most flatteriug notice being given to a photograph in the same exhibition, which to him had no redeeming quality.

How are we to reconcile such a discrepancy, and get both men right from their iudividual points of view? Had the photographer been through the course of study which is necessary to make au artist, he would have seen that the picture praised was one of nature's transieut moods, caught uuder conditions of great difficulty, where compositiou of line, light and shade, concentration of focus, were all there. The dirty plate was an accident, and was no more regarded than the bodies of dead flies would be upon an out-door sketch, if the sketch itself fulfilled the artistic conditions. In fact, the effort to catch the transient expression on nature's face was the cause of the dirty plate, in scrambling down the rocky bank of the stream. The dark slide fell, there was no time to get another slide, and the effect was secured on the plate which it was known must be dirty rather than miss it altogether, aud the result was a picture worthy of the praise lavished upon it, although techuically it was an imperfect photograph.

There, that is it, says the photographer. You admit it was au imperfect photograph, therefore in our exhibition of photographs it deserved condemnatiou instead of praise. Yes, sir; I admit that also, if the exhibits were to be judged solely from a photographic standpoint; but you see you call in artists as well as photographers as judges, and the artist judged it from his standpoiut, ignoring the faults of the photograph on account of its beauties as a picture.

Now what about the other picture, which the artist had passed by without a secoud glance, but the photographer had pronounced the best photograph there?

From a photographic standpoint it must be admitted it was perfect. Timed to a nicety, it was developed just right, printed and toned to perfection. Well, then, why did not the artist treat it as it deserved? He did, from his standpoint.

It was uot the only perfect photograph in the exhibition. Technical excellence is not at all uncommon in these days, when half the excellence is bought with the box of plates. When the chemical and mechanical difficulties were much greater, and excellence of manipulation harder to attain, perfect photographs were the exception, not the rule. Therefore the perfect photograph was entitled to and received its due meed of praise: now things are different. In these days of photography reduced to three motions, something more is needed than technical excellence, at least half of which may be due to the plate manufacturer.

But, urges the photographer, you have not told me what the artist saw in the photograph.

He saw an ordinary exhibition of photographic skill—a good lens in a good camera, pointed at a view calculated to show up the depth of the focus possessed by the lens, which had been stopped down to its smallest aperture to ensure sharpness all over. What he missed was the knowledge necessary to bring out the best points of the view. There was too much light on the picture, and from a wrong directiou; there had been no effort to keep the lights together, and in consequence the effect was spotty; the extreme sharpness of each plane, caused by using a small stop, made the distance, which should have receded, challenge attention with the foreground, and in short, instead of being a picture it was a photographic map; therefore he passed it by as unworthy of notice, and was surprised when he saw it praised by one of the photographic journals, and wondered at the utter want of artistic feeling displayed in the notice. Is it any wonder, from his point of view, that he should sneer at the photographer calling himself an artist?

Except in the case of the picture noticed above, there is no reason whatever why technical excellence in manipulation should not be shown in making photographs which shall be worthy of the name of pictures. As I have said before, the conditions of modern photography, making the technical easier, gives more time and opportunity for the exercise of artistic knowledge. But the knowledge must be there, and the photographer who sneers at the artist as a freak who does not know what a photograph is, must sit at the artist's feet, and learn what constitutes a picture, or, forgive the slang, he will get left.

He will have to unlearn a great many things, and learn to look upon some things he has hitherto regarded as essential to good photography as edged tools that will not bear playing with. He must learn that his smallest stop is not a friend but an enemy; that, in makiug a view, he must use the largest stop possible for the requisite definitiou of the principal object in his picture, and not put in his smallest stop, because it will bring it all up sharp, you know.

He must learn that there are many more pictures made with the sun in advance of the camera than were ever made with it behind, and that the less strong light there is in a view, the better the picture. He must learn to look out for reflections in water, as they are too apt to challenge attention from what ought to be the domiuant light in the picture; and above all, he must learn not to be dominated by the exact proportions of his plate. Many a photograph exhibited has been spoiled as a picture because the photographer would mount his print the same size or proportions as his negative, when by cutting away an objectionable light or line which spoiled the composition, he would, at the sacrifice of an inch or so of paper, make a picture.

There have been in the journals of late one or two protests from certain photographers that they considered a photographic journal should be devoted to photography, and not so much space given to art matters in connection with photography. These protests come from men who will remain photographers to the end. Art is nothing to them. They carry on their business for dollars and cents, and they see no reason why the journals should print articles upon subjects that they have no use for. But have they no use for them?—that is the question. I think they have. They may stand still, but their brother photographers will not, neither will the public, upon whom they depend for dollars aud cents. The amateur craze is spreading, and will spread, and the kuowledge that excellence in manipulation is no great mystery will put technical excellence more aud more at a discount, and artistic excellence will be the criterion by which photographic productions will be judged. Then will the photographer who despises artistic iustructions find that it means a loss of dollars and ceuts to him.—*American Journal of Photography.*

Invention alleges that a patent has been issued to Mr. Thomas A. Edison for the construction of incandescent lamps, wherein the transportation of carbon particles from the filament to the glass will be entirely prevented. This is accomplished by coating the inner surface of the globe with a conducting material—that is, a thin, transparent, adhesive, semi-liquid conducting-film.

A NEW POTASSIUM FERROCYANIDE.—F. Mahla, a German chemist, says that the liquor obtaiued by extracting the product from the gas-purifiers with water, yields a precipitate with perchloride of irou which is nothing more nor less than Prussian blue. But if after filtration of this precipitate a further quantity of ferric chloride be added, a violet precipitate is obtained, aud this can be decomposed by caustic potash, yielding ferric oxide and a new salt of potash. The ferric oxide being removed by filtration, the liquid is evaporated, and when sufficiently concentrated, it yields crystals of a new ferrocyanide of potassium. The new salt contains water of crystallisation, which cannot be expelled without decomposing the salt entirely. Its aqueous solution yields with perchloride of irou a violet precipitate which is characteristic, and with salts of copper a green precipitate. It is asserted by the author that the new salt contains three atoms of potassium, one of iron, and five of cyanogeu, but as nothing is said about the form of the crystals, it may turn out to be a mixture of *ferro* and *ferri* cyanides.—*Monthly Magazine of Pharmacy.*

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PHOTOGRAPHIC ACCESSORIES.

BY FRED. HART WILSON.

Somewhere, far away, there is a strange and wonderful country. I have never seen it myself—only pictures of it. But some less fortunate photographers have visited it, have been much impressed by it, and have returned bearing with them the products of the land; and ever afterward, just as some painters never get over Paris or Munich, so their art bears the indelible stamp of this mystic realm. In this land stuffed doves float among twisted trees with rugged trunks, or through massy foliage of palms and ferns more luxuriant and spreading than any mortal plant. When it snows—it does sometimes—all the landscape is dimmed in a spatter-work of flowery white, which yet never falls on the face. The soil produces not grass, but excelsior, or sometimes the plants may be seen growing right up out of carpets or rugs. Wonderful houses, with awe-inspiring fountains and urns and gate-posts, stand proudly behind papier-maché walls and balustrades. And the furniture is such as is seldom seen now-a-days out of the house of a war contractor or oil-operator who was suddenly enriched and bought household goods to environ his new magnificence before the Centennial Exposition had shed its enlightening influence on the taste of the land, or æstheticism and Japan had been known of men. Everything is black and covered with knobs and carvings, and immensely solid, suggesting tremendous possibilities in the way of firewood. The flowers on the carpet and the figures on the wall-paper shout aloud and rejoice to each other. And in the midst of all—one might not notice it at first—will be a human figure like unto us, in its best clothes, trying hard to look at home and to harmonize; but not succeeding—lost in Accessory Land.

I do not mean to imply that all photographic accessories are like this, but I do aver that in many cases they are of a peculiar style of art too much their own; that when used too freely, as they may be, they completely vulgarize a photograph, and that at best they are difficult to choose and dangerous to handle. I know that to be photographed in an antique chair, with carved cabinets and plushed curtains around them, seems to add dignity and refinement, an aristocratic flavour to the picture, in the eyes of the people whose chairs at home are not black and carved, but yellow and severely simple; and the photographer must please his patron. But in a great many other cases a little argument would convince that there is such a thing as character to be preserved in a picture, and that fewer cabinets and a chair of a less rococo type would bring a better result. I have seen the photographic type of chair in some studios where it could not possibly have represented the taste of the patrons; and it really seems as if the prehistoric taste in tables, and chairs, and balconies was making its last stand in the studios, and, determined to go on record, perpetuating itself in photographs to blast the eyesight of coming generations.

It cannot be so difficult for a photographer who cares enough about good work to do a little thinking and talking, to bring into favour a less artificial and obtrusive type of accessory. I know that almost anyone who comes into the gallery knows a great deal more about what will make a good picture than the operator himself, but a judicious exhibition of samples will accomplish a good deal. While it assuredly takes long and earnest study and experience to analytically appreciate art, while it demands rare powers and lifelong devotion to do very much in it, there is, nevertheless, a certain happy quality about a really good thing that commends it naturally to even the most untrained. They see that one painting, or even a simple dress, or a bit of wall-paper, is somehow of better effect, greater power to please, than others—even though they think they like the other better, they feel the force of the really good. Truth is mighty and must prevail.

The accessory, therefore, should be carefully chosen and cautiously used. Let choice be guided by appropriateness, and, in case of doubt, the most simple thing is apt to be the best. Plain folk are best treated plainly, and fine folk as well do not lose by a touch of the same quality. The papier-maché gate-post with a griffin on it, and the knobbed and sanded balastrade, are a tribute to cheap sentiment, and the dark and voluted furniture is not much better. They throw an air of pose and artificiality over the whole thing, which is out of date. This is not the age when the painter depicts gloomy castles and romantic maidens in trailing dresses among old bits of armour, and dusky chests and tall sideboards. A good portrait painter thinks very little of his chairs and tables, and takes, as a rule, the plainest he can get, but always those in character with his sitter, among which he lives. This gives the natural touch. In a very charming photograph I have seen of two girls the head of the photographer has chosen some everyday decent tables and chairs, quite unobtrusive; his subjects have brought an armful of little home things—books and papers and a vase or two. They are looking at a picture in a magazine; one has her attention called by the other, and is leaning over her sister's shoulder; and the result, as a record and a moment of the two, and as an artistic picture, is a thorough success. Most photographs are meant as a record of how some one looked at a certain time, to be kept, or it may be to send away to some one who cannot see the original. How much more satisfactory from this point of view are they when they do not seem posed on purpose, strange and unnatural, but have this familiar intimate home-touch!

There are, as has been hinted, some types of accessory that are always inappropriate and obtrusive. At best, they attract too much attention, or are out of taste, and so spoil the picture. But the best of accessories may be so used as to be objectionable. The fault usually lies in the making too much of them. Either they occupy an unduly prominent place in the composition, or there are too many of them. I have seen what might have been a good picture simply swamped with the excess of accessory. A most promising model leans on the edge of a table. So far good; but on each side of the table is a chair, in one corner a book-case, in the other a cabinet; a plush curtain worked in above, and two rugs of different patterns on the floor. Again, in a rustic scene, besides an excellent bench and gate, logs and dead branches, and, crowning agony, a totally uncalled-for stuffed pigeon, are dragged in and ruin the picture. In pictures such as these the accessory ceases to be such, and becomes a principal.

Simplicity and appropriateness are, then, the rules for their choice and employment. It is a saying among painters that it takes a long head to know what to leave out; this statement will repay consideration and digestion. Try to make a harmonious characteristic surrounding for the subject. Study how painters and illustrators treat their furniture and minor objects, and, above all, how unobtrusive they keep them. In working with the brush or pencil, care is needed to suppress and subordinate non-essentials—to forget detail. The lens insists on giving us only too much, so that in working with it and light, the same care is even more greatly needful.—*Wilson's Photographic Magazine.*

German Floating Exhibition.—Consul-General Oppenheimer, of Frankfort-on-the-Main, in his report just issued, says that the idea of establishing a floating commercial museum of German articles, recently planned by the Association for the promotion of German export, has met with general approbation in all industrial circles of Germany. A committee, consisting of the leading manufacturers of Germany, has been constituted to take the matter in hand, and hopes are entertained that the object contemplated will be accomplished. It is intended to construct a monster steamer fitted up with all modern improvements and conveniences. This steamer is to contain eight large show-rooms, provided with galleries for the reception of the articles to be exhibited. The goods are not to be placed in cases or boxes, but will be arranged in groups properly fastened in order to prevent their being injured by packing and unpacking, so that the exhibition, which is to visit eighty places, may be opened at once on entering at any of the ports. The staff, besides possessing commercial and technical knowledge, must be conversant with the principal modern languages. Like the continental exhibitions, which, in order to insure the success of the undertaking, must make it an object to attract the masses, the floating exhibition is to include entertainments of various kinds, taking on board not only persons sailing with a view to business, but also tourists. There will be concerts, theatres, restaurants, and cafés. A panoptical cabinet, a panorama, and similar shows will afford sightseers an opportunity of gratifying their curiosity, and souvenirs may be obtained at the photographer's studio and at the bazaars. As regards the dimensions of a steamer containing the above-mentioned eight large show rooms, concert rooms, restaurants, and so on, intended to receive thousands of visitors, and to find accommodation for the crew, staff, and passengers, it is stated that this monster steamer, a floating palace bearing the name, *The Emperor William*, will be the largest vessel crossing the ocean. Her length is to be 570 feet by 70 feet, and her height 45 feet. The vessel will be constructed of steel, and will be propelled by four-fold compound engines. Ventilators, electric light, refrigerators to reduce the temperature in the hold and engine rooms, and other arrangements will likewise be introduced.

PHOTOGRAPHIC OPTICS.*

BY W. K. BURTON.

CHAPTER VI. (*continued.*)

To Measure the Aperture of a Lens.—For most practical purposes it is sufficiently accurate to measure, for maximum apertures, the fixed stop; if this be smaller in diameter than any of the combinations, to measure the diameter of the closer opening of the smallest combination if this be smaller than any fixed stop; for other apertures the actual diameter of the stops.

These measurements are, indeed, strictly accurate in the following cases: in that of the single lens, when the diameter of the stop is the precise aperture, and in lenses of the rapid landscape or portrait type, where the fixed stop is as large as the front lens, and when this latter is not larger than the back combinations. In this case the diameter of the front lens is the precise aperture.

In other cases, if we want to be strictly accurate, allowance must be made for the condensation of the light by the first combination, in estimating the diameters of apertures—that is to say, for the purpose of comparing exposures. Of course in the merely mechanical sense the aperture is always the precise diameter of the stop. To explain. If a portrait lens having inserted a stop one inch in diameter, the aperture of the lens is in a mechanical sense precisely one inch; but for the purpose of comparing exposures, we must take into consideration the fact that before the light has reached the stop it has been very considerably condensed by the front combination, and that, therefore, the stop lets through more light than it would were it in front of the lens, and is, in fact, equivalent to a stop of somewhat more than one inch in diameter.

There are two methods of making the necessary allowance—one a mechanical, the other a mathematical. We give the mechanical method first. It is due to Dallmeyer, and is of great ingenuity.

A distant object is focussed, and, without changing the adjustment of the camera, the ground glass is replaced by a piece of cardboard with a small hole, little larger than a pinhole, in the middle of it. The camera is then carried into a dark room. A little powder is "puffed" on to the face of the front lens, and a lighted candle is held behind the hole in the cardboard. There will now appear a circle of light on the surface of the front lens. This surface is somewhat larger than the stop, and is the value of its diameter, after allowing for the converging effect of the front lens.

The mathematical plan is as follows:—

d = Actual diameter of stop.

D = Aperture value (*i.e.*, the diameter after allowing for the condensation of the light by the front lens).

f = Focus of front combinations.

l = Distance between the plane of stop and the centre of the first combination (by centre is meant half-way between the anterior and posterior surfaces).

$$D = d \times \frac{f}{f-l} \qquad d = D \times \frac{f-l}{f}$$

Example.—We have a portrait lens of 13 inches equivalent focus. We find that the focal length of the front combination is 20 inches. The distance between the centre of the front combination and the plane of the stops is 3 inches. We want to know the value of a stop of 2 inches actual diameter, and also to find what actual diameter we should give to a stop to have a value of $3\frac{1}{4}$ inches, so as to stand for No. 1 or $\frac{f}{4}$ of the lens.

In the first case—

$d = 2$ inches.

$f = 20$ inches.

$l = 3$ inches.

Therefore—

$$D = 2 \times \frac{20}{20-3} = 2 \times \frac{20}{17} = 2{\cdot}353 = 2\tfrac{3}{8} \text{ inch, very nearly.}$$

That is to say, we give to the stop of 2 inches in diameter the value of one $2\frac{3}{8}$ inches diameter.

It is to be observed that if this estimation ever give a diameter larger than the front combination of any lens of the symmetrical type, it means that the stop is not of any use, and that the actual maximum aperture is the diameter of the front element.

In the second case—

$F = 3\frac{1}{4}$ inches.

$f = 20$ inches.

$l = 3$ inches.

Therefore—

$$d = 3\tfrac{1}{4} \times \frac{20-3}{20} = 3{\cdot}25 \times \frac{17}{20} = 2{\cdot}762$$

= the smallest trifle over $2\frac{3}{4}$ inches. We shall therefore, in the case of one portrait lens of 13 inches focal length, make the No. 1 stop not $3\frac{1}{4}$ inches diameter, but $2\frac{3}{4}$ inches.

If it be desired to cut the stops with great precision, using a table of the diameters of U.S. stops for different focal lengths, such as I give in my "Modern Photography," it will be necessary to make a correction for each one in the manner just described—practically only for the first two, as all others can be got by dividing each of the corrected results by 2, 4, and so on. But probably an easier way will be to assume a shorter focus, and to look up in the tables the stops, as if they were for a lens of this shorter focus. The method of making the necessary allowance is as follows:—

F = The equivalent focus of the lens.

f = The focus of the front combination.

l = The distance between the centre of the front combination and the plane of the stop.

A = Assumed focus.

$$A = F \times \frac{f-l}{f}$$

Example.—In the actual case that we have supposed, of a lens of 13 inches equivalent focus, whose front combination is of 20 inches focus, and in which the distance between the plane of the stop and the centre of the front combination is 3 inches,

$$A = 13 \times \frac{20-3}{20} = 13 \times \frac{17}{20} = 11{\cdot}05$$

or we may say 11 inches.

We shall therefore cut our stops as for a lens of 11 inches focus in place of one of 13 inches.

Testing Lenses.—To perform a thorough test of a lens, to be able by examining it to say at once what is its standard of excellence, and, if it have faults, what precisely these faults are, is a thing requiring great skill, much practice, and some knowledge of optics; but no very great practice is needed to judge fairly well of the properties of a lens, and it is of great importance that the photographer should be able to do so, especially if he have a tendency to pick up second-hand lenses. Lenses offered second-hand by all except recognised dealers in photographic goods are, for the most part, rubbish; but if the photographer know how to tell a good lens from a bad, he may occasionally pick up an excellent instrument for a mere trifle.

We shall give first a few tests, of which it may be said that if if any one of them give an unsatisfactory result, the lens should be at once condemned. We shall then give the method of comparing two lenses. It is only by comparing a number of lenses with each other that the photographer can learn how actually to judge of a lens, as till he has made such comparisons he cannot be expected to know what to look out for.

Focus.—The first thing is to discover roughly the focal length of the lens. The methods of doing this have already been described.

* Continued from p. 524.

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Aperture.—After the focal length has been determined, it is necessary to observe the maximum aperture of the lens, as probably two out of three lenses offered for sale, say, by pawnbrokers, may be condemned on this point alone. In describing different forms of lenses I have given for each form the maximum aperture at which the lens can be expected to work. *If a lens be offered for sale with an aperture much under this it may be assumed at once that the lens is defective,* the aperture having been reduced to hide the defect—probably imperfect correction for spherical aberration—so far as possible. For example, a portrait lens with actual lenses of aperture $\frac{f}{4}$, but with a fixed stop reducing this aperture to $\frac{f}{8}$ or $\frac{f}{9}$, may at once be rejected. The same may be said of a "rapid landscape" lens with aperture reduced by a fixed stop to $\frac{f}{11}$ or $\frac{f}{12}$.

Definition.—The next step is to test the defining power of the lens with full aperture. A camera with very fine ground glass should be used, and the image should be magnified with one of the eyepieces commonly used for focussing. Some clearly defined object is selected—a steeple clock is an excellent one if the disc be of a light colour. This is focussed in the centre of the plate. The image should appear quite sharp under the magnifier. At the maximum apertures mentioned in the last chapter, a lens is at once to be condemned if it show any want of sharpness in the centre of the plate; to be strictly correct, I should say in the axis of the lens under the ordinary focussing magnifier. A really good lens will show no falling off under a magnifying power ten times that of the eyepiece commonly used by photographers.

(*To be continued.*)

THE PYROCATECHIN DEVELOPER.

BY DR. CARL ARNOLD, OF HANOVER.

The hope expressed by me some time ago that the price of pyrocatechin would be lowered as soon as the same could be produced in large quantities, seems not to be realized, according to communications received from Dr. Schuchardt, in Görlitz. That gentleman, at my request, was kind enough to have made for me at his factory a so-called technical—that is, not chemically pure—preparation, which, in the beginning, was of almost equal action with the pure preparation when tested by me; but even that cannot be made for less than eight-tenths mark per gramme. Further tests showed that at a price difference of only 20 per cent., the completely pure preparation should by all means be given the preference, as the latter, in aqueous solution, is, after eight weeks, still of the same action as on the first day, while the impure article, in consequence of the foreign matter mixed with it in aqueous solution, loses from day to day in reducing capacity. While giving the reducing capacity of the pyrocatechin in comparison with hydroquinone previously as 15:1, it has now been proven that the reducing capacity is so enormously great that the price of one mark per gramme can hardly come into consideration, as from 100 to 150 plates, of 13 by 18 cm. size, can be developed with this quantity. The quantity of the carbonate of potassium can be considerably reduced, if one possesses the necessary patience in developing, which, for a good many of the dry plates, that frill easily in a solution containing 5 per cent. of potassium carbonate, is of great importance. Sodium carbonate may also be used in place of potassium, but the negatives produced with this are never of equal sharpness, and the development is much slower. It surprises me that most of the hydroquinone and pyrogallic acid developers contain from 8 to 10 per cent. potassium carbonate, and that no complaint is made that those developers frill the plates. If such quantities of potassium are applied with the pyrocatechin, or even more caustic solution is added, very shortly-exposed plates can be developed with it; but with the exception of the films—Vergara and celluloid plates—I have had no brand of plate in hand yet that would not frill, or the whole film peel off.

The new developer is, for these reasons, not to be recommended for plates of short exposure, but an accelerating preliminary bath might be found pretty soon. An addition of sulphite of soda has no influence on durability, with either the technical or pure pyrocatechin, and it even seems to exercise a retarding influence.

For developing I keep on hand: first, a 1 per cent. solution of pyrocatechin; second, a 20 per cent. solution of carbonate of potassium. Both solutions will keep in the light. From this apply, for well exposed plates of 18 by 24 cm. size, 1 c.c. or 16 drops of the first, 5 to 10 c.c. of the second, and 60 to 80 c.c. ordinary water.

For instantaneous views, the addition of the first solution can be increased to 5 c.c.; but this is of more subordinate significance than the increase of the second solution, of which in this case 15 to 20 c.c. are to be applied. By a gradual addition of these two solutions the development of the picture can, of course, be accelerated or the lights increased.

After the experiences with the new developer made by me up to the present day, I believe that I can predict a great future for the same, and would advise everyone to test it. But so far I can only guarantee the pure pyrocatechin from the factory of Dr. Th. Tchuchardt, in Görlitz. The properties of the new developer may be shown in the following:

1. The pictures possess an excellently copying grey tone, and hardly go back during fixing.
2. Formation of fog has never taken place during my experiments.
3. As soon as the negative is in the developer it loses its sensitiveness to light almost completely. I develop, therefore, in gas, kerosene, or candle light, at about ½ meter distance; yes, even in diffused daylight development can be continued without any visible influence.
4. Even at 5° to 6° C. of temperature a slower development cannot be observed.
5. Whether two or thirty seconds' exposure, remains without influence as to the result; the development proceeded always gradually.
6. The developer leaves no spots on the hands.
7. The price, in consideration of the extremely small quantities used, is comparatively much cheaper than that of other developers.
8. The simple composition of the developing liquids, the easy solubility of its component parts in water, and therefore the possibility of producing highly concentrated solutions, and to measure these from drop glasses.
9. The convenience of carrying only condensed quantities of the ingredients during travelling; 5 grm. pyrocatechin and 1 kilo potassium carbonate are sufficient for more than five hundred developments. Total expense, six marks; therefore for one plate 13 by 18 cm., 1·2 pfennig.
10. The developer should only be used once, the necessary additions to old developer being sufficient for the preparation of a new quantity.
11. The development can proceed without motion. The more the developer is set in motion, the more rapidly the development will take place.
12. Serviceable pyrocatechin forms pure white, scaly crystals, which should dissolve colourless in water. By dropping the solution upon the liquid containing the potassium carbonate, a handsome green colour will appear, disappearing again when the liquids are mixed. The aqueous solution, when kept, should only colour very weakly yellow. Mixed developer will not keep. —*Photographisches Mittheilungen.*

Citric Acid containing lead has been recently commented on by M. C. Annesseus, a well-known pharmacist of Antwerp. Professor Herlant, of Brussels, has also called attention to the presence of lead in some specimens of citric acid having a very fine appearance.—*Monthly Magazine of Pharmacy.*

The Physiology of Tannin. F. Reinitzer.—The author protests against the present universal custom of giving the name "tannin" or "tannic acid" to all vegetable compounds which give with ferric chloride blue or green colourations or precipitates, and which are precipitated by solution of gelatine. As regards the former reaction, he points out that ferric chloride colours aqueous solutions of mono- or polyvalent phenols blue, green, or violet. Hence he considers it very probable that the tannins contain hydroxyl groups with a phenolic character. He further reminds us that many tannins do not precipitate solutions of gelatine at all, others occasion merely a turbidity, and others again produce a very imperfect precipitation. He doubts whether all these bodies can fulfil the same physiological function, and considers the idea of "tannin" about equal in value to that of "bitter principle," under which substances of very different character were formerly included.—*Deutsch. Botan. Berichte* and *Chemiker Zeitung.*

Notes.

Professor Pickering, it would appear, is trying to take the wind out of the sails of the International Astronomical Congress which assembled in Paris in 1887. This Congress, it will be recollected, determined upon making an astronomical chart of the heavens by means of photography, the work to be distributed over seventeen observatories. Whether this task has been begun we are unable to say; but, in the meantime, Professor Pickering has issued a circular asking for funds to construct a telescope of eleven feet focus and twenty-four inches diameter for the purpose also of making a chart similar in object and design to that determined upon by the Congress. The funds were unexpectedly forthcoming, the whole of the 50,000 dollars required being furnished by Miss Bruce. Professor Pickering's enterprise and Miss Bruce's generosity are both to be commended, but we agree with the editor of the *Observatory* in thinking it curious that the Professor should entirely ignore the conclusions come to by the Congress. The size of the telescope he proposes to build—a formidable undertaking, by the way—is of the exact dimensions of that chosen by the Congress, and in all respects his scheme is the same, the only difference being that he proposes to do single-handed what is to be undertaken by a combination of the principal astronomers all over the world.

No doubt some explanation may be forthcoming, but, on the face of it, the scheme seems to imply a competition with the Congress. Of course, if Professor Pickering thinks he can accomplish so gigantic a work by himself, there is no reason why he should not make the attempt. The only thing is that the persons who were originally asked to subscribe to Professor Pickering's fund should have been made aware that there was already a prior project in the field. So far as we can gather, this information was not given. As the *Observatory* points out, a great responsibility rests upon Professor Pickering, and should his ambitious scheme fail, it will be rather disastrous for him personally.

A cynical philosopher of our acquaintance declares he can tell from an inspection of a photographic show-case what kind of man is the photographer who took the specimens. A series of portraits all with dull wooden expressions, lack-lustre eyes, and dejected attitudes indicates, he asserts, a common-place, matter-of-fact kind of photographer without tact, and deficient in the little arts of agreeable conversation which put people at their ease and inspire animation. One picture where the pose is vulgar and ugly, he considers, is sufficient to stamp the photographer as devoid of artistic feeling, no matter though the pose of the figure in the other pictures in the case may be good. A graceful pose may be obtained by accident, he holds, but an ugly one very rarely—that is to say, the artistic photographer could never exhibit such a condemnation of himself. The continual use of furs as accessories, especially with children, he thinks, shows poverty of invention. Children's portraits furnish a severe test of a man's disposition. A case filled with children's portraits all of which are pleasing as well as natural, are sufficient evidence of good nature, patience, perseverance, and care. There is, perhaps, a grain of truth in the observations of our philosophical friend.

If Captain Cook could re-visit the Sandwich Islands he would be somewhat astonished at the march of civilization. In photographic matters, Honolulu, the Hawaiian capital, if not in advance of London, is at least quite up to date. In the chief Hawaiian newspaper, which rejoices in the poetic title of the *Paradise of the Pacific*, a firm of chemists advertises, "Photographic goods a speciality; dark room at disposal of amateurs." It is true that the large English retail photographic firms offer similar facilities, but we doubt whether chemists who sell photographic goods possess dark rooms, or even know very much about photography. They might take a lesson from Honolulu.

After reading in *Galignani's Messenger* the secrets which are there disclosed concerning the mysteries of "making up" the feminine face, one wonders whether the "professional beauty" is ever photographed, for most assuredly the camera would betray her. We read of a "complexion" which stains the skin, and will not wash, but only wear off. The bismuth preparation, we are told, dries and parches the skin; other powders have a basis of glycerine to cause them to adhere, but these have an unpleasant trick of departing and leaving the glycerine behind them; some scarlet lip-salves have a tendency to run, entirely altering the shape of the mouth; while there are not a few powders which, a short time after they are applied, turn of a bluish purple hue. What we would like to know is, do the ladies who use these beautifiers come to the photographers in their beautified state, or do they prefer nature unadorned? One would not, of course, tempt a professional man to betray the confidence reposed in him, but it would be interesting to have the experience of a photographer numbering among his clientèle ladies who paint. How, for instance, does the negative look of an actress who is photographed in character and "make up"? Does the uncompromising lens make any distinction between the real and the false complexion? and does a face retouched before photographing, require still more retouching afterwards?

To make one's self a popular hero on the Boulanger plan is simply to know how to judiciously advertise. The French Government see through the Boulangist methods, for one of the counts of the indictment is that he was photographed, and the copies of his photograph distributed broadcast. There is little doubt of the truth of the accusation, but whether it is a treasonable act to give away one's photograph is another matter. Anyway, it is quite certain that Boulanger appreciated the value of photography as an advertising medium, for money was lavishly spent in this direction. But in this he only imitated the Buonapartist policy, for a wholesale spreading abroad of portraits has always been a leading principle in the strategy of the party ever since the days of the great Napoleon himself, who was a staunch believer in the efficacy of the unlimited multiplication of his image.

WHAT KNOWLEDGE IS OF MOST WORTH TO THE PHOTOGRAPHER?*

In propounding the above question, we know we are liable to encounter considerable difference of opinion, and, at the same time, we fully realize the large scope that the answer must necessarily cover. Nevertheless, there are certain particular sections of human knowledge that we believe are more or less indispensable to the success of the photographer, both as an artist and as a handicraftsman.

We will assume that we have a young man that has had a common school education, and he is seeking to so plan his life that he shall fit himself to be a good photographic artist. He has only a limited amount of capital at his disposal, good health, and a clear head. One without any capital, only a home, health, and good common sense, would be equally eligible to the course we are about to recommend. With the common school education we have supposed such an individual to possess, he will be entirely competent to take up the more elementary studies of a higher education. And one of the first things to set about learning is a knowledge of mathematics, beyond arithmetic; this embraces elementary algebra and geometry, in order to understand the value of proportions and equations, and the measurement of angles. At the very suggestion of such a course, we can hear some of the older members of the fraternity crying aloud: "Oh, that's all nonsense; what's that to do with making pictures?" In the beginning, why should a boy or girl learn geography and grammar? They have nothing to do with making pictures; but they do have a great importance in the development of the mind. In the same manner the appreciation of the value of proportion and the measurement of angles will save a man from making many a stupid blunder in perspective that without such knowledge he will not realize. And, independently of all this, it will help him to understand better some other pieces of knowledge that we are about to suggest as valuable to the photographer.

Having attained a reasonably accurate knowledge of elementary mathematics, the next step should be the acquisition of a knowledge of physics, especially optics. In suggesting this step, we are satisfied that thousands of dollars would be saved for many of our photographers, if they only knew some of the most elementary facts in physical science. The effect of heat and light on glass and metal, the effect of refractive substances upon light, the optical properties of lenses; why, the very enumeration of these topics must suggest their value to the photographer. Yet there are many that will say, "Oh, you are becoming too scientific." What does "scientific" mean? Is the photographer to be careless? Scientific means careful. Is the photographer to be inaccurate? Scientific means accurate. Can the photographer understand his camera and lens without a knowledge of the optical principles that they are constructed upon? Would a mere intuition tell a man that a double convex lens would give an inverted image on the ground glass; and that the light that passes through a diaphragm is proportional to the area of the opening? No one that thinks about the subject would attempt to deny that all these things are facts that come from observation, and that observation must be accurate to be of value—in other words, it must be scientific. In order to understand physics, it is essential that some knowledge of mathematics, as we have mentioned above, should first be acquired.

Having mastered as much science as will give the requisite knowledge to understand the camera and lens, which is physical science, we should then recommend a study of chemistry. This, perhaps, is even more important than the former studies, heat and light, that we have mentioned, and we have found, as the result of many years of instruction, that chemistry is also not readily understood without a knowledge of mathematics.

In the study of chemical science, we would caution the beginner against taking short cuts to learn "photographic" chemistry. There is really no true photographic chemistry, but photographic processes are chemical processes, and are becoming more and more dependent upon an accurate knowledge of the science. It was an easy matter to coat a plate with collodion and develop with sulphate of iron in former days; but to-day we have a host of new chemical compounds being presented to us as developers; we have another line of substances as colour sensitizers, giving orthochromatic plates; all of which involve a good knowledge of chemical science to use them and appreciate them properly. It is above all things important to have a good knowledge of chemistry.

We therefore think that among many other pieces of useful knowledge for the photographer, mathematics, physics, and chemistry are pre-eminently fitted to stand first on the list. With a knowledge of mathematics, the mind appreciates perspective and proportion in form much better than without it. With a knowledge of physics, all those phenomena of sound, heat, light, and electricity, with which we are daily becoming more and more surrounded, no longer remain objects of bewilderment; but each is understood and appreciated, many of them being intimately connected with the photographic art.

Like all other arts and professions, the mere acquisition of the knowledge we have indicated will not make a man a good photographer. He must have a sufficiently clear head to apply the knowledge acquired, and at the right time. Again, he must be an artist, and by this we mean that he must appreciate and note those combinations of form and colour that make the pictures we see and that please us. Much of this knowledge can be acquired by reading, but by far the larger and more valuable portion of it comes from careful observation—in other words, it is truly scientific. It is the acquiring of a knowledge of those combinations that please or distress the eye in nature, and the storing of them in the mind for future use. The just appreciation of these forms and the union of them into compositions gives us the artist.

Much, very much, more could be said upon the subject of useful photographic knowledge; but if the thoughts given above serve as a guide to some just starting in the profession, we shall be glad that they were penned. Our advice is founded on many years of observation in educating young men, and the line of work indicated above will save from many pitfalls in the future. It will be a foundation upon which a superstructure of more imposing proportions may safely be reared. As to where to obtain such knowledge, we have only to point to the many excellent scientific schools covering the length and breadth of the United States, where over every door is written "Come and welcome." And almost without cost to the seeker after wisdom, owing to the generosity of many great and good men. There is no excuse for ignorance in the rising generations.

* A leading article from *Anthony's Photographic Bulletin*.

PHOTOGRAPHING A MIRAGE.

A strange story comes from San Francisco. A certain Professor Richard D. Willoughby, of Alaska, claims to have photographed a mirage. Two prints have been sent to the United States Government at Washington, and the third was sent to the *San Francisco Chronicle*. These are 8 by 10 inches in size, and represent a scene taken from a garden or park on a hill. In the foreground are a gravelled walk, a stone wall, rustic seat, and a child at play. Beyond the wall are house-tops and some clumps of trees. In the distance are incomplete towers of a cathedral and several tall buildings, while in the far distance, and enveloped in clouds, are tall smoke-stacks and church towers. The architecture is said to be modern, and the chimneys are made of tiles. At Tabor's studio, in San Francisco, the picture is regarded as a trick, the result of a badly exposed plate. Perhaps we shall hear more about this picture in the future.—*Anthony's Photographic Bulletin.*

AN ACID FIXING BATH FOR GELATINE PLATES.

BY DR. H. W. VOGEL.

LONG ago the addition of alum to the hypo bath was recommended; but objection was always made that sulphur separates by the decomposition of the bath, which might be detrimental to the negative. Against that is recommended by Kleffel an acidified fixing bath with alum to prevent the formation of brown deposits upon the plate, which is said to take place from hydroquinone. Herr Lainer recommends at present a fixing bath which contains a mixture per litre of 70 to 100 c.c. sulphite of soda solution, with 30 c.c. of tartaric acid solution—15 grm., dissolved in 30 c.c. of water—or 40 c.c. citric acid solution—20 grm. dissolved in 40 c.c. of water.

Lainer says that this bath proves generally advantageous after all alkaline developers, which are subject to becoming brown.

With regard to the production of the acid fixing bath, he remarks that the tartaric acid or citric acid solution has to be mixed with the sulphite solution before it is added to the fixing bath.

Lainer made the observation that the acid fixing bath has a hardening action upon the gelatine films. Comparing a plate fixed in a neutral bath with one fixed in an acid fixing bath, he proved that in the latter case the gelatine film has more power of resistance against rubbing with the finger than in the first case, and that the film had a less slippery appearance.

To further confirm the observation, Lainer cut from some gelatine sheets two equally large geometrical figures, both in a length of 55 mm. After soaking in ordinary water, an increase in size of 2 mm. took place. Lainer placed now one sheet in an ordinary neutral fixing bath; the other he placed in the fixing bath acidified with double the quantity of the citric acid sulphite mixture. After about ten minutes it showed that by application of the acid fixing bath the figure had resumed its original dimensions, a length contraction of 2 mm. having taken place, while in the neutral fixing bath the extension was only moderate. The thickness of the films differed now also considerably, the acid fixing bath having made the sheet thinner and tougher.

The acid fixing bath acts, therefore, not only advantageously with regard to the clearing of the negatives, but, in consequence of its contracting effect, also favourably upon the power of resistance of the film and the adhesion of its support, and perhaps also with regard to the prevention of distortions.—*Anthony's Photographic Bulletin.*

A MIXED ALUM AND FIXING BATH.

BY ALEXANDER LAINER.

DURING the hot season certain kinds of emulsion plates are in a particularly disagreeable manner subject to frilling of the film and bubbles in the fixing bath. An after-treatment of the plate with concentrated alum solutions, or with alcohol, serves to remedy the evil in some extreme cases, and this should therefore be met with by immediate application of the mixed alum and fixing bath.

The mixed alum and fixing bath is obtained by pouring together one litre of ordinary fixing bath with one-half to two litres of concentrated alum solution. But this fixing bath shows such a strong discolouration that it can be employed only after the principal reaction has passed and it has become clear to some extent. A complete clearing will not take place as long as alum and hyposulphite of soda act against each other, with continual separation of sulphur and aluminium hydroxide.

$$Al_2(SO_4)_3+3H_2O+3Na_2S_2O_3 = Al_2(OH)_6+S_3+3SO_2+3Na_2SO_4.$$

The chemical equation shows that dioxide of sulphur is also separated, which has a clearing action upon the plates. Sulphite of soda is formed from the hyposulphite of soda, and the fixing capacity will consequently cease finally.

The fixing baths fix considerably slower, whereby the frilling and bubbles are more easily avoided. A disadvantage, though, is that the negatives become milky and contaminated; but this is overcome by wiping the negative with a soft sponge or a piece of chamois leather to remove the superfluous precipitate.

During my studies and experiments about the fixing baths for gelatine emulsion, I made trials to prevent the separation by neutralization of the ordinarily acid-reacting alum with soda and ammonia, and then mixed with fixing soda. So-called neutral alum forms, as known, by neutralization of the alum, but in this way no results could be obtained; by application of sulphite of soda it was different.

If a saturated sulphite of soda solution is added to a concentrated alum solution, a precipitate will form, but it dissolves again; a further addition leads finally to a limit, where a solution of the precipitate will not take place any more. During the reaction there is a strong smell of dioxide of sulphur observable. If such an alum bath is now mixed with an equal volume of fixing bath, the latter will remain clear.

Further tests proved that it is not necessary to advance to this limit with the addition of the sulphite of soda solution to the alum bath. I mixed 1,000 c.c. alum solution (concentrated) with 200-300 c.c. sulphite of soda solution (concentrated), and added to this solution an equal volume—therefore, about one litre—fixing bath.

This mixed alum and fixing bath kept completely clear and undecomposed in open as well as in covered vessels. I reduced the addition of sulphite of soda in above formula to 100 c.c., and still obtained a clear alum and fixing bath, but of shorter durability. It is to be remarked, however, that, according to the quantity of alum, the sulphite addition should be, or may be, increased or reduced. In one case there were 40 c.c. sulphite of soda solution (1 : 4), already sufficient for 1,000 c.c. alum solution, to avoid precipitations with the additional fixing bath within eight days.

This clear alum and fixing bath, possessing the advantages of similar mixtures without showing their disadvantages, might be preferred to the ordinary mixed alum and fixing bath in cases as mentioned in the beginning of this article.—*Photographische Correspondenz.*

RARE EARTHS IN THE PHOSPHOROSCOPE.—Mr. William Crookes, in the course of a presidential address to the Chemical Society, said:—"The phosphoroscope affords another method of verifying the simple or compound character of a substance. It is well known that the continuance of phosphorescence after the cessation of the exciting cause varies widely, from some hours, as in the case of the phosphorescent sulphides, to the fraction of a second in the case of uranium glass and quinine sulphate. On examining phosphorescent earths glowing in a vacuum tube under the action of the induction discharge, I found remarkable differences in the duration of this residual glow. Some of the earths, after the cessation of the current, remain luminous for an hour or more, whilst others cease to phosphoresce immediately on the stoppage of the current. Take the case of yttrium. As already stated, I succeeded in resolving this earth into several simpler bodies not equal in basicity. While seeking for further proof of the distinct character of these bodies, I observed that the after-glow differed somewhat in colour from that which the earth exhibited whilst the current was still passing. Further, the spectrum of the after-glow seemed to show, so far as I could judge by the faint light, that some of the lines were missing. As this phenomenon indicated another difference among the components of yttrium, I examined them in an instrument similar to Becquerel's phosphoroscope, but acting electrically instead of by means of direct light. Under ordinary circumstances it is scarcely possible to perceive any phosphorescence in an earth until the vacuum is so high that the line spectrum of the residual gas begins to grow faint. Up to this point, the stronger light of the glowing gas overpowers the feeble glow of the phosphorescence. But in the phosphoroscope the light of the glowing gas lasts only for an inappreciable time, while that of the phosphorescent earth persists long enough to be distinctly observed. The different bands of the new constituents of yttria do not all appear at the same speed of rotation. At the lowest speed the double greenish blue band of Gβ is first seen, followed next by the dark blue band of Gα. As the velocity increases, there follows the bright citron-yellow band of Gδ, and as the utmost speed approaches the red band of Gζ is seen, but with difficulty. If lanthanum sulphate along with a little lime is examined in the phosphoroscope, the line of Gε is visible at the lowest speed; Gδ follows at an interval of 0·0035 second, and the Gα line immediately afterwards."

GELATINO-BROMIDE PLATES IN HOT COUNTRIES.

BY L. MONGEL.*

I have found the gelatino-bromide of silver plates, even the best, cannot be kept in hot countries, such as I inhabit, more than three years. From the second year the edges of the plates blacken in the development, whether the development be with iron, pyrogallic acid, or hydroquinine. The flexible films of M. Balagny, which are certainly preferable in every respect to glass plates, seem to keep better. During the great heat it is better to develop with iron, which does not soften the gelatine as much as does the alkaline bath. For the plates that are to be shipped to hot climates or which are to cross tropical seas, the shippers should never make use of hay for packing. Hay always contains a certain amount of humidity which, on account of the high temperature, spreads through the interior of the box and spoils the plates. This is especially true when the plates and hay are packed in a soldered zinc box. I recently made some experiments with the alkaline developer. I started from this fact: that in general, in chemical reactions, bodies in the nascent state have a stronger action. I make my developing bath in the following manner:—

Water	100 parts
Sulphite of soda	8 „
An ammoniacal salt	5 „
Pyrogallic acid	1 part.

I plunge the plate in this mixture, after which I add a few drops of a solution of caustic potash of twenty per cent. The ammoniacal salt is decomposed and gives off ammonia in the nascent state. The only ammoniacal salts that I was able to procure were the sulphate and the chlorhydrate; they gave me magnificent negatives. Doubtless the same success would be obtained with the sulphite of ammonium, which would do away with the sulphite of soda in the formula.

THE PROFESSIONAL PHOTOGRAPHER.

I chanced to be lounging about at a seaside place one summer—I told everyone I had come down to inhale the ozone, but it was really to escape a couple of confounded creditors—when my eyes fell upon a rose-embowered villa residence, the door of which was adorned with a frame containing an assortment of photographs of perhaps the ugliest persons I have ever set eyes on.

While staring vacantly at these curious specimens of the photographic art, and wondering what on earth would become of all the bald-headed babies, each with an apoplectic look about its swollen features, I was suddenly accosted by a dapper individual who presented to my notice a blackened thumb and first finger, between which he held a small square of glass with a damp surface, whereon was dimly visible a smudgy representation of a gentleman wearing a coat three sizes too long for him, while his unmentionables were precisely the same number of sizes too short.

"Capital, ain't it?" said my friend—I call him my friend here because the expression is customary in articles of this kind, and at that time I did not know his true character, and felt benevolently towards him. Later on—but I am digressing.

"Jest fresh from the bath."

"What, the gentleman?" I exclaimed, examining the glass curiously.

"Oh, no," said the little man with a merry smile—that merry smile, as I subsequently found out, covered a multitude of sins—"the fottygraf."

Personally speaking, I found nothing of the slightest interest in the piece of glass with the shadowy smudge on it, but, not wishing to display a want of geniality, I declared that I had never seen anything so perfectly charming before. I was an idiot to have committed myself in that way, but the danger and foolishness of doing so did not occur to me until some hours later. Then I repeated of my cordiality.

"D'ye think so?" said the little man, gently urging me through the front door of the villa residence; "I can see you have a heye for hart. Come into the studio."

I went into the studio. Why I did so I have not the remotest idea, for it was a smelly, dirty, close, stuffy, and singularly uninteresting apartment. But, in spite of the unpleasant nature of the place, I couldn't manage to get away. The dapper little man with the black fingers held me a prisoner against my will. When I began, "Well, I have enjoyed myself immensely, but I am afraid I must be going now, and——" he broke in suddenly with the information that he had a view of Pevensy Castle in a thunderstorm to show me, or a picture group of Mr. Smith's family—the Smiths of Biggleton, not the family of the same name resident at Slushington—and I remained. By such means as these he completely exhausted me. I did not have much energy when I came in; I had literally none when I went out. The dapper little man had squeezed me as dry as a sponge. That was his artfulness. When he saw I was in a jellyfish condition, he went to business, and said, "I could make a beautiful picter of you." I felt somehow that he was right, and, with the confidence of a child of six, I allowed him to place me in front of a waterfall, with a library table bearing an inkstand, a book of sermons, and a telescope on my right hand, and a rustic gate and a Gothic column, rather the worse for wear, within easy reach of my dexter palm.

Then he wedged my head into an iron machine and asked me to smile. I didn't want to appear discourteous, so I endeavoured to the best of my ability to comply with his request. I failed.

He arranged my arms and legs for me in various attitudes which had never occurred to me before. In the solitude of my own chamber I have since tried to recall the extraordinary postures I assumed in that studio. My efforts have been quite unavailing.

"Head a leetle more to the right, please. To the *right*, please; you are turning to the left. That's better. Now look straight before you; fix your heyes"—the dapper man, I grieve to say, was weak in his aspirates; this failing, I find, is rather prevalent in the photographic profession, I don't know why—"on the camerer. Soh! Left arm a leetle farther back, please. Steady; you're rumpling your 'air. Advance right leg; good. Sit hupright and look pleasant. Oh, you'll make a beautiful picter."

I suffered an hour's torture, for I am a nervous man, and the most trifling things excite my innate irritability, and was then shown another damp piece of glass with the photographic presentment of myself on it. I am afraid I laughed. If there is any doubt about my mirth on that occasion, I know I laughed when he showed me the photograph finished, framed, and glazed. It was a hollow laugh. I never knew my eyes protruded to such a painful extent, or that my feet were of such gigantic proportions; my whiskers, too, looked as if they had been trimmed by a one-eyed barber. I paid the price demanded, and then threw the whole bundle of pictorial libels into the river.

Some time since, in London, a well-meaning but mis-guided friend inveigled me into the studio of a fashionable photographic artist (the poor man was very susceptible, and felt the slight keenly if you addressed him as a photographer), and, forgetful of my past experience, I blindly submitted myself to fresh tortures at the hands of another and more exacting member of the craft.

The rustic bench on which I sat was full of knobs, and I suffered agonies. An electric light blazed in my eyes, an iron machine grazed my spine, a horible smell of nauseating chemicals disturbed my olfactory nerves, and the consciousness that I was looking a perfect unadulterated idiot weighed on my mind and caused my customary pleasant expression of the face to assume a demoniac and vulgar look calculated to convey the impression to the uninitiated that I had either appeared recently in the dock of the Central Criminal Court, or on the stage of the Britannia Theatre. The artist's assistant, a silent person with a strong grasp, dragged me about and tweaked my legs, arms, head, and body, in all directions, trying the effect of full face, three-quarter, and side-face, full-length, bust, and head, until I felt hot, uncomfortable, and murderously inclined towards the entire photographic world.

When the ordeal was over, I took my friend by the arm and rushed from the place. "I do not bear you any malice," I breathed hoarsely in his ear, "but you have done me a great wrong." He thought I was mad, and fled.

I shall never be photographed again. If the torture is painful, the result is, in every sense more so—to myself and to everyone

* Mr. Mongel is a mining engineer, in the service of the Ottoman Government at Bagdad. This translation of his article appeared in *Wilson's Photographic Magazine*.

who gazes on my "picture." I shall save up and get my portrait painted by an R.A.

I think I have said enough to explain why I always pass a photographic studio with averted head and accelerated pace. Heavens only knows but that one of my "beautiful pictures" may be displayed in the frame of specimens, with my lack-lustre eyes fixed half angrily and half reproachfully on vacancy or the kerbstone. Such a sight would completely unnerve me, and I feel certain I should slaughter the professional photographer responsible for it, for I hate him and his brethren with a deep undying hate.—*The Tattler.*

CHAPTERS ON ELEMENTARY PHOTOGRAPHY.*

BY W. M. ASHMAN.

LANTERN slide making by some of the leading processes having been briefly described in the previous chapter, the present is an opportune time to set forth certain directions of a selective and manipulatory character, respecting the exhibition of such, which may be of service. Everybody, it may be assumed, has been familiar with the appearance and performance of lanterns from their early childhood, but the details involved in successfully working them are not so universally understood, and to elucidate these as far as can be done in a single article, is the writer's intention.

A lantern, sometimes named magic, and at others optical, is essentially a dark box somewhat like a camera, constructed generally of metal, because of the great heat produced by the lamps contained therein, and it is necessary that there should be no solder in their manufacture, as it would soon be melted, so rivetting, or brazing, unites the several parts. A mahogany box is frequently used as an outer case, but it has to be lined with stout tin plate, and an air space left between the metal and wood: occasionally asbestos packing or other non-conducting material is introduced, and the wood employed must be thoroughly seasoned. A chimney is provided at the top of the box, and so constructed as to prevent the light from the interior reaching the darkened room in which the transparencies are to be shown, whilst perforations, also shaded, are made near the bottom of the case, to admit a plentiful supply of cool air. This last condition becomes an especially important one when mineral oils are employed for illuminating, as the perfection of the ventilation is relied upon as a means of keeping the oil chamber moderately cool. Indeed, in some forms, this chamber is quite outside the bottom of the lantern, and into which only the wick tubes enter; thus, between the reservoir and opening an air space is left.

When fitting up a lantern for exhibiting slides, it should be erected on an elevation rising to half the height of the screen whenever possible, so that the central rays of light impinge upon the middle of it when the lantern is quite level. By this arrangement, and by keeping the screen square and vertical, less trouble will arise from distortion. When, however, this cannot be done, and the lantern has to be very much tilted, the base of the screen, if portable, can be brought forward to a corresponding extent. The reason for this will be found in the fact that the rays of light forming the image, after leaving the lens, cross, and so those which arrive from the upper part, and have really further to travel, owing to the tilting of the camera, are received by the lower part of the screen, and therefore the necessity for making that part approach the camera. This also accounts for the need of putting the slide upside down, and with the ends reversed from the natural position. High class lanterns have sliding front and swing adjustments, which are a great advantage to the manipulator. The surface upon which the image is received may be either opaque or translucent, but the convenience of a fairly smooth surface, like that of a whitewashed plastered wall, or of a linen sheet tightly stretched and hanging vertically, is very evident. Unbleached calico covered with white paper makes a capital screen, especially useful, as it is portable, and can be rolled up like a background on a wooden roller. Translucent screens are made of some sort of thin material like muslin, and are wetted, after being stretched, with a sponge or spray producer, just before using. This operation has sometimes to be repeated during an exhibition of slides, when the heat of the room makes the evaporation very rapid. It must be remembered that in the case of translucent screens the observers are on one side and the lantern on the other, so that though the slide must still be placed upside down in the lantern, it should not be reversed as to its ends, or else any letters included in the subject will not be in the right position for being read from the other side.

A compact single lantern with doors back and side, a three-wick lamp, chimney, four-inch plano-convex condenser, an achromatic combination lens, and rack-and-pinion adjustment, can be purchased complete for three pounds, leaving the stand, screen, and slides to be provided. With an inexpensive equipment of this sort much amusement can be afforded. The lamp, perhaps, demands our first consideration, for upon its performance depends, to a great extent, the success of our efforts. Therefore, before proceeding to test a lantern, see that a good start is made in this respect. Cotton wicks of from six to eight inches long are used in such an instrument as the above, and they should be thoroughly dried first. The wicks inserted, pour into the reservoir the oil to be used. That sold as best crystal oil should be chosen, and a small lump of camphor dissolved in each charge added. This will help to give whiteness to the flame. Do not quite fill the lamp with oil, and never permit any to run down the outsides of the burners, or to condense thereon afterwards, for experience has shown beyond question that the burning of this is the true cause of the disagreeable smell which frequently emanates from all kinds of paraffin lamps. After lighting, the edges of the wicks should be wiped with a cloth to produce evenness, and not cut with a pair of scissors to obtain a similar result. After use, and when cool enough, it is better to pour back the oil, and remove the wicks, which can be well dried; the outside of the lamp may then be cleaned from any traces of oil which may have been spilled or condensed upon the exterior. To proceed with the details of fitting up the lantern for the purpose of showing an enlarged picture—the lamp trimmed and lit, the wicks ought not to be turned up to the full extent, but kept rather low for several minutes inside the lantern, so that the heat will gradually disperse any moisture which appears on the condenser or objective, such moisture destroying the clearness of the image projected. When all parts of the lantern have been gently heated, the wicks should be gradually turned up, in a three-wick lamp, outer ones first, followed by the centre one, which, when finally adjusted, should be a trifle higher than the others, so that the lights form a pyramid when viewed at the edge of the flame, and should reach to a height of about four inches, thus giving a broad expanse of an intense white light. The heat produced will most likely tend to raise the flame, but the lamp must not be permitted to smoke at the height of flame mentioned. Suppose our lantern is being supported in a perfectly level position, on the head of a high tripod, or on some high stand, situated about fourteen feet from a white wall, or other suitable screen, the position and quality of the illuminated disc of light projected can be fairly estimated. It will doubtless be brilliant, although bearing a poor comparison with the disc obtained by a similar instrument supplied with an oxy-hydrogen jet and compressed gases. If there is much prismatic colour seen at the edge of the disc, the lens has not been properly corrected to render it achromatic. This may not prove a serious obstacle, and becomes less apparent when observed at some distance away from the screen. The size of the disc is, of course, a tolerably rough guide to the dimensions of the picture, but the distance between transparency and lens may require adjustment in order to pro-

* Continued from page 500.

perly fill the space. A lantern slide is next required to be placed upside down in a suitable carrier, with the marked side against the condenser in the opening provided for it. Fig. 24 illustrates a cheap and convenient form of carrier,

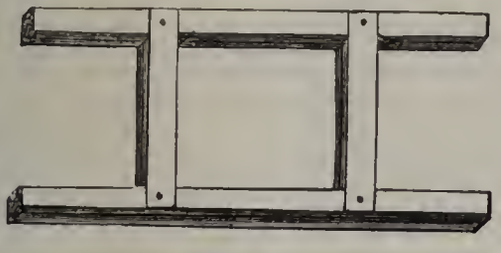


Fig. 24.

the ends of which are removable to admit slides ; it is retailed at about sixpence.

The picture should, under such circumstances, be seen very nearly, or quite, in its proper position on the screen, but most likely will be very foggy and, perhaps, not accurately centred. Focussing with rack and pinion will soon correct the former, and very little variation of the positiou of the transparency will serve to set the latter right. Then the enlarged light picture should appear bold and moderately well defined in its right place upon the screen if viewed from any point in the vicinity of the lantern. With ordinary instruments of the kiud referred to, our picture will measure about 8ft. in diameter ; but, as already stated, the focal length of the lens used determines the size of the picture at a given distance ; so that, knowing this, it is better to employ a lens suited to the dimensions of the room and screen. Although the single oil lantern is very serviceable for small entertainments, two lanterns working side by side enable much better effects to be produced, besides arranging for the sequence of views without a break, generally known as dissolving. For this purpose, a strip of brass, some four inches wide, and a section of a circle, the ends of which are cut like huge saw teeth, is mounted on a pivotted rod in front of the lenses, so that when one lantern is on and a change of picture is required, the dissolver is pulled over, thus producing a vignetting or confusion of the two images during the period of change. The most perfect dissolving arrangements are obtained with an oxy-hydrogen or oxy-ethyl bi-unial lantern, fitted with a six-way dissolving tap and double bye-pass. Space does not admit of details concerning these two forms of apparatus and their manipulation, but it may be observed that with oxy-hydrogen the latter gas used is generally that known as carburetted hydrogen, or common coal gas, and is drawn from the ordinary house gas pipe either direct, when the pressure is enough, or into india-rubber gas-bags, to be afterwards weighted under pressure boards and discharged into the lantern by means of two taps and rubber tubing, the gas entering at one side. A better result is, however, to be got by the use of pure hydrogen compressed into a cylinder, and worked direct from the regulator. The oxygen is either stored in a similar gas-bag, or in a compressed form in a steel cylinder provided with tap and regulator, and a stream of this gas is made to enter at the other side of the lantern.

The two gases of tolerably equal pressure are thence conveyed in separate tubes to some species of jet with platinum nozzles when they are burnt. The hydrogen tap is turned on enough to emit a small stream of gas ; this ignited, a little oxygen is turned on, and the lime and lantern, slowly heated, and not the full intensity sought for at once. The flame, when both taps have been more fully opened, should impinge upon one side of an upright cylinder of compressed lime, namely, the side opposite the condenser, and the lime is so adjusted as to be readily turned on its centre by a cog wheel arrangement, so that in the event of fracture or blackening as a result of too much hydrogen, a fresh surface can be presented to the jet ; but it is always desirable to heat the lime surface gradually, and withdraw the cylinder from the lantern as soon as done with, or the rapid absorption of moisture will cause it to fall into pieces quickly. The lime when properly treated is rendered vividly incandescent, and it is thus that it produces the intense light known as the limelight. In the case of oxy-ethyl, there is no hydrogen used, but a stream of oxygen at high pressure is passed into a vessel containing ether, becoming saturated therewith ; a second stream of oxygen unites with the etherised gas in a suitable mixing chamber, and passes thence to the jet, when it produces the incandescence of lime as before.

THE INTERNATIONAL PHOTOGRAPHIC CONGRESS.

The International Photographic Congress now sitting in Paris will finish its labours next Tuesday, when the results of its previous deliberations will be submitted to a public meeting of photographers to be held in the Trocadero Palace, under the presidency of Dr. Janssen. To a large extent it has adopted the recommendations of its various committees, made in their reports drawn up before the Congress met, and of which we shall have more to say hereafter. Mr. Leon Warnerke and Mr. William England have taken an active part in the proceedings. The honorary presidents of the Congress, appointed after its assemblage, are M. A. de Blochouse, Mr. Rutherfurd of New York, M. Becquerel, M. Fizeau, Dr. William Huggins, the Prince de Molfetta, and Mr. H. Gylden. The president is Dr. Janssen.

COPYING NOT ART.

Mr. Haberle had on exhibition in the Art Institute such an exact imitation of a ten-dollar bill and a one-cent postage stamp, that a critic declared the picture to be not an effect of colours and oil, but a veritable bill and stamp pasted on the canvas and varnished. The artist, in defence of his honour and reputation, came all the way from New Haven and demonstrated, beyond a doubt, that the imitation was genuine painting ; but it would be difficult to see where the art comes in. The writer of an article asks, "What has Mr. Haberle accomplished ?" and thus answers the question :—

Mr. Haberle has thus established his honour as a man, and the claims of his work to exhibition in some museum of curiosities, but any amount of success in this sort of reproduction would not entitle him to be called an artist, or his imitations to be shown in any collection of works of art. It would seem as though a brush so skilful in reproducing delicate effects of texture might be better employed than in accomplishing mere intricate imitations of uninteresting objects. It is hardly an excuse for such a waste of time to say that these pictures sell for high prices, and that art collectors buy them. They are wholly out of place in any collection of works of art, and market value is a motive ruinous to true artistic endeavour. Mr. Haberle may produce these imitations merely as pot boilers, and in hope of doing higher work bye-and-bye. But a man who begins by catering to the popular love of the curious is in danger of permanently vitiating his motives, so that they will no longer urge him to appeal to that love of the beautiful which art must develop and foster. A true artist can never work for money alone. A man who looks to the financial reward of his labours ought to follow some trade or profession whose usefulness is connected with material things. He should not endeavour to minister to human souls, either directly, or through the eye, or ear, or understanding. Every sacrifice an artist makes to expediency detracts from the truth and value of his work. If he is not prepared to starve for his mistress rather than defame her, he is not worthy to touch the hem of her garment, and he will never enjoy her favour ; for there is nothing better proven by history than that men highly endowed by nature have gained great places in the domain of the arts in exact proportion to their sacrifice of worldly expediency and present gain to their sense of truth and loyalty to the highest motives.—*The Beacon.*

The jury of the photographic section of the Paris Exhibition has nearly finished its heavy duties, in which Mr. England has taken an active share.

Patent Intelligence.

Applications for Letters Patent.

12,439. F. W. BARKER, 151, Strand, London, "Camera."—August 6th.

12,440. C. MORRELL, 22, Southampton Buildings, London, "Camera Stands."—August 6th.

12,450. J. E. ENJALBERT, 45, Southampton Buildings, London, "Apparatus for Receiving Coin and Delivering Photographs."—August 6th.

12,593. F. HOFFMANN, 46, Lincoln's Inn Fields, London, "Dry-Plate Cameras."—August 9th.

Specifications Published.

939.—18*th January*, 1889. "Photographic Cameras." ALFRED SMITH, 5, Cambridge Lodge Villas, Cambridge Heath, London, Gentleman.

The object of my invention is so to fit photographic cameras, especially those that are called detective cameras, that a large number of sensitive plates can be exposed in succession without any necessity for opening the cameras.

To carry out this object I form a box or case of any desired size, and preferably rectangular in shape, in one end of which, and in the lower part thereof, is the lens, while any suitable view-finder may be fitted in the upper part of this end.

According to one form, a plate is fitted vertically in and against each side of the case, and preferably about half the length of the same, which plates can be caused to move along these sides by a rack-and-pinion operated on the outside of the case, and in these plates are a series of corresponding parallel vertical grooves. A horizontal partition which may extend the entire length of the case is fixed therein in such position as to divide the case into two somewhat equal parts, and transversely in this partition is made a long slot, preferably about midway in the length of the case, or the horizontal partition may terminate in this position. The sensitive plates are placed separately in the grooves of the two side plates above this horizontal partition, their lower edges resting on the same, and each plate must be backed by some opaque material, wherefor I preferably place each plate in an open faced holder, which holder is then placed in the grooves in the side plates, which in this form are now at the lens end of the case. When it is desired to place one of the sensitive plates in position to receive and be acted on by the light through the lens, these two side plates are moved backwards until the first plate or its holder arrives at the slot in or at the end of the partition, when it slides downwards in the grooves until it is checked and held in the proper position behind the lens with its sensitive surface presented thereto, and then the desired exposure can be given, and the two side plates are again moved backwards until the next plate or its holder slides downwards in its grooves into position, and so on; as each plate is backed by an opaque material, no damage is done to those plates that have before been exposed.

According to another form, each side plate is divided horizontally into two parts, and separately fitted above and below the horizontal partition, and the pinion mounted between the same gears into racks on each part. The sensitive plates are placed as aforesaid between the two side plates above the horizontal partition, but in this form are now at the rear end of the case, while the two side plates below the horizontal partition are as before at the lens end of the case. The pinion is then turned; the upper side plates are moved forwards, while the lower side plates are moved backwards until the first plate or its holder can slide downwards in the grooves over the end of the horizontal partition or through the slot therein, into position as aforesaid, and the same procedure is maintained.

A stop can be fitted to ensure that the plates or their holders shall so slide downwards when required.

8,820.—*May* 28*th*, 1889. "Portable Tripod Stands, especially for Shaving Looking Glasses." HENRY PINCUS, of 841, Broadway, New York, Gentleman.

The inventor says that all persons who are in the habit of shaving themselves have experienced the difficulty of obtaining a proper light upon the looking-glass which they use, and efforts have been made to devise suitable reflectors to overcome this fault. These have been more or less imperfect, possessing various faults which it is the object of this invention to obviate, by a glass that is readily adjusted to any position, angle, or height desired, and readily movable from place to place, so as always to give the best light upon the reflector. He then describes a little tripod stand, easily packed for transit, and which may be used for other purposes than holding mirrors.

9,921.—17*th June*, 1889. "Photographic Negatives and Sensitized Plates for Use in Photo-illustrative Processes." HERBERT DEVERIL, Photo-lithographer, and WILLIAM GALLAGHET, Gentleman, both of Sydney, New South Wales.

This invention relates to improvements in photographic unvarnished negatives and in photographic sensitized plates, by means of which the pictures obtained upon them may be printed in greasy or fatty ink on the ordinary material and transferred to stone, metals, wood, glass, porcelain, or other substances for printing, etching, or engraving, or other illustrative or ornamental purposes, and revealed thereon in minutest detail and with half-tones and all degree of shadow clearly defined.

This improvement in photographic negatives and sensitized plates for use in photo-illustrative processes is comprehended in the obtainment in the negative from which the picture is printed on the usual and ordinary transferring material of non-actinic, opaque, or semi-opaque dots, lines, grains, or such like. These dots or lines may be of a latent character upon sensitized plates, and are developed with the pictures upon such plates after exposure in the camera, or they may be superinduced upon developed unvarnished negatives.

In carrying out this improvement in photographic negatives and sensitized plates for use in photo-illustrative processes, what is for convenience sake termed a "mater" is first prepared. This consists of a sheet of glass, or transparent or semi-transparent paper, or other suitable substance, rendered opaque or non-actinic except in dots, lines, grains, or such like, which remain transparent or semi-transparent. This "mater" may be prepared in any convenient manner—for instance, it may be a dry print on thin photographic paper, preferably Rives, obtained from a lithographic stone evenly coated with stiff lithographic ink, or, preferably, it is an ordinary photographic negative of a drawing, or material, or substance, which will give the desired result. Having this "mater" at hand, it is used as desired for converting the "plates" or the "negatives" into suitable means for obtaining the required "transfers."

An ordinary sensitized plate of gelatino-bromide of silver manufacture, with its face upwards and its back protected with a dark non-reflecting material, is exposed for a very brief period in an ordinary printing frame under a "mater," face downwards, to the action of weak white or actinic light, say, for from three to twenty seconds, according to the density of the "mater" to the light of an ordinary paraffin candle, and it is then ready for use immediately, or at any future time, to obtain a picture by exposure in a camera, and which, after ordinary development, will be seen to consist of a greater or lesser quantity of minute opaque or semi-opaque dots, lines, or grains, such as are required to produce white dots or grains in the resulting transfer, and it is printed from upon sensitized transfer paper or material in the ordinary way. Instead of being treated under the "mater" before exposure in the camera, the plate may be so treated after exposure in the camera, but before development.

An ordinary unvarnished developed negative, having a gelatine film, is immersed in a saturated solution of bichromate of potash for, say, ten to fifteen minutes, the surplus solution blotted off to prevent crystallization of the salt, and then dried in the dark, when it becomes sensitive to white or actinic light. It is then exposed to strong white light, sunlight, in a similar way to the exposure of the plates before described under the "mater," until opaque or semi-opaque dots or grains appear, such dots being in fact minute portions of the negative reduced into a resinous substance, which, remaining in union with oxide of chromium, is insoluble in water. The negative is then washed, and, when dry, is ready for immediate or any future use in printing a transfer.

We should have it understood that we do not confine ourselves to the precise manner and the details thereof described of carrying our improvements in photographic negatives and sensitized plates for use in photo-illustrative processes into practical effect, so long as the nature of the said invention be retained, but we declare that what we claim is:—

1. A sensitized photographic plate having upon it latent dots or marks, which, during development, become and afterwards remain opaque, or semi-opaque, or non-actinic.

2. A photographic gelatine negative having upon or within the developed picture superinduced opaque, or semi-opaque, or non-actinic dots or marks.

3. A sensitized photographic plate for the obtainment of negatives for photo-illustrative processes, prepared in the ordinary manner, and before or after exposure in a camera, by an exposure to light under a "mater" or non-actinic sheet having transparent or semi-transparent dots or marks.

4. A photographic gelatine negative for photo-illustrative processes, prepared by couverting minute portions, or dots, or marks, of an ordinary photographic negative into a substance insoluble in water, and preferably by treating such negative with bichromate of potash and exposing it to light under a "mater" or non-actinic sheet having transparent or semi-transparent dots or marks.

13,301.—14*th September*, 1888. "The True Reproduction of the Colours of Nature in a Compound Photographic Print." Henry Charles Bond, Highland Road, Bromley, Kent, Schoolmaster,

My inveution relates to an improved process for the true reproduction of the colours of nature iu a compound photographic print, and has for its object the obtaining of the required results by natural means, without the use of the brush or any manual application of pigments, such as crystoleum, to the finished priuts.

In carrying my invention iuto practice, I take three plate-glass troughs, composed of two thin sides cemented together round the rims, and held apart by narrow strips of plate glass of suitable thickness, and fill these with liquids, each of such colour as shall transmit all solar rays, except those forming one of the primary colours. Thus, the first will be filled with a green solution—preferably chlorophyll in alcohol—which transmits all rays but red; the second with an orauge solution—preferably ferric sulphocyanide—which transmits all but blue; and the third I fill with a purple or puce—preferable aniline puce dye—which transmits all but yellow; or I may fill the three slides with such other liquids as shall be found to possess these properties.

The first of these colour screens is now hung by loops attached to its upper corners immediately inside the lens of a camera, and a colour-sensitive gelatine dry plate is exposed behind it, giving as a result a picture in which the red solar rays have had no effect at all.

With the second screen a picture is obtained in which no blue rays take effect, and with the third no yellow rays take effect. On developing these images, certaiu striking differences are noticeable between each. From these negatives, prints are next taken by contact on paper coated with bichromatised gelatine, or on glass coated in the same manner—collotype process—and in the former case the image is trausferred to the lithographic stone. Each picture is uow inked up with rollers and lithographic ink of a trausparent aud brilliaut character, complementary in colour to the colour of the screen under which the negative was exposed. Each colour is next printed iu turn on to the same piece of paper, exactly as in chromo-lithography, and the result is that the red ink takes those parts of the picture where uothing showed through the greeu screen, and no effect was produced on the green plate. The blue ink takes the parts where the orange cut off the light, and the yellow ink those parts obliterated by the purple screen. The resulting poiut, if the colours of the colour screens and of the inks have been exactly balauced, will be fouud to portray all the colours of nature, as the secondary and tertiary colours and the deep tones of the shadows will be correctly given where the pure primary tints overlap. These coloured pictures may also be printed in gelatine tissue, stained to the requisite colours after development with aniline or other dyes, and the three skins superimposed for magic lantern slides and the like.

What I claim is: The process for obtaining the true reproductions of the colours of nature in a compouud photographic print, as hereinbefore described, and for the purpose set forth.

11,300. *4th August*, 1888.—"Portable Photographic Camera." Samuel George Harrison-Dearle, 80, Islingtou, Liverpool, Dental Surgeou, and Thomas Henry Ashcroft, 8, Marine Terrace, Liscard, Chester, Timber Merchaut.

The object of the invention is to produce a camera in which photographs can be taken while the camera is carried by the hand or otherwise, and these photographs can be taken without the knowledge of any bystander. This camera can be constructed cheaply, and can be arranged to receive and use plates of any desired size.

To carry out this object we form a box or case preferably of wood, and of the desired shape and size, and the outside of this box can be covered with any material, or be otherwise so treated as preferably to look like an ordinary package or receptacle such as is usually carried by a handle on the top thereof; the side of this box can be opened to allow of access to the interior thereof, and the whole box is so constructed as when closed to be light-tight. In one end of this box is an aperture, behind which is pivoted or centred on the box or elsewhere a circular or segmental or other shutter, wherein is an aperture corresponding with the aperture in the box, and a spring tongue or catch is fitted, which can hold this shutter in positiou to close the aperture in the box; when this catch is retired, a spring applied to the shutter causes the same rapidly to revolve, during which revolution the aperture in the box is uncovered by the aperture in the shutter, and then closed again by the solid part of the same; the shutter can be revolved back against the spring from the outside of the box by a buttou on its pivot or centre, until the catch can again retain the same. The aperture in the box can be masked by one of the ordinary name labels, so fitted on the outside of the box as to be capable of beiug turned back to unmask the same. Behind the aperture in the box and the shutter is the leus mounted on and connected with another light-tight box or camera, so formed and secured in the outer box or camera as to be capable of being lengthened or shortened as may be desired; in or at the rear end of this inner box are fitted the usual grooves, along which the dark slides that coutain the sensitive plates can be passed; or the resr end of this box can be otherwise fitted for the particular sensitive apparatus to be used, and a screen or screens can be fitted to prevent the light reaching the leus, even when the side of the outer box is opened. The outer box can if desired be so lengthened at the rear of the inner box as to carry a number of dark slides or other desired articles.

Thus when the shutter is properly set, and the sensitive plate or other article is duly exposed iu the inner box, the catch is retired preferably by a wire or pull passing out at the side of the box to the handle, so that an unobserved pressure by the thumb or finger can retire the same, and the shutter revolves, giving the desired exposure to the plate, aud the photograph is taken.

In order that it may easily be known at what the lens is directed, two apertures are made iu the outer box, one being in the frout end thereof, the other in the top thereof, aud preferably near the corner of the box, both of which apertures can be masked, as is the aperture for the lens; inside the box is fitted auy usual or other view fiuder, the glasses and lenses and reflectors of which are so arranged, aud the apparatus is so fitted iu the box, that ou looking down into the aperture in the top of the box the operator can see the view to which the lens is directed.

Though we preferably use a revolving shutter in our camera, we can obviously also use a drop or any other usual kind of shutter when it is desired so to do.

Correspondence.

THE 1889 CONVENTION.

Sir,—Allow me to announce that the opening meeting will take place on Monday evening next at St. James's Hall at 6 o'clock.

The proceedings will include the opening ceremony and the president's address; conversazione, followed by a lantern exhibition. Members are entitled to one lady's ticket, admitting to the opening meeting, on application.

Excursions have been arranged as under:—Windsor Castle and town, Richmond and Hampton Court, Kew Gardens and Observatory, boat excursion down the river, Greenwich Hospital. Permission has been obtained to photograph at all the above places.

Papers will be read each evening, followed by a lantern entertainment. Programmes can be had on application at Trees' Office, St. James's Hall; or to

J. J. Briginshaw, *Hon. Sec.*,
128, *Southwark Street, London, S.E.*

Proceedings of Societies.

HACKNEY PHOTOGRAPHIC SOCIETY.

A DISCUSSION on Hydroquinone was held last Thursday. Mr. JOLLY presided.

The HON. SECRETARY preferred quinol on account of its cleanliness, being free from stains and smell, and useful as an all-round developer. It saved ferrous oxalate and was cheaper, as it did so many plates; he had developed as many as a dozen plates in the same solution. Some people had found it slow, but it was in the early days. Thomas's was a very strong developer, and was best diluted to half its strength.

Mr. BRADDOCK used pyro, and preferred it. He was not troubled with stains. He used his pyro dry.

Mr. JOLLY preferred hydroquinone for lantern work.

Mr. GRANT wanted to know whether it was advantageous to employ alum when using Thomas's plates with quinol.

The HON. SECRETARY thought it necessary, and Messrs. Jolly and Braddock agreed.

It was asked what caused blistering with silver paper?

The CHAIRMAN thought the changes of temperature of water, and the bath not being sufficiently alkaline.

LEWES PHOTOGRAPHIC SOCIETY.

AT a meeting held on the 6th inst., with the PRESIDENT in the chair, it was decided that the future meetings should be held at the "George and Dragon" Coffee Tavern, High Street; and a vote of thanks was carried to Mr. J. M. Smith for lending the glee room for ordinary meetings, and also to the president for allowing the use of his room for committee meetings.

Particulars of the excursion to Sheffield Park on August 2nd were given; six members attended, and thirty-eight plates were exposed.

A discussion followed on "Defects in Plates." Several members called attention to the marks on the edges of plates caused by packing with cardboard inserted between each plate. The excellent way in which Messrs. Thomas and Co. pack their plates was mentioned.

A batch of plates by a well-known maker seemed to be very bad, several members bringing plates which had the gelatine film considerably stained, one being a bright crimson; and it was proved that these stains were not owing to development, but must be in the emulsion.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

A MEETING was held on August 12th, in Jubilee House, Hornsey Road, Mr. CHERRY in the chair, when Mr. S. T Chary was elected a member.

Mr. CHERRY gave a report of the outing to Welwyn, and presented the Club with a portrait of Mr. Valentine Blanchard executed in oils. He also exhibited some large direct portraits printed in silver.

Mr. CHARY exhibited several views of the 'Cycling Club at Godalming, taken with a detective camera, and printed on aristotype paper, which were much admired.

At the next meeting of the Club, Mr. E. T. Hiscock will demonstrate the platinotype process, printing in sepia, and also on fabrics. Visitors invited to attend.

Talk in the Studio.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Next week being "Convention" week, the usual Thursday evening meeting of the above Society will not take place.

PHOTOGRAPHIC CLUB.—In order that the members of this Club may have an opportunity of attending the Photographic Convention at St. James's Hall, the usual meeting at the Club will not be held on August 21st. Saturday outing at Broxbourne.

PHOTOGRAPHY IN CHINA.—We are indebted to W. S. Emens, of Shanghai, China, for a copy of the rules of the "China Camera Club." Ying-siang-way is the motto on the cover, which we suppose means the same thing. Dr. W. J. Milles is the *President*; W. G. Gibson, *Secretary*; and W. S. Emens, *Treasurer*. Any resident of China, not a professional photographer, is eligible for membership. Meetings are held once a month, from September to May, inclusive. The Club offers prizes to its members for competition, and holds an annual exhibition.—*Anthony's Bulletin.*

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper and Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

GELATINO.—Agar-agar, or Bengal isinglass, is a dried seaweed, usually consisting of bundles of small transparent colourless strips, which may be dissolved in boiling water, forming, when cooled, a thick, tasteless, and odourless jelly. Another form of this or very similar material, given to the writer many years ago by the late Mr. W. B. Woodbury, takes the shape of square bars about ten inches long, and exceedingly light. It was supposed to come from Japan or Java; but we cannot say where either sort can now be procured commercially.

D. R. D.—The use of a cyanide fixing bath is always inconvenient in a small dark room, and may in time prove injurious, the fumes being, as you say, hydrocyanic acid. Employ a covered dipping bath to lessen the danger; but there is no fear either with the ferro- or ferricyanide of potassium. Nitrate of silver seldom contains enough free acid to overcome the alkalinity of commercial cyanide; but even then the bath always smells of prussic acid, and this cannot be otherwise than prejudicial to health.

APPLES.—Considering the number of journeys and time occupied, the fee ought to be five guineas, without extra charge for travelling expenses, unless they amount to an item worth talking about.

J. C., Jersey.—That supplied by Messrs. B. J. Edwards and Co. is quite reliable.

SEA-SIDE PRINTER.—There seems to be a batch of bad paper in the market just now, for yours is not the only case of blue spots from overtoning in patches. Generally this is accompanied by blisters. See last week's answer to S. Brooks.

J. B.—For list of hotels provided with dark rooms, consult the handbook of the Cyclists' Touring Club; membership 2s. 6d. per annum, and handbook 1s. Apply to the secretary, Mr. E. R. Shipton, 139, Fleet Street.

W. G., Preston.—Kaolin is infinitely better for clarifying a dark-coloured printing bath than the alkaline method you have been trying. Shake it up well with kaolin, allow to subside, and pour off through a filter. After use, return the bath to the same bottle.

M. R. P., Clitheroe.—There is no difficulty in procuring Ashford's tripod stand; the maker's address is 179, Aston Road, Birmingham; but they are kept in stock at Messrs. Marion and Co.'s, and by most of the London dealers.

INQUIRER.—The meeting of the Photographic Convention is fixed for next week, commencing on Monday, 19th instant, at St. James's Hall, Piccadilly. See Mr. J. J. Briginshaw's announcement in the NEWS of August 2nd, page 510. Apply to that gentleman for a prospectus; his address is 128, Southwark Street, London, S.E.

W. MORGAN.—1. Rouge or tripoli in salt brine makes a good material for cleaning off old wet-plate negatives; but if the glasses have been varnished, you must use wood naphtha or methylated spirit first. 2. Sulphite of soda solution is active in removing the poisonous bichromates from the hands.

OPERATOR.—The printed slip is correct; unless actually appointed, no such statement could appear.

G. C., Walthamstow.—Use magnesium powder alone in the flash-lamp.

H. H.—Later information confirms the advice already given you by post. It is hopeless to attempt photography with tripod and field camera in the streets of Paris without official permit, and you would not be allowed to pass into the Exhibition with such apparatus.

G. C., Barnet.—The Exhibition of the Royal Academy is now closed; Bank Holiday, 5th inst., was the last day. We had noticed the close similarity of Nos. 296 and 1107, where the girl model and background were the same, the only difference being that "sweet lavender" was replaced in the last-named picture by a basket of wallflowers. About the policy of accepting two practically identical pictures from the same artist, when ten thousand or more were rejected for want of space, we have nothing to say; the responsibility rests solely with the hanging committee. Two enlargements by different processes, or an enlargement accompanied by the original photograph, often find their way into our exhibitions; but then there would be a specific object in duplicating the show which hardly holds good for the Royal Academy.

P.W., and other correspondents, in our next.

PATENT OFFICE

THE PHOTOGRAPHIC NEWS.

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THE INTERNATIONAL CONGRESS OF PHOTOGRAPHERS.

THE nominal work of the International Congress of Photographers in Paris came to an end with the meeting in the Trocadero Palace last Tuesday, but its actual work is not yet finished. Mr. Leon Warnerke has taken an active part in the proceedings, and worthily represented this country in the matter of certain standards relating to diaphragms and lenses already established here after painstaking consideration, and now in use also to a moderate extent abroad; his remarks met with considerable support, and will no doubt bear fruit in the practical outcome of the Congress. In a letter to us, Mr. Warnerke says that the Congress has worked busily every day from two o'clock to half past five, but that no definite decision is officially formulated as yet, because every decision is sent to a Commission which will "repolish" it, and put it into proper form. The members of the Commission are Col. Sebert, and Messrs. Davanne, Favre, Petersen, Cornu, and Warnerke. Mr. Warnerke says:—"In all this work Colonel Sebert is most active, and he is the right man in the right place. Some of the meetings have been rather chaotic, and I have had the greatest trouble to impress upon the Congress that the various decisions must be such as to be likely to be accepted out of France also." An article on the Congress from our Paris correspondent, M. Leon Vidal, editor of the *Moniteur de la Photographie*, is published in these pages this week, and gives a few additional particulars. M. Pector, the secretary to the Congress, sends word to us that any detailed particulars about its work published now would probably be incorrect, and that no information while matters are in their present incomplete state has yet been issued to the public from his office.

One thoroughly good practical result is tolerably certain to be achieved by the Congress, namely, the inauguration of the adoption throughout the photographic world of the simple little amyl-acetate lamp, so that in experiments, and in testing plates, we shall henceforth have a practically uniform standard of light. The advantages of this will be far-reaching in all branches of photography, and eminently practically useful. The influence of the decision of the Congress will necessarily result in the particular type of the standard lamp which it recommends being manufactured by means of standard gauges, and then will find its way all over the world. In this country it is at present easier to desire an amyl-acetate lamp than to get one, but some time ago, if not at present, they were made here by Messrs. Siemens Bros., the telegraph engineers.

The decisions of the Congress on other subjects in their programme deal with matters of less popular interest, but perhaps the most important will be in relation to standard bayonet joints for lenses to tourists cameras. A tourist with a portable camera and several lenses has now to waste an abominable amount of time in screwing and unscrewing lenses, and occasionally, by the said loss of time, he misses fleeting effects which he intended to photograph. For this class of outdoor work, the sooner screws are abolished for bayonet joints or some other mode of attachment, the better.

The Belgian Photographic Association first made the attempt to hold an International Congress; it fell through because most of the chief photographic societies of the world to which the Association addressed preliminary letters on the subject, had the lack of courtesy and of good manners to send no reply. If we remember aright, the intended Congress was not projected on a popular basis; it was not one in which every photographer who felt an interest therein could take part, but was to be attended solely by representatives appointed by societies. The method adopted in Paris this year has been excellent. In the first place, a committee was formed including nearly all the chief and most honoured scientific men in France interested in photography, also of several professional photographers, to draw up preliminary schemes for the Congress to consider. Then, in order that no persons interested might be excluded, any photographer who chose, could attend and take part on the payment of the small sum of ten francs, and be entitled to copies of the official report of the proceedings. The Congress was held by authority of the Government of France, and was officially connected with the Paris Exhibition. Thus all that could be done to hold a good International Congress was done, and although the attendance of foreigners was thin, the probability is that in an International Congress held in England, the attendance of foreign photographers would be no better. So that the work is done, it matters little who does it, and, as already stated, the probable result of the future general use of the amyl-acetate lamp by photographers, and the introduction of a suitable type thereof into the market in consequence of the public weight of the decisions of the Congress, will alone be a boon to the whole photographic community.

This Congress has, no doubt, given its chief promoters plenty of anxiety in initiation, and of hard work afterwards, and the French deserve the thanks of photographers at large for all the trouble they have taken in this useful matter.

VARNISHING LANTERN SLIDES.—Lantern slides are generally mounted without varnishing. When properly varnished, the transparency and detail in the shadows are vastly improved. We have recently been using the M. A. Seed & Co.'s celluloid varnish, and find it eminently suitable. It is applied cold, dries in a few minutes, and is so beautifully glossy that the glass side cannot be distinguished from the varnished, and is altogether unaffected by the heat from even a "five-wick lamp." *The Beacon.*

THE ARISTOTYPE PROCESS AT ITS PRESENT STAGE.

BY HERMANN E. GUNTHER.

Soon after the introduction of the beautiful gelatino-chloride printing-out paper by Dr. Liesegang, in the year 1886, its many advantages were fully appreciated and pointed out in these pages, and since that time this paper has acquired a wide popularity and extensive use in Germany as well as in England, and nearly so in many other countries, and in all cases where it has been used, and where reasonable care has been taken in following the instruction given by the manufacturer, the results have been most satisfactory.

Sometimes it is declared that the "Aristo paper," as this new material has been called, is destined eventually to supersede the albumen paper, but this is quite a mistake; for certain purposes, especially for interiors and forest-scenes, for landscapes with extended depths, for negatives with soft half-tones and plenty of details in the shadows, the albumen paper will be always preferable to the gelatino-chloride paper. On the other hand, aristo-paper is indispensable in the case of thin negatives devoid of contrast, which fail to give anything approaching a good print on any other paper; further, in the case of many landscape scenes—snow and ice scenes especially; finally for astronomical and microscopical subjects, as it renders all the fine details of the negative perfectly in every respect. The experienced and ingenious operator will always know which of the two printing papers he has to select in each case, and therefore there need not be any question of mutual opposition.

As in the case of almost every new photographic process, also in the aristotype process, many of the original formulæ and instructions given at the time of its introduction have been altered and improved; but the experiences and communications with regard to this subject being dispersed in numerous journals and papers, a description of the process in its latest and most approved form will perhaps be of interest to those readers who work or wish to try the method.

If the paper, before printing upon, is kept in tin boxes, protected from light and moisture, it will keep well at least six months; the slight yellowish tint which the paper sometimes acquires by keeping always disappears in the toning and fixing process. The surface of the aristo paper is about equal to the finest albumen paper, but a little care must be taken in handling it; indeed, touching the sensitized surface with the fingers should be avoided as much as possible.

The paper, having been cut to the exact size required, is placed in the printing frame quite dry, as is done in the case of albumen paper. The print must be a little darker than required when finished, since a considerable amount of depth is lost in the after processes. Negatives with beautiful soft half-tones or with delicate cloud skies are, for this reason, printed with preference on albumen paper. It is not absolutely necessary to tone the pictures immediately after printing, though it has been observed that the lights of the picture are suffering a little if the prints are kept for a longer period between printing and toning.

In washing, the prints are placed face downwards one by one in a sufficiently large tray or dish filled with water, which must be changed eight to ten times, this mode being preferred by many operators to the washing in running water. The washing, which, of course, should never be carried on in a strong light, is continued for at least one or two hours.

Before toning, some operators place the washed prints in an alum solution; but I have observed that, in spite of the prints being washed, the alum often sticks to them, making the gold solution frothy, and spoiling it; it is therefore better to employ the alum bath after toning. For toning I prefer the bath recommended by Mr. A. Stieglitz, into which two prints at one time are placed, not more:—

Chloride of gold	15 grains
Phosphate of soda	390 „
Water	34 ounces

The bath should be prepared twenty-four hours before using it, and its strength increased, after a number of prints have been toned, by adding gradually small portions of gold solution 1 : 50. Another good gold bath which I can recommend is the following one:—

Stock Solution No. 1.

Water	3 ounces
Brown chloride of gold	2 grains

Stock Solution No. 2.

Water	3 ounces
Sulphocyanide of ammonium... ...	30 grains

The two solutions keep for any time. Before use, equal parts of these are mixed, pouring solution No. 1 into solution No. 2; in no case the reverse, as the gold would be precipitated. This bath, which gives a warm chestnut-brown colour, should be kept a few hours before using, as it must be quite colourless. The prints, when placed in this bath, become at first yellow, then acquire a brown tone, and finally a purplish-brown tone. When this last colour has made its appearance, the print is taken with the right hand, and allowed to fall in the alum bath or in the fixing bath, into which it is immersed with the left hand. Any trace of hypo coming in contact with the unfixed prints will cause yellow spots. Should the bath contain too much gold chloride, the prints will not become yellow, but immediately blue; in this case, it is necessary to dilute the bath with water. The bath may be used several times, but, when exhausted, it should be renewed. When toned, the prints are washed with clean water.

As it has already been stated, an alum bath may be used after toning and washing, in order to harden the film on the paper, and to clear it. This bath consists of 100 to 150 parts of alum to 2,000 parts of water, in which the prints remain for about fifteen minutes; they are then removed, and placed again in clean water.

Fixing is done in a solution of 1 part of hypo in 8 to 10 parts of water, in which the prints are left for five to ten minutes. By holding them against the light, it can easily be seen whether they are thoroughly fixed or not; if they are, they must have lost their measly and muddy appearance. It is necessary to keep the prints in motion in the fixing bath.

The subsequent washing must be done most thoroughly for at least two hours in several changes of water. The prints should on no account be left too long in the same washing water, this being injurious to their beauty. It is a good plan to use two trays of large dimensions for the washing process. The prints are placed one by one in the first tray, and, after a few minutes, again one by one in the second tray. The first tray is then emptied and filled with fresh water, when the prints are removed from the second tray and replaced one by one into the first tray; then the second tray is filled with fresh water. This procedure is repeated several times. By this means the pyro is rapidly eliminated off the prints. The elimination of the last traces of hyposulphite of soda may still more be accelerated by using a ten per cent. solution of common salt instead of the ordinary washing water.

The operation of toning and fixing is much simplified by using the combined bath, as recommended by the manufacturer of the paper, though I am somewhat in doubt whether the prints treated with it will be as permanent as the others treated with separate solutions. The bath may be prepared as follows:—

A. In 24 ounces of water are dissolved 6 ounces of hyposulphite of soda, 1 ounce of sulpho-cyanide of ammonium, and 360 grains of acetate of soda; to this is added a solution of 80 grains of alum in 2 ounces of water,

B. 30 grains of silver nitrate are dissolved in 150 grains of water, and 30 grains of common salt, with much stirring, added to it. The solution is allowed to stand for twenty-four hours, when it is filtered and the following solution added to it :—

C. Chloride of gold, 15 grains ; chloride of ammonium, 30 grains ; water, 6 ounces.

This bath, into which the prints are placed after removing from the printing frame without being previously washed, keeps well for any length of time, and can be used over again. It becomes of course, in time, almost saturated with chloride of silver, when it will be impossible to perfectly fix with it, and it is therefore necessary to add then some fresh hyposulphite of soda, or to employ a separate fixing bath besides this combined one. In this combined bath the prints become at first chrome-yellow, then they change to a brown, and finally to a deep purple-black. As soon as the desired tone is arrived at, the prints are taken out and placed in a bath of fresh water, and washed for two or three hours in several changes. With a freshly made bath, the toning proceeds generally rather slowly, but after it has been used several times, it tones quicker.

Having been thoroughly washed, the prints are removed from the water, and drained by hanging them face upwards across a half round planed long pole. As soon as the last print has been hung, the first one is removed in order to be mounted. The print, being only half dry, is placed face downwards on a clean support, brushed over with strong starch paste, and then transferred to the cardboard. A sheet of clean paper is laid over it, and pressed well to avoid blisters and wrinkles. The cardboard thus provided with the print, is now, face inward, put against a wall and allowed to dry. After four or five hours the mounted prints will be dry, the mounts being still perfectly flat.

The pictures may now be retouched and spotted out, which is done best with the "glossy retouching colours," as provided by the manufacturer of the paper. After retouching, and when the prints are perfectly dry, they are burnished, running through the machine from a different corner every time slowly, without too much pressure and heat. It is well to pour some plain collodion over the prints before burnishing, especially in cases where much retouching is done on them.

As it has already been stated, the surface of the aristo paper is about equal to the finest albumen paper ; but it can be afterwards rendered matt or brilliantly glossy, according to the desire of the operator, by simple methods. To obtain a *glossy* surface, equalling glass in appearance, the following method has been found to be reliable. After the prints have been thoroughly washed, they are allowed to dry, hanging them over clean blotting paper. When dry, they are once more placed in clean water ; then a glass plate, free from bubbles and scratches, is polished with talc powder by means of a pad of cotton-wool, the loose powder being rubbed down by means of a piece of linen. This done, the prints are kept under water, and a soft brush passed over them to remove all air-bubbles ; then they are removed and, whilst still wet, placed upon the glass plate and covered with a sheet of clean paper or of india-rubber, and rubbed in every direction with the squeegee. The paper or india rubber then being carefully stripped off, all the superfluous water is taken up from the prints with blotting paper. When half dry, starch paste, or any other cement preferred, is brushed over them, and the prints allowed to dry. When perfectly dry, they will easily leave the glass, with a beautifully enamelled surface. To mount the prints, the cardboards are sponged, and the prints, after trimming, placed in contact and pressed well ; also "Wolff's adhesive mounts" may advantageously be used for this purpose in the same manner. As by mounting the prints in this way their glossy appearance is always suffering to some degree, many operators used to mount them only with the four corners or by the edges only. This is done best by means of fish-glue, with which the edges of the print are brushed only $\frac{1}{16}$ of an inch wide. Care must, however, be taken that nothing of the medium comes into contact with the surface of the print.

To impart to the prints a *matt* surface, equal to an engraving or a platinum print, a simple and very effective method is the following : A piece of plate glass is ground with finest Venetian emery powder until an evenly matt surface is obtained ; in about ten minutes two plates may be ground. Then the plates are well washed, rubbed with talc powder, and the excess dusted off. The prints are placed on these plates wet, treated with the squeegee, when perfectly dry stripped off and mounted. The results obtained are splendid.

In concluding my remarks upon this subject, I mention a number of defects most commonly met with in the aristotype process, and give the remedy in every case where I know of one.

Spots of all kinds are produced if absolute cleanliness has not been observed. The trays and dishes must, therefore, be perfectly clean, also the fingers and the table.

The margin of the print tones quicker than the centre if the gold bath is too strong, and if the prints are not constantly kept in motion, especially if too many pictures have been placed in the bath at one time.

The half-tones acquire a pink colour if the prints have remained for too long a time in a weak gold bath.

In the fixing bath the picture obtains a bluish slaty colour if it has been toned too long.

The picture loses in the fixing bath its bluish tint, and turns yellowish-brown if it has not been printed dark enough, or if it has not been sufficienily washed after toning.

In the combined toning and fixing bath the picture becomes greenish if the bath has been used too often, and therefore contains no more gold.

The picture loses too much of its strength if it has not been printed deeply enough.

The picture refuses to tone, keeps its brown colour, if the combined bath contains not enough chloride of silver.

Prints with glossy surfaces show matt round spots if they have not been pressed well into contact with the glass plate, and air-bubbles have consequently been produced.

The print refuses to leave the glass plate if not sufficient talc powder has been applied to the glass plate.

A Luminous Ox.—Most persons know something about the Balmain luminous paint, which at one time seemed likely to come into extensive use for brightening the interior of tunnels and other dark places. Although Mr. Balmain probably improved the manufacture of his paint, which is said to have been made of oyster shells calcined with sulphur, *The American Architect* is unkind enough to suggest that he was by no means the inventor of the luminous compound, which is described at length, with the process of manufacturing it, in an old book which was familiar to our boyhood, and seems, from a curious story which is told about it, to have been known to the Orientals for many centuries. A Chinese legend says that a certain emperor, who reigned about 1,000 years B.C., was told one day of a picture, belonging to one of his subjects, which had a remarkable property. The picture represented an ox, and every morning the ox came out of his frame, and went to graze in the meadows, returning at night, to resume his place in the frame, where he remained quietly until the next morning. The emperor caused the picture to be brought to him, and sought in vain for an explanation of the mystery. After the mandarins of the court had exercised their philosophy over it to no purpose, an old priest was found, who remembered that the Japanese had the art of treating oyster shells in a certain way, and mixing them with various pigments so as to form colours which were invisible by day, but became visible at night. The picture, he suggested, was probably painted with these colours, and as the figure became invisible by daylight, it needed no great credulity—for a Chinaman—to imagine that the animal had temporarily joined the flocks feeding in the neighbouring pastures.—*Invention.*

THE JUBILEE PHOTOGRAPHIC CONVENTION.*

PRESIDENTIAL ADDRESS BY MR. ANDREW PRINGLE.

I AM aware that the president of a learned or artistic body, on an occasion such as this, is usually expected to deliver a weighty address on some subject chosen by himself as being specially within his province, or specially congenial to his taste; but in this year, the fiftieth, as I hope to show, of practical photography, the course clearly indicated for me to follow will be to trace before you the history of photography from its birth as a practical science to this, its "jubilee" year. A more momentous story, more gigantic and sudden strides, more at once of patient labour and of brilliant genius, will not be found to mark the history of any science than that of photography. If any science can be compared in these respects with photography it must be that of spectroscopy, and the two have, for evident reasons, gone hand in hand together.

It is difficult to realise here and now that fifty years ago, had the whole world been searched, half-a-dozen men could not have been brought together able to start or discuss any topic concerning photography, while in this country alone we have now at least ninety societies, numbering many thousands of members, every one more or less conversant with some of the many photographic processes in use in our day. I have been unable to ascertain with anything like exactitude the number of persons now actually engaged in the production of photographs, in the manufacture of photographic materials, in photography as a livelihood, as a recreation, and as an adjunct to other sciences. I can only say that to-day photography supports, amuses, and helps tens of thousands in this country. Let us now look back fifty years.

In 1839 Louis Jacques Daguerre, after many years of labour, partly in collaboration with Joseph Nicéphore Niepce, obtained from the French Government a pension for the production of the process we later knew as Daguerreotype. It is said that in January, 1839, Daguerre communicated the details of his process to Arago, a famous scientist of that time, but what we know is, that on this very day, the 19th of August, fifty years ago, and probably about this very hour, Daguerre's process was fully divulged to the Acadèmie des Sciences in Paris. But it would ill become me, for the sake of "making a point," to ignore the claims of our own countryman, several of whose processes we are working to this day, while Daguerre's process was never known to most of us, and was long ago relinquished by all of us who ever knew it. On the 25th of January, 1839, the great chemist, Faraday, described to the Royal Institution Fox Talbot's process of photogenic drawing, and on the last day of the same month Talbot himself read a paper on the same subject before the Royal Society, saying that he had produced results practically the same in 1835. Talbot used sodium chloride and silver nitrate on paper, these salts being not unfamiliar to us at the present time. And, farther, when, in 1841, Talbot's claim for patent protection was opposed, it was proved that the Rev. J. B Reade—the "good old rector," as I have heard him called—had during, if not before 1839, sensitised his wife's white kid gloves with silver chloride, and, as a result of these experiments, had been led to use galls to render the action more rapid. Talbot's claim in this case was upheld, but in 1843 he made a less successful application for protection, when he claimed the use of sodium hyposulphite as fixing agent; but it was clearly proved that in 1839 Sir John Herschel had shown the use of our familiar "hypo" in photography, having many years previously discovered its solvent action on silver haloids. During 1839, too, Herschel used glass as a support for his sensitive film, though it was not till later that a "vehicle," as we now call it, was used to bear the sensitive salts on the glass. Dr. Fyfe, in 1839, sensitised paper with sodium phosphate; and, lastly, in this same year Mungo Ponton published in Edinburgh his experiments on the action of potassium chromates on gelatine. Either in 1839 or 1840, *sel d'or*, the hyposulphite of gold and sodium, was used as a toning agent for Daguerreotype plates. Thus we have not only the Daguerre process, but the silver chloride process, a development process, the fixing process, the use of glass, the principle of a vast array of gelatine printing processes, and, perhaps, the foundation of our toning process, all bursting upon the world in one year, and surely I may say that we celebrate with justice the jubilee year of photography.

I must not weary you with details too minute of the course of events following these I have mentioned. I will try merely to point to the most conspicuous landmarks of our history. 1840 saw bromide, and 1841 chloride added to our silver haloids, the former by Goddard, the latter by Claudet. Claudet was one of the two photographers then in business in London; Edinburgh had a photographer, Birmingham had one, and in Britain there were only these four.

In 1841 the term "negative," now so well known, was first used by Herschel, and Petzval designed lenses having their visual and actinic foci coincident.

Talbot's calotype process held sway for some years; until 1850 the paper constituting at once "vehicle" and "support" was not even waxed.

We now come to a very important era. In 1849 Le Gray suggested that collodion might furnish an excellent *menstruum* for our silver salts, but the general opinion is that the credit of the collodion process is due to Fred Scott Archer, who certainly used the wet collodion process in 1850, and published his method of using it in 1851. But our friend W. K. Burton has heard the late J. G. Tunny, of Edinburgh, who was a patriarch in photography, say that before Archer's publication, Le Gray furnished him—Mr. Tunny—with a practical collodion bath process, and, further, that Le Gray developed with sulphate of iron. For many years wet collodion reigned supreme, and with good reason, for it was a process capable of yielding the very finest results. But the inconveniences attending the use of this process, the vaporous exhalations, and the staining propensities of the bath solution, as well as the necessity for cumbrous tents and other paraphernalia, set a cloud of experimentalists to search for some method to obviate these troubles. From Taupenot's process, 1855, to Abney's albumen beer, 1874, much valuable work was done; but in the opinion of most competent judges not one of these processes, not one indeed of all the other collodion processes, yielded results equal, on the whole, to the wet collodion process.

The first photographic exhibition was held at the Society of Arts in 1852; the first photographic society was the Photographic Society of London, dating from 1853; the first public photographic periodical was *The British Journal of Photography*, which started as a monthly in 1854.

The next era with which we have to deal was that of collodion emulsion. On September 9th, 1864, B. J. Sayce and W. B. Bolton published their unwashed collodion emulsion process; soon after this Sayce seems to have retired from the photographic world, but Bolton has from time to time ever since shone out in some new or improved process. In 1874 he gave us his process for washed collodion emulsion, whereby, instead of having to wash each coated plate, we were enabled to wash our emulsion in bulk, and, further, to preserve it in the dry state for a long time.

We have it on record that in 1868, W. H. Harrison made an emulsion with gelatine, silver nitrate, and cadmium bromide and iodide. Mr. W. Jerome Harrison, in his admirable "History of Photography," to which I am indebted for much valuable information, mentions this experiment of W. H. Harrison, and rightly points out that most writers have overlooked this fact of an early attempt at a gelatine emulsion. [Extract from *British Journal* was read.] *The British Journal of Photography*, September 8th, 1871, contains an article by Dr. Richard L. Maddox, proving for the first time that gelatine emulsion was a fact practicable and accomplished.

A word on Dr. Maddox—my guide, philosopher, and friend. Though for over forty years he has suffered from a distressing malady—always in discomfort, often in agony—these forty years, and more besides, have been wholly devoted to science, and the results of these labours have been ungrudgingly given to the world without thought of gain, and with too scanty recognition.

In 1873 we find Burgess advertising gelatine emulsion, and Kennett obtaining protection for a gelatine emulsion pellicle requiring only to be melted and poured on a plate. Various modifications were introduced during the next four years, but the great event that brought our negative process to the point where it now practically stands, took place in 1878. Very many in this audience will remember the surprise created when on March 7, 1878, Charles Bennett showed at the South London Photographic Society negatives on gelatine bromide emulsion produced under conditions that would have been totally inadequate to produce a useful image on any plate previously prepared. Bennett, in a truly magnanimous manner, did not hesitate freely to give his process to the world in *The British Journal of Photography*, March 29; and so fully was his method described, that many present to-night were able almost at first

* Read at the Convention last Tuesday.

trial to produce results similar to those of the discoverer Bennett, by prolonged action of moderate heat on the emulsion, altered the molecular state of the silver bromide in such a way that the sensitiveness to light of the silver haloid was vastly increased, and in process of time it was found that a much greater heat applied for a much shorter time to the silver bromide in a less viscous solution of gelatine effected the same desirable change, and in this position our gelatine bromide process may be said to stand at the present day. Monckhoven, in Belgium, showed that a similar result to that obtained by boiling may be achieved by the use of ammonia, but I may say, speaking for myself, that it seems to me matter for regret that the injurious ammonio-nitrate process was ever made known, for I am convinced that the use of it has done much mischief to commercial gelatine emulsion plate making.

In the details of gelatine emulsion, many improvements have from time to time been suggested. Iodide was added by Abney, chloride was also used, and considerable ingenuity has been shown in contrivances for getting rid of the bye products of the decomposition taking place at emulsification. King used dialysis, Wratten precipitated by alcohol, Plener separated by centrifugal force, and again, speaking for myself, Plener's system elaborated by A. L. Henderson is the one that for certainty, simplicity, and regularity commends itself to me.

Regarding negative processes, it may be said that while processes now obsolete rendered magnificent results—though doubtless the fittest only have survived to attract our admiration—still to-day we get results equally good in all cases, with much more ease and rapidity, and we can now in certain branches achieve results wholly beyond the reach of any process except the gelatine bromide in use to-day.

In printing processes our great want, our great aim, and our great achievement during these fifty years have been in the direction of permanence of result. The albumen paper, in its virtues as in its defects, stands pretty nearly where it stood half a century ago, but we have now several processes of indubitable permanence—the platinotype process, patented by Willis in 1873; the carbon processes, founded on Ponton's discovery of 1839; and the gelatine-bromide, and perhaps gelatine-chloride processes of later dates.

Paper and other substitutes for glass have always exercised great influence on out-door photography; from the days of Melhuish's roller slide till the advent of the Eastman-Walker roll-holder; from Talbot's calotype to the present day of celluloid films, the matter has been steadily kept in our view. The public mind is now on the alert for a process said to be achieved, yielding a transparent film, capable of being wound on a roller and exposed in a roll-holder.

In the province known as photo-mechanicel printing we have made enormous strides; but as this subject has never occupied my attention, I refrain from discussing a subject of which I am ignorant.

A shortcoming of photography, if possible more serious than want of permanence, has been incorrect translation into monotone of certain colours. Colours found in nature and in painting giving effects of brightness to the eye are rendered by ordinary photography as dark, while certain colours more or less sombre to the eye in nature, and used as low tones by painters, are represented by ordinary photography as high lights. I have deliberately left orthochromatic—or, as I prefer to call it, colour-correct—photography to the end of my remarks on our technique, because this line of research is at present engaging our chief attention, and because in this direction certainly lies our next great advance.

In 1873 Vogel discovered that certain dyes make photographic plates more relatively sensitive to some of the less refrangible rays of the spectrum. In 1874 Becquerel used chlorophyll, and in 1876 Waterhouse used eosin with collodion plates. In 1879 Ives published his system of using chlorophyll obtained from the blue myrtle. On January 8th, 1883, Tailfer obtained provisional protection for the use of eosin with gelatine plates, ammonia being used along with the dye. This pateut stands at this day, and is worked by an English firm. On December 4th, 1884, Dr. Eder read a most important paper on the subject before the Vienna Academy of Science, and since then he has published several papers, all of the greatest value as contributions to the subject of colour-correct photography. The eyes of photographers in this country were first opened to the advantages of orthochromatic photography by the exhibits at Pall Mall of Dixon aud Gray, whose work, however, seems to have been stopped by the Tailfer patent I have mentioned. Dr. Mallman in the same year, 1886, gave a valuable paper to the Photographic Society of Great Britain, showing ways of using various dyes so as to produce effects in colour-rendering equal, if not superior, to the results obtainable on commercial plates. The next year saw the entrance of our friend, C. H. Bothamley, iuto the arena of orthochromatics, for in that year he read a paper to the Society of Chemical Industry, wherein he described his repetition of Eder's experiments, and his investigation of the group of eosin dyes; also he exhibited comparative results which went to prove that the relative sensitiveness conferred by the dyes was even greater than had been supposed. In 1887 Mr. Bothamley first flashed upon our astouished senses at the Glasgow Convention, as all who were present cannot fail to remember. Since that time he has been the leader of British research into colour-correct photography for general purposes, while Captain Abney's attention has been turned to the more special line of spectrum photography. I do not hesitate to say that to colour-correct photography we must look for the next important era in photography.

There is a name I have only mentioned casually as yet, but photography must never forget how much it owes to Abney. That scientist does not, I believe, claim to have initiated any absolutely new line of departure, but there is hardly a branch of our science on which he has not left a permanent mark.

Carey Lea's researches have been always valuable. And there is another friend of ours, a particular friend of my own, far distant geographically, but doubtless present in spirit with us now. William K. Burton is young in years—still younger in photography—but he has brought to bear on photography a genius and an energy that have marked his footsteps wherever in our march he has trod.

And close to me is another landmark of photographic progress, not a landmark either, but rather a series of milestones. For a quarter of a century and more, Traill Taylor has sat in the editorial chair, and taken cognisance of every event that has influenced our career; and not a mere idle watcher is Taylor, but an active helper, especially in the branch most congenial to his taste—optics.

I have endeavoured to trace the astounding advances scientific photography has made during these fifty years. Artistic photography hardly permits of similar treatment. But I believe that our art has kept even pace with our science. We see many artistic photographs of bygone years just as we see many unfaded prints, but the average of artistic production has advanced just as the average of technique. Connected with the art education of photographers during these past years must ever be the name of Robinson; by precept and by example he has led us in the right way; even by provoking rivalry and eliciting contradiction he has served us, for his rivals have produced works that, with all their faults, will eventually work for the good of photographic art.

The questions I now venture to ask are searching ones, the answers I shall supply no less momentous if I reply correctly. Might we have advanced more rapidly in science and in art than we have done? I think we might. What have we lacked in past, and what do we require for future advance? *Training.* We require training in science, and training in art. Mr. W. E. Debenham has stated, and Mr. C. H. Bothamley has corroborated the statement, and my wish is to emphasise it, that there is in our ranks a sad want, an almost total absence, of scientific methods of research and logical report of our investigations. We are not trained to scientific investigation; we lack the patience to eliminate *singulatim* the causes of our variations in result; we jump at conclusions without safe ground to jump from. Photography is far behind every other science in this respect. Papers such as we read and write would never be accepted or attended to by societies cultivating any other science, so far as I know.

So, too, in art, Mr. Robinson has said, Dr. Emerson has shouted, that we want art training; we trust to what we are pleased to call intuition; we despise and shirk study, or, what is far worse, we make no pretence of art, and shoot promiscuously with hand cameras at all and sundry over the face of the whole globe. If photography is to advance we must train ourselves to advance it.

Is there a mind anywhere incapable of finding work or pleasure or help in photography? Is it possible to find a being dead to *every* branch of our art-science? Surely our resources are wide enough. From the immeasurably great celestial bodies to the infinitesimal microbe, everything visible is open to photography. Whatever the eye can see, aided or unaided, photography enables us to depict, and much that the eye can-

not see, photography will catch. Stars too dim, flight too rapid, wave vibrations too frequent or too far separate for our eyes to appreciate, are all within the recording power of photograpy. The lightning flash, the quiver of the iusect's wing, the cloud-capped mountains, and the bowels of the earth, are all alike amenable to our science. Photography links together the past, the present, and tbe future; the absent with the present, the dead with the living. Fifty years ago what poor man had a portrait of his wife or childreu? what mother could look on a picture that reminded her of the features of a son in foreign lands? What lover could carry near his heart *her* portrait? Now, what cottage so lowly as not to have its portrait album, rude though the portraits aud rough the album? Art, or, if you prefer it, portraiture, was then for the prince or the plutocrat; it is now for all. This is not a small matter that photography has accomplished, and you and I have helped photography to bring it about.

What science is there that can dispense with photography? Certainly no practical science. The astronomer needs us, the mechanic needs us, the microscopist calls on us, the physiologist and the pathologist appeal to us for help. The artist has learned many lessons of us, and will learn more. Truly, the influence and the use of photography are universal.

Everyone now before me has adopted, or may adopt, some special brauch of photography as a professiou, as a recreation, or as an aid to some other science. To everyone, therefore, I say train yourself to make the best of what you undertake; there is no necessity to undertake too much, but let us have no dabbling or smattering; make scientific experiments, reason logically from the experiments, and let the world have the benefit. Whatever we may do for photography, photography has done much more for us. There is an old proverb, and a homely one, but I commend it to-night to your attention with all the force of which I am capible, *Whatever is worth doing, is worth doing well.*

PHOTOGRAPHING GESTURES.

M. George Guerboult has sent to the Academy of Sciences the following paper:—

A person speaks before the Edison phonograph, making use of gestures and play of features. By the following system, I think, it will be possible to preserve these gestures and movements, so as to reproduce them later in exact correspondence with the spoken words, and even to be able to transmit them to a distant point. I suppose that at the time at which the cylinder of the phonograph commences to turn, instantaneous photographs are taken of the person speaking, at equal intervals of a tenth of a second. If the revolution of the cylinder is made in thirty seconds, for example, we will have three hundred photographs. When developed, they are placed in a phenakistoscope which also makes its revolution in thirty seconds; the photographs passed successively before the eye of the observer at the velocity of one-tenth of a second; the applianee will reproduce all the motions of a person in virtue of the principle of the persistence of the impressions of the retina; and as there is no syllable which, to be articulated, requires less than a tenth of a second, the gestures and the play of features will follow exactly the motion of the word reproduced in the phonograph. It will, therefore, be possible for an actor or an orator, for example, to reproduce at the end of any lapse of time the text and the action of a discourse.

Light and Electricity.—At a meeting of the French Academy of Sciences, held August 5th, a memoir was read on "A Study of the Electric Phenomena Produced by Solar Radiations," by M. Albert Nodon. Numerous observations made at the laboratories of the Sorbonne and the Collége de France show that on meeting an insulated metallic or carbon conductor the solar rays communicate to it a positive electric charge; that the amplitude of this charge increases with the intensity of the rays, and decreases with the hygrometric state of the air, the phenomenon attaining its maximum value in Paris about one p.m. in summer, when the atmosphere is pure and dry; lastly, that the effects cease during the transit of clouds across the face of the sun. If these results can be extended to non-metallic bodies, then solar radiation may be regarded as one of the causes of the electrization of the clouds.

THROUGH JAPAN WITH A CAMERA.

Chapter X.—Nikko—Japanese Temples—Religion in Japan.

Our work at Sendai was soon over, and we might have gone further on our travels, but we did not like the idea of travelling the ninety miles or so of the somewhat uninteresting road between Seudai and Koriyama (the nearest railway station) for the third time. There is a railway line between the two towns just mentioued, but it is not *yet* opened. Tbe engineer in charge, however, kindly offered to let us travel on a ballast train, and we decided so to do, although it would keep us for several days longer in Sendai. I believe the truth was, we were in no great hurry to leave; we had so completely lost our hearts to the Bamboo and the Chrysanthemum, the charms of young ladies who, in addition to other attractions, could stand on their heads, having proved too much for us. However that may be, the ballast train somehow or other went without us; but we are all the slaves of time, so one evening saw us packing up our luggage, and at 4 o'clock next morning, long before it was light, the girls came romping and shouting into our room, pulling down the "mosquito houses" ou the top of us to indicate that we must be marchiug. At the first streaks of dawn we were on the road, "Sayouara,"* the sweet sounding parting greeting of the Japanese, long called after us.

So we did this somewhat weary road from Sendai to Koriyama for the third time.

By this time the excessive heat was over, and the people were beginning to resume their clothes. During the very hot weather their raiment had been of the scautiest. The men wore merely the narrowest of loin bands; the womeu, for the most part, wore a siugle Japanesc garment, (like a dressing gown), but threw it off their bodies from the waist upwards. The children under eight or nine went scampering about stark naked.

Nagasakisau and myself both took train at Koriyama, but the former went straight on to Tokio. Our business was over, but I had some ten or twelve days more of holiday, and had no desire to get back to the steaming atmosphere of the capital sooner than I had to. Besides, I wished to see the great town of Nikko. I therefore left the traiu at Utsonomiya, from which towu Nikko is about twenty-five miles distant. The road is one continuous avenue of stupendous pine trees.

Nikko is the Rome of Japan. It is a city of temples, or, more strictly speaking, it is a very small town surrounded with innumerable temples, which are for the most part amongst the trees which cover the sides of the mountains around the town.

The uatural situation of Nikko is very beautiful. It is surrouuded with mountains of very considerable height, all wooded to the very top with pine trees. There are deep valleys and gorges betweeu these, with swift mountain torrents and cataracts flowing through them. The town itself is a single street, running parallel with one of these streams.

To give any idea of a Japanese temple is a most difficult thing, especially as there are temples of at least two distinctly differeut religions, namely, Buddhism and Shinto. One thing that is noticeable, and contrasts favourably with certain things at home, is that the priests of the different religions seem to carry on their offices side by side in the most perfect concord.

I have tried to discover whether the Japanese have any feeling of reverence whilst in these temples, or towards them, or anything that they represeut, but it is very difficult to find a trace of any. I have seen crowds in a temple, smoking, laughing, and drinking tea. I have seen young fellows go up to the door of a temple and pull the cord attached to the bell, which, I believe, is supposed to call the attention of the deity, laughing all the time as if it were a great joke. On the other hand, I have seen—occasionally—old men and womeu apparently deep in prayer.

The whole matter is very difficult to judge of, aud in attempting to do so it is uecessary to bear various things in mind, as, for example, that some of the temples are (I believe) not even professedly places of worship at all; and agaiu, that the Japanese appear to express by laughter many emotions different from those that we so express.

An anecdote may serve to illustrate the difference between the customs in Japanese temples and Christian churches. A friend of mine wished to photograph the interior of a temple. It was dark, and the exposure required was long. He asked the priest how long it would be beforc there would be any service, and got a reply which he understood to mean half-an-hour. As this would just allow him the time he required, he put up his camera; but after ten minutes had elapsed, the priest re-

* Pronounced like sigh-oh-nara. Literal meaning, "If it must be so."

appeared followed hy a crowd of people. "Had the honourable gentleman not finished his photograph?" "No; hut, of course, if service was ahout to begin, he would take down his camera." "Oh, hy no means; the service would wait till the honourahle gentleman had finished his exposure."

I forget now whether "the honourable gentleman" took advantage of the kind offer or not.

The temples vary in structure from a simple wooden canopy on four wooden posts to huge piles of the most elahorate wood carving, filled in the inside with more carving, with gilding, painting, bronze work, lacquer work, and a general wealth of ornamentation perfectly bewildering.

Prints of these, which are of excellent quality—of cahinet size—were purchased from a local photographer for a trifle under 2d. each. At the same shop an alhum contaiuing thirty carte size silver prints could he bought for less than a 1s.—and this where all the collodion-albuminised paper and other reqnisites have to he imported from Europe!

COLOURED FIRES.

Mr. W. H. Browne, analytical and consulting chemist for explosives, writes to the *English Mechanic*:—

I notice in your valuable journal an article copied from *Suad Apothek Ztg.** respecting coloured fires, and as these articles appear to crop up from over the water every year in a mysterious way with astonishing formulæ, may I be permitted to point out that these formulæ have not one single feature to commend them, nuless it is excessive cost of production of worthless and dangerons compounds?

The formulæ in qnestion are not coloured fires within the meaning of the term as understood by pyrotechnists; are, in fact, flash-lights or chlorate explosive mixtures, and will not hurn as a coloured fire.

Sulfonal is nnsafe in a chlorate mixture, unstahle even in the hands of an expert in explosives, and is in no way superior to shellac with or without a small percentage of pure sulphnr. The same will also apply to the picrates.

I suppose that the writer of this article is aware of the violent action of sulfonal and potassium chlorate when fired by means of a detonator. This formula for the so-called white fire is really little better in active power than that of the old friend of our youth, Chertier's white fire. Even if you could obtain a steady flame from equal parts of sulfonal and potassium chlorate, which I deny, the cost of production and risk of storing the compounds is strongly against its use. For instance, take the lilac fire with lithium carbonate and sulfonal, the lithium salt is worth about one shilling per ounce retail, and is in no way superior to pure precipitated strontium carbonate, at nearly tho same price per ponnd. The cost of the lithium, added to that of the sulfonal at 3s. per oz., makes this costly, and the latter can easily he replaced with shellac without destroying the brilliancy or colour of the flame. Again, the term "violet fire" is a misnomer, as it has heen found impossible to produce a violet Bengal fire, either open—as a pan fire—or in cases. It has been done with lances of small calibre, but the effect is very poor, and is never, or rarely, used hy the professional pyrotechnist, so that I will leave our readers to judge what the effect would he in the wide bore of a Bengal case.

Again, the violet fire in question containing magnesium is wrong hoth in theory and practice, the composition in question only producing an explosive flash.

The great active power of the magnesium flame is against one being able to produce any striking or deep colour, and violet is about the last colour one would expect to succeed with. A violet flame is characterised hy a very low illuminating power, and the action of the magnesium when in combination with a violet composition is simply to either destroy it, or so to neutralise the violet tinge as to he imperceptible at a short distance.

It is quite possible to tinge magnesium in combustion with a slight green tint by aid of harium chlorate, or pale red or rose by means of strontium carbonate, nitrate, or oxalate; but in hoth cases the colour effect is weak, decidedly sickly, and detracts rather than adds to the heauty of magnesium fire.

With respect to the low illuminating power of the violet light, let any of the readers of "Ours" kindly notice the effect of the violet lamp or tail light nsed on some of the engines on our liues to convince them that the term "violet fire" is a delusion, nseless amidst the hrilliant works of pyrotechny.

* See Photographic News, August 2nd, p. 505.

THE JUBILEE YEAR OF PHOTOGRAPHY.

FROM THE DAILY CHRONICLE, AUG. 20TH.

The jubilee year of photography is heing celehrated this week by the Photographic Convention of the United Kingdom, who are holding their fourth annual meeting at St. James's Hall, Piccadilly. The Society was established in 1886 on the lines of the British Association, and the increasing importance of photography, both as an art and a science, undoubtedly justified the formation of an association devoted exclusively to its advancement. The first meeting was held at Derby, mainly through the exertions of an enthusiastic amateur, Mr. J. J. Briginshaw, the hon. secretary and treasurer, who was greatly assisted by Mr. J. Traill Taylor, editor of the *British Journal of Photography*, and the growth in importance of the yearly gatherings held subsequently at Glasgow and Birmingham, and opened in each case hy the mayor of the town, made it clear that the objects of the Association need only to be mado known to be fully appreciated, not only by those specially interested in photography, but hy scientific men generally. At the first meeting about seventy persons assemhled, but the opportunity for conference between professional and amateur photographers was at once recognised, and at the next convention there was an attendance of over 200, while at Birmingham last year more than 500 devotees of the camera took part in the proceedings. The great interest displayed at each meeting in the papers and discussions, together with the exhibition of pictures and apparatus, have incontestably proved the usefulness of the organisation. Regarded as a means to the development and cultivation of all matters pertaining to photography, the wide and varied experience which such a large and representative body of members can bring to bear, cannot fail to lead to important and practical results in the solution of the various problems connected with the scientific and theoretical, as well as with the technical and artistic sides of photography. The Convention consists chiefly of delegates from the London and provincial photographic societies, and by these a council and a general committee are elected to make arrangements for the annual gatherings, and to watch over the interests of photographers during the year. The rapid development of art, due to the modern chemical research, and the enterprise and ingenuity of manufacturers in cheapening and improving apparatus, have been the chief factors in the vast increase which has taken place in the numbers of photographers, and especially in the ranks of amateurs. The programme of the Convention comprises mainly excursions to picturesque and interesting places in the neighbourhood of London in the daytime, and meetings for the discussion of photographic questions and other matters in the evening; the formal business being brought to a conclusion on Friday evening with a dinner and smoking concert. The advance of the science and the means for its pursuit are illustrated by the exhibition opened last evening at the St. James's Hall, which is the headquarters of the Convention. The collection is by no means the complete exposition of the history and methods of photography which will doubtless be some day provided, but as far as it goes it will be found most interesting both to the members of the profession and to the general public, whose inspection is permitted on the payment of a merely nominal sum. The exhibition consists of specimens of the best photographic work, illustrating some of the principal processes, and of collections of apparatus showing the latest improvements and developments. The exhibits are of a high order of merit all round, and their excellence will be the means of attracting a large number of visitors during the week, the exhibition being open every day.

A new book, "Kant's Critical Philosophy for English Readers," has just been published by Messrs. Macmillan and Co. *Nature*, in the course of a long review of it, says: "It is clear that the famous 'Kritik of Pure Reason' is still regarded as a necessary element in all philosophic education."

The Action of Light on Nitroso-Camphor.—At a meeting of the French Academy of Sciences, on July 29th, a paper was read "On the Oxidizing Action of Nitroso-Camphor under the Influence of Light," by M. P. Cazeneuve. This substance, recently obtained by the author (*Comptes rendus*, cviii. p. 857), yields Liebermann's blue reaction with phenol and sulphuric acid, and also presents the curious phenomenon of becoming decomposed under the influence of light. The conditions seem somewhat analogous to those attending the formation of chlorophyll and of the colouring-matter in flowers.

Notes.

The *Court Journal* has made a wonderful discovery. As we do not profess to understand its precise meaning, we had better quote our contemporary's words:—"There is astonishment," it says, "also laughter, at the vanity displayed in the illustrations of the same subject in the papers. The fact is, many London pressmen, of every grade and variety, are skilled amateur photographers, and a large proportion of the sketches accompanying accounts of important occurrences are from the men who wrote the narrative. This may, perhaps, explain the all but invariable atrocity of the presentment." It is a great pity the *Court Journal* did not give chapter and verse for this extraordinary statement. The fact is, "many London pressmen" are not acquainted with photography. There are rare exceptions, such as in the case of artists on illustrated papers—Mr. Melton Prior, for instance—but the ordinary pressman, not excepting the high-class "special," are wofully ignorant of photography. The "atrocities" alluded to are probably the attempts at illustrations which have appeared in some of the evening papers, and are not the outcome of photography at all.

If reporters generally were artists, newspapers would be the gainers. The difficulty of obtaining portraits of criminal celebrities is sometimes enormous. Of course, *after* a criminal has risen to be a celebrity the matter is an easy one, because an artist can be sent to the police court or the assizes; but in this respect all newspapers are on a level. It is in the early production of a portrait where the difficulty arises, for, as a rule, when a prisoner is brought up for the first time, no artist is present. The reporter, therefore, who is able to make an accurate sketch is worth his weight of gold; up to the present moment he has not been discovered. To tell the truth, even among professional journalistic artists, there are few who can be relied upon to make a thoroughly characteristic and reliable sketch-portrait from life. Give them a photograph as a guide, and they are all right; but without this help it is quite a chance whether the portrait is correct or not. Considering the enormous demand for portraits now-a-days, this shortcoming is rather remarkable.

Mr. W. S. Wyllie, the well-known marine painter, resides in a sort of eyrie overhanging the Medway near Rochester. The house is on a hill, and on the top of the house is a studio studded with portholes, in which telescopes swing like miniature guns. With these he sweeps the river, and when anything especially sketchable is going on, the telescope enables him to take it. This plan is no doubt of great assistance to the artist, but we cannot help thinking that an instantaneous camera attached to each telescope would assist him still more. To release a drop shutter would in no way interfere with his sketching, and the memorandum thus preserved might at times prove of invaluable service. The pictures, of course, would be small, but enlargement is easy enough.

The dark flashes, as they are called, in lightning photographs, have long puzzled those who have devoted themselves to this particular study. It had been thought that these flashes were phenomena which were actually photographed, but Mr. A. W. Clayden, in the series of experiments which he details in *Knowledge*, disputes this theory. He says the dark flashes have no existence in nature. They are not due to any photographs of lightning discharges, such as an oscillatory series of flashes. On the contrary, they are a purely photographic effect, the explanation of which belongs to the most obscure portion of the physics of photography. Taking Mr. Clayden's words as they stand, it is clear that some more light has yet to be thrown upon these mysterious dark flashes.

The author of the brightly written article in the *Daily News* on Photography and the Photographic Convention is evidently so familiar with the art that it is strange he should speak rather slightingly of copying pictures by photography. He says: "We now photograph pictures with an amazing fidelity, though as yet we have got no further than the effect of the canvas as seen through the medium of an observant eye. The plate generally bears as many traces of friendly touch as my lady's miniature, and with few exceptions it is at best no more than an artistic impression of the work." This certainly is not fair to many ardent workers in orthochromatic photography, which has of late years made such advances. In the face of the admirable work of Braun, Blanchard, and others, it is not quite true to speak of "friendly touches" in this connection.

Mr. W. J. Linton, the well-known engraver, is engaged upon a most unique work, and is setting about it in the most unique manner. Some twenty years ago he commenced a history of wood-engraving, but, after labouring at his task for some time, discovered that its magnitude was more than his time would allow. The work was put aside for several years, and renewed in 1883, when Mr. Linton, having received permission from the Trustees of the British Museum to make the necessary photographs, copied with the camera some two hundred examples of engraving from the Library and Print Room. Having obtained his materials, which were of the most comprehensive character, Mr. Linton set to work to prepare the book. He first set up three pages of type, and having worked off pages 2 and 3, distributed the type, and set up page 4 to make the complete sheet. In this way he prepared three entire copies, cutting and mounting two hundred photographs in each with his own hands. The book is now in the hands of the printer, who is working from one of the original three copies. Apart from the value of the book as an exhaustive treatise on wood-engraving, the laborious method adopted by Mr. Linton lends additional interest to it. Mr. Linton, we believe, rather deplores the extreme use made of photography by modern engravers, but in other respects we should fancy he would look upon the art with gratitude, as without it his book as it now exists would have been impossible.

THE INTERNATIONAL CONGRESS OF PHOTOGRAPHY.

BY LEON VIDAL.

It is difficult to indicate at present in any precise manner the solutions adopted by the Congress on Photography. The greater part of the propositions resulting from the preparatory reports have been handed over to an editing committee, which will not have accomplished its labours until after the sittings of the Congress. Until then, all that may have been published by persons who have assisted at the Congress cannot have any character of complete exactitude. For this reason it is better to wait until the work is definitive and official.

At present I can only give a general outline of what has passed within the Congress. In the first place, we may remark that although the number of members of the Congress is sufficiently large, the number of those who have assiduously attended the sittings is very limited. The international element is represented, but not to a sufficient extent to be altogether satisfactory; nevertheless, the principal questions receive a fitting sanction by the presence of several scientific committees, who bring to the examination of the solutions indisputable competence well calculated to ensure the highest degree of precision, including MM. Janssen, Marey, Wolf, Cornu, Cole, Sebert, Fabre, Labaume, Pluvinel, Buguet, Davanne, Petersen, and Warnerke.

Generally speaking, the more scientific solutions are those which have taken the lead of practical matters, although the latter are better within the reach of the larger number.

It appears to me that it has been forgotten that the Congress is, above all, photographic, and that the greater part of the discussions would have been more in place at the Academy of Sciences.

I should not complain of this circumstance if sufficient attention had been given to what I call the practical solutions. Unfortunately, the great and illustrious savants, whose presence is such a great honour to our Congress, are perhaps afraid of descending too much when admitting propositions which have a less scientific character. I hold a definite opinion in this matter; I certainly desire solutions in matters of pure science, but I consider them as inaccessible to the larger numbers of photographers and manufacturers of apparatus, and on behalf of these latter I ask for solutions which I call practical—that is to say, more easily comprehensible, and such as may be adopted, and realise the objects of the Congress.

For the moment we find ourselves face to face with solutions which will remain a dead letter to most people, and that is to be regretted, for it is to be feared that an understanding of a more industrial value or character will be found to replace the work of the Congress, and indefinitely adjourn the adoption of the more technical solutions. I could have wished, in order to preserve the authority of the Congress in all its integrity, that, as well as exact solutions satisfying scientific men, there had been practical observations and understandings arrived at, which would satisfy practical men as well as the learned. In my view photographers are not necessarily deeply scientific men, and it is speaking in the desert to propose mathematical and geometrical formulæ to persons who have not had the initiation necessary for understanding them.

When the definite result of the labours of the committee of revisers is ready, I shall be the first to send it to the readers of the News, and I shall afterwards indicate what are the practical solutions that might reasonably have been added to those which have been adopted, and which, in my estimation, are required to complete the work.

The meetings last until Saturday, the 17th of August; then on Tuesday, the 20th, comes a closing conference, which will doubtless review the solutions adopted; but perhaps a permanent committee will be entrusted with the difficult task of executing the decisions of the Congress. It is then that they will be found in face of a task the impossibility of which it is easy now to foresee, and which might have been avoided by adopting temporary measures of a sufficiently approximate character.

We shall see this committee at work, and we shall follow its labours closely or at a distance, as we may or may not be called upon to take a part in it.

Sanction of the work of the Congress must result not only from the persevering work of the committee, but also from the good will of the persons interested, both in France and abroad. It may happen that some of the solutions are wanting in that character of being international that would secure their adoption elsewhere than in France, and thus the door may remain open for complete liberty of action to any who choose to say that, notwithstanding the decisions arrived at, each one will continue to act in his own fashion, and particularly in the way which is easiest and most comprehensible to himself.

But I will not continue to anticipate events; I will await the future to see what it has in reserve with regard to the work which occupies us. I shall shortly give more precise details of the solutions arrived at.

FALSE RENDERING OF PHOTOGRAPHIC IMAGES BY THE MISAPPLICATION OF LENSES.*

BY THOS. R. DALLMEYER.

Portrait Lenses.—A good many rules have been laid down in order to obviate the shocking examples one often comes across in portraiture, as well as in "wide-angle pictures," and I have thought it well to explain the cause of these failures, and to endeavour to arrive at a sure means of preventing the bad results thus produced. In portraiture it was advised, many years ago, that in taking the portrait of a given size the focal length of the lens employed should be at least double the largest dimensions of the image. This rule was laid down to avoid as far as possible false rendering in perspective.

To start on first principles, take a case of a large head, life size. It is well-known to you that, in taking such a portrait, the camera must be wheeled out to double its equivalent focal length, and the subject placed at the same distance on the other side of the optical centre of the lens. This particular distance, viz., double the focal length of the lens, holds a very important position in its relation to the law of conjugate foci, in that any other point nearer than this will produce an enlarged image upon the screen, and that any point more distant than this will be represented by a reduction in size of the object; hence, if the eye of the sitter be focussed for full face, the nose of an ordinary person projecting in front of the eye must necessarily be enlarged, and the ear, further away, must be reduced in scale. By what is called *straining* a lens, these effects of contrast become more and more apparent, and hence it is that, although there is a drawback in using long-focus lenses on account of their lack of depth of focus, still, the longer the focus of the lens employed, in the given case of portraiture, the better, in that these contrasts are not so marked.

To repeat what is deduced from this generally, it is apparent that the more a lens is strained—*i.e.*, used under conditions farthest away from those for parallel rays, or giving it a temporarily lengthened or forced focus—the more pronounced will be the false rendering. As an example of this, I have in my possession a number of old carte-de-visite photographs that were taken when the carte-de-visite was originally a rage in this country, and, I believe, first taken up by the late Mr. T. R. Williams. In these cartes-de-visite most of the subjects are full-length figures, and placed at such a distance from the carte lens that there was hardly a perceptible difference between the focus for the subject and the focus for parallel rays. Since that time, I do not say invariably, but in cartes-de-visite taken with lenses of the same focus, there has been a strong movement towards having much larger heads, accordingly bringing the subject very much nearer to the lens, and when this is the case, the palpable difference in the conjugate point for the foreground and the background necessarily gives upon the plate an exaggerated perspective. This is sometimes an artifice of the photographer to flatter, for we have all often seen hardly recognisable portraits of thin-faced subjects that have come out

* Read at the Convention on Tuesday last.

comparatively full-faced, simply due to pushing the short-focus lens close up to the sitter.

It appears, then, that for ordinary portrait work it is best to limit the amount of angle taken in as far as possible by employing lenses whose foci are at least twice the length of the image, and also to have the subject at such a distance that there is not a too remarkable difference between the corresponding conjugate points of the fore and backgrouuds. While speaking on this head, it follows that, theoretically, an enlargement from a portrait taken under the most favourable circumstances is truer in drawing than a direct large head. This arises from the fact that in making the small portrait, taking it for granted that all the rays are practically parallel, they are received accurately upon one plane.

I do not propose to discuss here the *pro* and *cons* of direct large heads as against enlargements, for there are many other reasons coming in, which, at the expense of theoretical benefit, have proved that a direct large head, when taken under the most favourable circumstances, that is, with a lens of long focus, is undoubtedly much more pleasing than an enlarged small image.

View Lenses.—The whole of false impressions given in views, outside the question of imperfectly corrected lenses, hinges on the point of the amount of angle that is allowable to be included on a given size of plate. I have once before poiuted out that, from a scientific point of view, a theoretically perfect instrument would be a pin-hole camera having the section of a mathematical straight line for an aperture. Such an instrument would give any amount of latitude in focus and angle of subject included. At a given distance the image or impression received upon the plate thus obtained must, of necessity, be absolutely correct from the one point of sight, but that it be a true rendering of the subject in the image thus obtained from the ordinary distance of vision does not follow at all. Such an instrument can do what the eye of itself can never do. For example, the whole horizon of 360°, by a very short-focus arrangement, could very nearly be taken in in two views of angles approaching 180° each. To imagine the result is somewhat difficult, but as the eyes cannot take in without movement more than from a quarter to a third of the 180°, the subject thus taken would hardly be recognisable from the ordinary distance of vision.

In this connectiou the correct amount of angle to be included is then the point to be settled. With regard to views, as well as in portraiture, rules of thumb have been laid down, and the reason for this is only due to the desire to make it impossible for the lens to include angles which the eye of itself cannot possibly take in. I think it may be taken for granted that no picture should include more than au angle of 60°, and it would be safer still to never employ a lens of shorter focal length than the larger dimension of the plate, or slightly over 50° ; but it is very evident that the longer the focal length of the lens compared to the greater dimension of the plate, the more pleasing will the perspective become, provided there is sufficient subject of interest thus included. The ordinary distance of vision is about 15 inches, and at 15 inches I am of opinion that the most pleasing size of picture at this distance would be about 10 by 8 inches, but not exceeding 12 by 10. If, then, it can be decided once and for all what is the extreme amount of angle to be included, and this, or always less, is included, we shall uever be pained by seeing pictures that, if they are true in drawing from the point of sight of the lens itself, are nevertheless distinctly untrue from the ordinary distance of vision. Taking numerous cases of the falsely rendered results one sees of architectural subjects and iuteriors on the one hand, and "wide-angle" landscapes on the other, where the distance is dwarfed and does not hold its true value compared to the foreground, it should be borne in mind that if those views could be comfortably viewed at the distance of the focus of the lens they would be true, but angles of 70° to 100° it is impossible, without movement of the head, to appreciate even at that distance. There are other subjects in connection with artistic treatment of subjects where the form and construction of the iustrumeuts employed necessarily come in. Some are self-evident, such as distortion and imperfection in correction for other than central pencils, which of themselves will necessarily give untrue rendering in the structure of the image. Putting a lens entirely out of focus must necessarily destroy structure, but the introduction of spherical aberration in many instances may still maintain the structure of the image, but produce a softer effect. I think that this is the only legitimate form of aberration to soften images, although I maintaiu, at the same time, that a perfectly well-defined or sharp picture throughout is not of itself at variance with softness due to conditions of atmosphere and lighting, the latter remark being, I think, particularly applicable to studies of landscape without prominent figure.

In subject photography in combination with landscape, the employment of a long-focus lens has an important bearing from the standpoint of some of our leading artists, in that the main object or subject of interest focussed for is better defined than either foreground or background, which are subservient, and lead up to the main feature, this of course being dependent again on the position of the conjugates. To obtain truer values also with the long-focus lens in *landscape work*, the subject chosen for the foreground should be sufficiently distant that the correct amount for definitiou for this should be consistent with that of the most extreme distance or parallel rays, this being often easily attained with large aperture ; but if the limits are wide, can only be arrived at by the use of diaphragms.

Another important feature in the employmeut of long-focus lenses is that it is always much more easy to attain equality of illumination for the whole of the plate, and in this way allow for every part of the subject to receive its full share of light to the extreme edges of the plate, and thereby allowing true values in light and shade.

I have continually used the word long focus in respect to view lenses, but by long focus I simply wish to be understood to mean long focus in the sense of comparison to the base of the plate that it is worked upon. No matter what the form of lens, on a given plate all lenses of identical focus would give exactly the same rendering of *perspective*. By the optician, lenses are designated "wide angle," "narrow angle," aud so on, merely from the fact that according to their name it is possible to use them under circumstances for which they have been particularly designed. Records of buildings and interiors, and wide-angle views, are of course interesting in their way as mementoes, and lenses are constructed to enable photographers to obtain results that cannot otherwise be obtained by using lenses for their truest rendering.

In conclusion, I would only impress once more upon you that the so-called wide-angle lens should never be employed to its full extent where it is possible for the subject to be treated by a so-called "narrow-angle" or long-focus lens, or the "wide-angle" lens under such conditions that it *practically* is a narrow-angle one.

PHOTOGRAPHY AND CHARACTER.—I feel sometimes that phreuology is the refuge of mediocrity. Its charts are almost as misleading concerniug character as photographs, and photography may be described as the art which euables common-place mediocrity to look like genius. The heavy-jowled man with shallow cerebrum has only to incline his head so that the lying instrument can select a favourable focus, to appear in the picture with the brow of a sage and the chin of a poet. Of all the arts for ministering to human vanity the photographic is the most useful, but it is a poor aid in the revelation of character. You shall learn more of a man's real nature by seeing him walk once up the broad aisle of his church to his pew on Sunday, than by studying his photograph for a month.—*Backlog Studies.*

A BORAX MINE.—W. H. Storms writes to the Pasadena *Union* as follows :—"In the Calico district is a strange mine called the Borax. Usually borax is obtained all over the world by collect- the accumulations of the bi-borate of soda in the beds of dry lakes, where the borax has been left as a residuary deposit, the same as salt and gypsum. The mine referred to is a vein found enclosed in sandstone and shale, and the borax is mined the same as quartz or any other mineral. Beautiful crystalline specimens of snowy whiteness are frequently found. The mine is a geological curiosity. The origin of the borax mine is simple enough. In past ages, the now nearly vertical vein was a bed of borax in the bottom of a dry lake, where the deposit had accumulated by the evaporation of the waters of the lake which contained the mineral in solution. Subsequently the water spread over the land and lake, and mud and sand were carried down into the lake, and the borax was covered. This process continued until hundreds of feet of sedimentary deposit had accumulated. In the course of time these hardened, and became rocks. When the main range of the Calico mountains was uplifted, the borax deposit was also tilted with its enclosing rocks, and it now has every appearance of a veiu. It follows perfectly, however, the line of sedimentatiou of the adjacent rock."

LIGHT, LENSES, AND STOPS.*

BY JOHN EDMONDS.

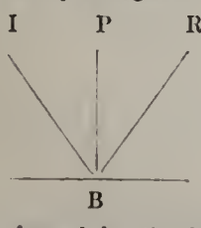
There are two theories by which the nature of light and its propagation through space are explained, namely, the corpuscular or molecular theory, and the undulatory theory. According to the first, light consists of minute particles emanating from self-luminous bodies, as the sun, a candle, or a red-hot piece of iron. According to the other, light is produced by waves or undulations of the molecules of an extremely subtle and rarefied elastic matter called ether, existing everywhere, and set in motion by the causes which produce light; this is called the undulatory theory, and is now generally received. This ethereal medium is not light, but light is produced in it by the excitation on the part of luminous bodies of a vibratory motion, similar to the undulation of water that produces waves, or the vibration of air yielding sound. Water set in motion produces waves; air set in motion produces waves of sound; ether—that is, the theoretical ether pervading all matter—likewise set in motion produces light.

The nature of a vibratory medium is better understood by reference to that which we know possesses the ordinary properties of matter, viz, the air; and by observing the analogy between the propagation of sound and light, the difficulties of the undulatory theory become less formidable.

To illustrate vibration, take a small ball attached to a silk thread, and suspended inside or outside of a glass bowl, so that it may touch the edge; set the glass in vibration by means of a violin bow producing sound, when the ball will be thrown from the edge and repelled so long as the sound is continued. This must suffice as to the theory of light. We know but little of its nature, but must proceed to consider briefly some of its peculiar properties.

All objects upon which the light falls are either opaque or transparent, but these terms are not absolute. Many objects are only partially transparent or translucent, none are absolutely transparent. We have to use the term, a ray of light, but a single ray must be in reality a mere ideal abstraction. In practice we can only deal with whole bundles of rays, the larger of which are usually called *beams*, and the smaller ones, whether parallel or conical, *pencils*. It is, however, convenient to speak of small *parallel* pencils as rays; when convergent or divergent they may be designated pencils.

When rays of light fall upon a plane surface, as the flat surface of a mirror, a greater or lesser number of them are reflected, and the result is in accordance with a definite law by which the angle of incidence, as it is called, is equal to the angle of reflection. This is easily shown by a diagram.



Thus, the angle I B P, formed by the incident ray I B with the perpendicular P, is equal to the angle P B R, formed by the reflected ray B R, with the perpendicular P. This is a simple law, but an important one, and the knowledge of it is essential in the various applications of mirrors and other reflecting surfaces.

When rays of light in their passage impinge, or are incident upon, and enter a transparent medium or material of a different density, their course becomes altered, and the line of their direction broken, whence they are said to be refracted. If the medium they enter is denser than that through which they were at first passing, they will be refracted towards a line perpendicular to the surface, or, as it is expressed, refracted towards the perpendicular. (This was shown by a diagram.)

Light is not simple, but compound, and when a ray is passed through a prism it is divided into the primary colours of the spectrum, viz., *violet*, *indigo*, *blue*, *green*, *yellow*, *orange*, and *red*—the red, or visual rays, being the least refrangible, and the blue ones at the other extreme of the spectrum having the greatest refrangibility. This was shown upon the screen by a diagram, and afterwards by projecting rays through a prism by means of the limelight, when the brilliant rainbow colours of the spectrum appeared upon the screen. By interposing a double convex lens in the path of the ray, the colours were re-converted into white light.

The lecturer then explained that lenses were of two kinds, viz., positive—convergent or magnifying lenses—and negative—divergent or diminishing lenses—the one enlarging and the other diminishing the image of an object seen through it.

The principal forms were illustrated by diagrams, and described as convex, plano-convex, and concavo-convex, or meniscus positive lenses, and double concave, plano-concave, and divergent meniscus negative lenses.

In all lenses having the properties of prisms, spherical and chromatic aberration are inherent in them, and means were adopted in former times to correct these errors by altering the forms of the lenses so as to diminish the aberration, and by the use of diaphragms to compel the rays of light to pass through the centre of the lens, and thus improve the definition—this method, however, being very imperfect, and attended with great loss of light.

Spherical and chromatic aberration were then briefly explained, and diagrams projected upon the screen showing the various forms of achromatic lenses, constructed of two or more compound lenses made of crown and flint glass respectively, each kind of glass having a different density and refractive index, and the curves being so arranged that the negative aberration of the one counteracted the positive aberration of the other.

This was followed by a description of the achromatic view lens, the Petzval portrait lens, and the more modern doublets, rectilinear, and other lenses used in photography, also of the position and uses of stops to correct distortion, flatten the field, and regulate the sharpness of the image and the time of exposure required.

In conclusion, a series of instantaneous and other photographs were exhibited, taken under varying conditions as to exposure, light, lenses, and stops.

Chloride of Silver in a Vacuum.—Dr. T. L. Phipson writes to the *Moniteur* that a long time ago he showed the necessity for the presence of a *third body* in order to determine the chemical action between two other bodies. This third body completes the electric chain, as in the Volta pile, as may be proved with the aid of the galvanometer. Since then a number of scientists have reverted to the subject; but his theory, which was a development, strengthened by new experiments, of that proposed by Dobereiner, professor at the University of Jena, is still, he says, the only one by means of which it is possible to explain these curious phenomena. Quite recently the question has been again taken up on what takes place when the chloride of silver in a vacuum is exposed to the light. Under these circumstances this silver salt not only does not blacken, but it remains perfectly white for years, provided the vacuum be sufficiently perfect. A certain quantity of humidity is necessary to form a reaction. In the very cold weather, when the water in the atmosphere is reduced to the condition of ice—that is to say, solid—photographic impression is much slower than when the weather is warm and damp.

Reproducing Distant Images.—Mr. Edison is in Paris, and Mr. Edison has been "interviewed." Asked about his invention for seeing at a distance, he said—or rather is reported to have said—"I am, and have been, at work at an invention which will enable a man at Wall Street not only to telephone to a friend near the Central Park, say, but to actually see that friend while speaking to him. That would be a practical and useful invention, and I see no reason why it may not soon become a reality. One of the first things I shall do on my return to America will be to establish such an apparatus between my laboratory and the phonograph works. I have already had satisfactory results in reproducing images at that distance, which is only about 1,000 ft. Of course, it is ridiculous to talk about seeing between New York and Paris. The rotundity of the earth, if nothing else, would render that impossible." Mr. Edison does not pose as a savant, it seems. "Men of that sort are a great success at explaining in learned language what other men have done; but it is the simple fact that all their formulated knowledge put together has never given the world more than two or three inventions of any value. Then about inventions in general. I'll give you my idea. It is easy enough to invent wonderful things, and set newspapers talking, but the trouble comes when you try to perfect inventions so as to give them a commercial value.—*English Mechanic.*

* An abstract of a paper read at the ordinary meeting of the Birmingham Photographic Society.

LENSES FOR HAND OR DETECTIVE CAMERAS.*

BY J. TRAILL TAYLOR.

A HAND camera implies the extreme of rapidity in its action, as, unlike others, it is held in the hand during exposure instead of being supported on a stand.

To this end the lens must possess certain characteristics—a large angular aperture to ensure luminous intensity, and conjoined therewith a form by which the illumination will, as far as possible, be evenly distributed over the area of the plate. But a large aperture, while securing intensity and consequent rapidity, is unfavourable to other requisites, such as depth of definition, and must therefore be subject to limitation.

The acme of rapidity will be found in a portrait combination, but there are two objections to its employment in outdoor or landscape work. Its components being placed one at each end of a rather long tube, the illumination, great in the centre, necessarily falls off rapidly towards the margin; and when to obviate this defect a stop is inserted, then not only is the special advantage of employing such a lens lost, but a positive evil, a flare spot in the centre of the plates, is also imported, which becomes of an increasingly pronounced nature the more the aperture in the stop is reduced.

Still, this lens is invaluable for operations which are conducted in a weak light, or when the scene or subject is not spread over an extended area, but is confined mainly to the centre of the plate. With a lens of this class the shutter must be driven with great rapidity, for as its angular aperture is, say, *f*-4, its intensity exceeds by four times that of the popular lenses which work at *f*-8, or squaring these apertures, as 16 to 64.

When employed with full aperture, its great light-transmitting power renders the portrait combination invaluable for many purposes. There is one use in particular to which it may be applied when fitted to a hand-camera. In many of the narrow and dark courts and alleys of cities such as London, scenes of life, in no place else obtainable, are to be found at almost every door. Here, inversely speaking, the very aristocracy of low life and squalor are to be found rampant. But scenes such as these defy the best efforts of the ordinary detective camera, for, owing to the high walls and the narrowness of the courts, the light which reaches these doorways is too feeble to permit of ordinary instantaneous photography being practised with any measure of success. Here the portrait lens proves the friend in need; for as I have proved amid the purlieus of Drury Lane, which stand proudly pre-eminent over all the slums of the metropolis, there is no scene which cannot be obtained by its agency, and whereas, on an open landscape scene, only a very limited portion of the field would be sharp, here, owing to the convergance of the subject and the well-known law of conjugate focus, the field on the sensitive surface is flat, and the picture sharp up to its very margin.

Before dismissing the subject of the portrait combination as a means of securing snap shots, I would allude to the value of the invention of Piazzi Smyth, the late Astronomer-Royal for Scotland, for flattening the otherwise round field of a portrait lens when working at open aperture. It consists in inserting immediately in front of the sensitive plate a plano-convex lens of suitable curvature and dimensions, its concave surface to the front. Into the optics of its action I need not here enter, beyond saying that it prolongs the convergence of the marginal rays in so much greater ratio than the axial ones as to bring both centre and margin to a focus on the same plane, and thus solves the problem of a flat field with full aperture.

The lens which of all others is most employed in detective cameras is that introduced by Professor Steinheil, of Munich, in 1865 or 1866. It is now manufactured by every optician, and is known by a hundred different names, to each of which the prefix "rapid" is usually attached. Its component lenses are symmetrical, or nearly so, and its images are orthographic or rectilinear, or, in other words, non-distorted. Formed of two kinds of flint glass, instead of the usual flint and crown, it is aplanatic—that is, works without a stop with an aperture equalling usually one-eighth of its focus. When a larger aperture than this is employed, it is not infrequently termed a euryscope. Its superiority for landscape or group purposes over the portrait combination consists in its greater covering power with any given aperture.

It is with the smaller lenses of this class that we have mainly to do with hand cameras, and fortunately small ones are amenable to proportionately larger apertures than those of greater dimensions. I possess two paired lenses of this class, which are employed either in a binocular or one or other of my detectives, the apertures of which are *f*—5·65, the focus being six inches. The tubes of these particular lenses are unusually short, and hence the illumination is excellent, even at the margins. This leads me to speak of the effect of the length of tube in preventing equality of illumination. The longer the tube the more circumscribed will necessarily be the area of illumination, and rays transmitted obliquely through a tube are much more attenuated than central ones. An axial ray is all right, and it correctly represents the angular aperture of the lens; but in proportion to the obliquity of light from the object, so does the intensity diminish, until at length it is cut off, and total darkness results. Pictorial effect demands the equalisation of the lighting. This may be effected by the insertion of a stop, not in this case to improve the marginal definition, but to subdue or diminish the lighting in the centre.

But in all cases where a lens is mounted at opposite ends of a tube a sometimes distressing number of reflections are formed. Just take up such a lens and direct it to a gas-flame, and you will observe at least four images, and, in most cases, a fifth one, between the lens and the eye. Every such image impairs crispness, by which I mean intensity of illumination as against a contrasting blackness. The Americans have coined a name for this, which they call "cutting," whence their term that such and such a lens cuts sharp—by which they mean that it gives sharp definition of a bright something as against something adjoining which is dark. Each and every reproduction of a luminous image between the lens and the focal plane means a lowering of the brightness of the subject all over the plate by the diminution of the darkness of the shadows, and this condition prevails, no matter whether the lens is stopped closely down, or is worked at full aperture. I am not now referring to a central flare-spot, which is caused by the posterior one of these reflections, and which is easily prevented, but to the effect of these reflections over the whole surface.

It is this inevitable effect of having such a combination of lenses in a tube which led experienced opticians to speak of the superior pluck and brilliancy of the image obtained by single achromatised lenses, and this leads us to consider the application of single lenses for detective cameras. That such a lens gives brilliancy is shown in the foregoing remark. But it gives an equality of illumination surpassing that of all others of the double form, unless such doublet be considerably stopped down so as to cause the margin to be impressed by a ray equal to that by which the centre is produced. I am not here taking into consideration the diminution of the light, caused either by its transmission obliquely through a circular hole, or of its further attenuation by having, owing to its obliquity, to travel a greater distance than the central rays ere it reaches the margin of a plate, although I quite recognise these, as well as the hypothetic loss caused by the oblique incidence upon the lens itself. The single lens, when skilfully constructed, can be made to work with a large aperture—much larger, indeed, than is necessary for many subjects in bright weather.

The one fault possessed by a single lens is that of inequality in its ratio of refraction from centre to margin, producing thus an increasing compression of subject towards the sides of the picture. But in a landscape such distortion is not recognizable. What is all-important in a small photograph, especially one intended for enlarging, is sharpness. There is no negative so distorted but what, in the course of reproduction, the distortion may be eliminated. Not so, however, with those in which there is any falling off in definition. This cannot be cured. If the light permit, the distortion of a single lens may be minimised by bringing the stop nearer to the lens. There is no doubt that, as regards defining power and intensity of light, single lenses will answer quite well for hand cameras.

Another class of lens—the simple non-achromatic lens, made of one piece of glass only—is now being resuscitated for detective work. The main difference between an achromatic and non-achromatic lens in photography is this: in the former the visual and chemical foci are brought to a focus on the same plane, whereas with the latter there is usually a distance equalling a thirtieth of the focus between these foci; hence to obtain definition it is necessary, after making the image visually sharp on the ground glass, that the sensitive plate be placed, not on that focal plane, but on one a thirtieth nearer to the lens. By adopting this precaution a very excellent degree of sharpness may be obtained. For cameras in which the focus is fixed, or is effected

* Read at the Convention on Tuesday last.

by measurements and without a ground glass, there seems no reason why simple lenses may not be employed; nay, for that matter, they are employed in hand cameras, and that too somewhat extensively, as witness the Kodak, Lilliput, and other American cameras, as well as some others in this country. The simple lens can undoubtedly be made to produce extremely sharp work, capable of being several times enlarged without much falling off. Owing to its very simplicity the simple lens possesses excellence *sui generis*; there are the fewest reflections from its surfaces, and it is thin, and therefore little absorbent of light. I have used such lenses a good deal, made by past masters, such as Joseph Zentmayer, Thomas Ross, J. H. Dallmeyer, Steinheil, and Morrison, some of these constructed for tentative purposes, others commercially. While I do not recommend the employment of simple lenses on theoretical grounds, in practice they may be made to answer quite well. I here submit what may be termed the *reductio ad absurdum* of this class of non-achromatic lens, namely, the two glasses of my pince-nez stuck by sealing wax on perforated circles of wood which fit a mount. This objective, when proper allowance is made in the focussing, gives a sharp, bright picture, free from distortion, and works with a drop shutter.

CONVENTION NOTES.

The Photographic Convention began its week's work in London last Monday at St. James's Hall by the delivery of the opening address of the president, Mr. Andrew Pringle, printed in these pages to-day. The exhibition in the Hall consisted of photographs and of apparatus, of which we may have something to say next week. The stalls of the exhibitors of apparatus occupied the major portion of the ground floor of the Hall; the majority of the pictorial exhibits were in the gallery. At a general meeting on Wednesday it was resolved that next year the Convention will meet in the city of Chester. On Wednesday evening a great attraction was provided, in the shape of an exhibition by Mr. Eadweard Muybridge, of transparencies of some of his celebrated photographs of animals in motion; as he had previously exhibited them at a *conversazione* of the Royal Society, also at the Royal Institution, and elsewhere, and they have been so much described in photographic and other newspapers of late, it is not necessary to say more about them here. What with the good attendance upon this evening and the many attractions, the scene was of an animated character. Papers were read at some of the evening meetings. To-day, Friday, a down-river excursion of the Convention leaves London Bridge, Old Swan Pier, at 10.30 a.m. for Greenwich and Gravesend, and a dinner will take place at 6 p.m., at the Café Royal, Regent Street, followed by a smoking concert. On Saturday, at 11 a.m., a group photograph of the members will be taken by Mr. Friese Greene, in the Quadrangle of Burlington House, Piccadilly, and the proceedings this year will come to an end with an exhibition of slides by means of the lantern at St. James's Hall, at 8 p.m. Mr. F. A. Bridge has managed the exhibitions by means of the optical lantern, when the latter was used at the meetings.

Mr. Conrad Beck on Lenses for Detective Cameras.

Last Tuesday night, in the course of a brief discussion at the Convention meeting, Mr. Conrad Beek said that the workers with detective cameras might be divided into long-focussers and short-focussers; each method has its merits, and each has its di advantages. A short focus lens is easily focussed, or can be used with a fixed focus. He would class lenses of four inches and under as of short focus, and of six, seven, eight inches and over, as of long focus, when used for quarter-plate photographs. The smaller lenses give great depth of definition, consequently can be used with a greater aperture than others when great rapidity is required; but a short focus lens gives total destruction of the result as a picture. The long focus lens introduces the disadvantages of difficulty in focussing, and a smaller amount of depth of definition, but these difficulties can be overcome by care in focussing. Unless extreme rapidity be desired, he thought that a lens of long focus should always be used with a hand camera, and with such a lens he thought that a greater aperture than $\frac{1}{8}$ could not be employed, but no larger aperture is required for out-door work in brilliant weather, street work excepted, and in the latter case a larger aperture is desirable.

The Excursion to Windsor.

Last Tuesday a Convention excursion to Windsor Castle and town took place under the leadership of Mr. F. P. Cembrano. Although the morning was far from promising, about thirty members took part, including several ladies with cameras. The excursionists began by taking photographs inside the grounds of Windsor Castle; they next entered the building, and had permission to photograph portions of the interior to which the public are not admitted; they had, however, to contend with a bad light. They then visited St. George's Chapel and the Memorial Chapel, but took no pictures therein, having no authority so to do; moreover, under the conditions of lighting, excessively long exposures would have been necessary. At two o'clock they lunched at the "White Hart," after which they sallied forth and took views outside the precincts of the Castle, but portions of the latter came into most of the pictures. Then the light was better, and some pretty cloud effects were obtained. The whole party were back in town by 5.30 p.m., highly pleased with their day's excursion.

Dates Relating to Photographic Journalism.

In the presidential address to the Convention printed herein this week, and delivered from the coldly impartial and almost judicial locality of the chair, will be found some historical information about photographic journalism. For the information of readers in foreign countries, who may not be so well acquainted with a range of historical facts as those in this country, we now add a few dates and particulars.

The first weekly paper connected with photography issued in this country was the Photographic News, and it was published in London by Messrs. Cassell, Petter, and Galpin, under the editorship of Mr. William Crookes; afterwards, a provincial journal, not a weekly one, which had existed previously to the News, changed its name to the *British Journal of Photography*, published at Liverpool twice a month; long afterwards it opened a London office. The first number of the Photographic News, of London, appeared on September 10th, 1858, and the first number of the *British Journal of Photography*, of Liverpool, appeared January 1st, 1860. The consecutive number of to-day's issue of the News is 1616, and of the *British Journal of Photography* 1529.

The first number of *The Liverpool Photographic Journal*, "conducted," says the title page, "by some members of the Liverpool Photographic Society," was issued January 14th, 1854, and published monthly for the proprietors by Henry Greenwood. At the end of 1856 Mr. Henry Greenwood bought it, and changed its name to *The Liverpool and Manchester Photographic Journal*, published in Liverpool twice a month, and edited by Mr. William Crookes; the first number under the new title appeared January 1st, 1857. Mr. Crookes' editorship ceased May 15th in the same year. On January 1st, 1859, its name was again changed, and this time to *The Photographic Journal*, published still in Liverpool, and edited by Mr. George Shadbolt, who had succeeded Mr. Thomas Malone on March 1st, 1858. The 1859 volume contains a frontispiece which is an interesting specimen of photo-mechanical engraving, executed by Paul Pretsch's process, and representing the Undercliff near Niton, Isle of Wight. On January 1st, 1860, its name was changed to *The British Journal of Photography*, issued twice a month, and published in Liverpool; its first issue, edited by Mr. Shadbolt, bore the number 109, in continuation of the series of numbers which had appeared under other names.

The present editor of our respected contemporary, and that excellent honorary secretary, Mr. J. J. Briginshaw, founded the Photographic Convention three years ago, and are among its chief guiding powers.

THE CONVENTION VISIT TO KEW OBSERVATORY.

Yesterday the Convention visit to Kew Gardens did not come off, as strangely enough in relation to so beautiful a place, few wished to go there, so in the morning those few joined Mr. F. P. Cembrano's party, and visited places of interest in Richmond. Yesterday afternoon Mr. Cembrano's party joined that of Mr. R. L. Kidd, who conducted the visitors to Kew Observatory, where Mr. G. M. Whipple, the superintendent, was in waiting to receive them, having come up from Deal for the purpose. The visitors included Messrs. R. L. Kidd, F. P. Cembrano, J. Traill Taylor, W. Cobb, Mr. J. B. B. Wellington, Mr. Friese Greene, and others. In the Observatory the party was divided into two sections, not to overcrowd the instrument rooms ; one section was conducted over the building in one direction by Mr. Whipple, whilst the other section was taken round in the opposite direction by Mr. Baker.

Kew Observatory is nearer to Richmond than it is to Kew, and is situated in the middle of the Old Deer Park, to the west of Kew Gardens. The Observatory is devoted to physical purposes, and its isolated position, far from any carriage road or place accessible to the general public, secures the instruments it contains from vibrations due to other causes than those they are fitted up to register. In its earliest days it was the private observatory of George III., but subsequently was granted by Queen Victoria to the British Association for the Advancement of Science, and for a long course of years its superintendent was the late Dr. Balfour Stewart, than whom no man of science was ever more respected by those who knew him. Its first superintendent was the late Mr. Francis Ronalds, who was the first to propose an electric telegraph to be worked by frictional electricity acting on pith balls ; he was appointed in 1842. At the present time it is under the control of the Royal Society, and is managed by some members of that body known as the "Kew Committee," whose chief official on the premises is Mr. G. M. Whipple.

Mr. Whipple told his visitors that George III., in his later years when his mind was failing, spent much of his life at Kew Observatory, and used what is now the photographic laboratory for experiments in alchemy, in which he made what he believed to be gold and cast into money. What became of this valuable coinage Mr. Whipple did not know, but no workmen, when digging near the premises, have ever discovered a pot of sovereigns.

Thermometers and barometers are tested at Kew for a nominal fee, and this is a great convenience to men of science who have to work with accurate instruments ; indeed, when it first became known that these instruments would soon be liable to be tested at Kew, those sold in the shops began to improve perceptibly in accuracy.

The work at Kew which most concerns the readers of this journal is the self-recording by means of photography of the indications of a variety of meteorological instruments. The most remarkable of these are the magnetographs, which were made self-recording by photography by Mr. Francis Ronalds. His arrangement was afterwards improved upon at Greenwich Observatory by Dr. Brooke, and this again was improved upon at Kew by Mr. John Welsh, assisted by Mr. Beckley. Mr. Welsh was superintendent of Kew Observatory from 1852 to 1859, when he was succeeded by Dr. Balfour Stewart.

The magnetographs are in one of the lower rooms of the Observatory, which room is surrounded by a vaulted passage to protect the instruments from damp ; it is liable to but small changes of temperature, the daily variation being within 1° Fah., and the annual range within 20° Fah. There are three magnetographs. The declination magnetograph consists of a bar magnet 5·4 in. long, 0·8 in. broad, and 0·1 in. thick, suspended at its centre by a fibre of silk, which carries a small mirror. The principle, but not the actual construction, of the arrangement may be explained by aid of fig. 1, in which A is the mirror which moves with each motion of the magnet, and upon which the ray of light E A falls constantly ; H K is a cylinder which moves very slowly by means of clockwork in the direction H K, whilst the spot

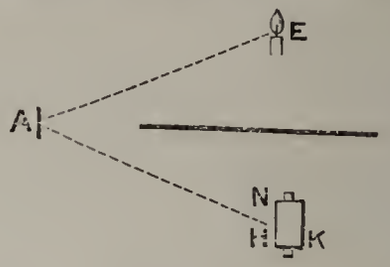


Fig. 1.

of light reflected by the mirror moves upon the cylinder between N and H with each movement of the magnet. The cylinder was in the olden time covered with photographic paper prepared by the waxed paper process ; now it is found preferable to use the gelatino-bromide paper of Messrs. Morgan and Kidd. By the arrangement just described, it is evident that when the shifting magnetic force pulls the magnet either to the right or to the left of the magnetic meridian, what with the motion of the cylinder and the motion of the spot of light, a slanting line is photographically impressed on the paper, and a succession of these lines forms a zigzag diagram, which can afterwards be measured off, and the values of the deflections ascertained.

Instead of pulling the magnet to the right or to the left, the force to be registered may pull it up or down, so another magnet, H K, fig. 2, is balanced upon a knife-edge

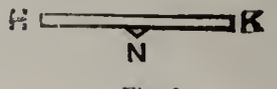


Fig. 2.

at N, and surmounted by a reflecting mirror, the motions of which are registered upon a photographic cylinder by the adoption of the principle already described. The acting force may sometimes vary or not vary in direction, but change in its intensity ; any increase or decrease of its pull is indicated by the aid of the magnet A K, fig. 3, which is suspended horizontally by means of two silk fibres attached to it at the places marked by two dots at equal distances on either side of the centre N H in the diagram. These two fine fibres tend to hold the magnet at a right angle to its normal position, so the harder it is pulled by the force, the more does it turn towards the magnetic meridian, and this pulling force is thus enabled to be photographically registered by means of a mirror and cylinder, as in the other two cases.

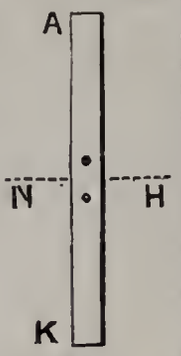


Fig. 3.

Magnetographs on the same pattern have been established from time to time in observatories in other parts of the world, and thus the influence of this mysterious force is steadily registered by photography from one year's end to another, and the results preserved for scientific examination.

The standard thermometers and barometers are also made to record their indications by photography by throwing an image upon a sheet of sensitive paper, which paper moves by clockwork at a right angle to the up and down motion of the column of mercury.

The gelatino-bromide paper gives prettier-looking diagrams than were obtained by the old waxed paper process, but they are not of more value ; in fact, by the extra sensitiveness of the former the secondary reflection from the mirrors is photographed, and had better be absent. The great advantage of the gelatino-bromide paper comes

in, in the large amouut of time saved to the assistants in the photographic operations.

The subject of the testing of photographic lenses at Kew Observatory began to be considered about a year ago, and Mr. Whipple sent in a preliminary report to the managing committee on the subject. It was found that to carry out a good system of testing, a high charge for the testing of each lens would have to be made to fully meet the requirements of photographers, and that some publicly suggested charges of a shilliug or half-a-crown would be ridiculous. Although the present charges for testing other instruments at Kew are so low, that no firm worked alone on commercial principles could do the same, au establishment having extraneous support being necessary, the public nevertheless now complain of the amounts they have to pay. If lenses were tested. a series of perhaps a dozen different delicate examinations woul l have to be made over each objective. The farther consideration of the subject has been deferred by the committee.

In his library Mr. Whipple exhibited to the visitors yesterday a curious old calotype photograph taken in the Observatory by Mr. Collen, in 1843; it was a diagram representing the intensity of atmospheric electricity. A moving metallic plate had been coated with shellac, which was pierced by sparks of electricity, which electricity was collected from the atmosphere. Chalk was then dusted over the plate to make the image visible, and by means of the camera a copy of the indications was then made by the calotype process. Mr. Whipple also exhibited some pictures of flashes of lightning, and of the stars in Cyguus. Furthermore, he exhibited some old and faded Daguerreotype portraits which have long been in the Observatory, and perhaps are the portraits of scientific men whose names cannot now be attached to their photographs. Some photographs of sun spots taken years ago at Kew with Mr. Warren De La Rue's photo-heliograph, were exhibited; this photo-heliograph is the saiue which was used in Spain iu taking some of the earliest photographs of a solar eclipse; the instrument itself is still iu use at the Observatory, and was inspected by the visitors.

Mr. W. Hugo, who has charge of both the verification and photographic departments at Kew Observatory, exhibited to the visitors the cameras with which for four or five years, up to the beginning of 1889, photographs had been takeu to ascertain the height and velocity of clouds. The instruments have been used chiefly upon the highest or cirrus clouds, as thereby most information of nse in forecasting the weather is likely to be obtained. The system was for an operator with one camera to station himself on the top of the Observatory, and another operator with auother camera to station himself about eight hundred yards off, in the park below; the shutters of the two cameras were attached to opposite ends of an insulated wire so that they could be released at the same instant by electricity. One of the operators then selected the bit of cloud to be photographed, and, having suitably adjusted his camera in azimuth and zenith distance, the other operator did the same; the plates were then exposed at the same instant, and on examination of the resulting negatives the height of the clouds could then be ascertained by parallax. The object of placing one observer higher than the other was that they should see each other well, and their method of commuuication was either by telephone or flags. To ascertaiu the velocity of clouds, photographs were taken at stated intervals, say of two miuutes. Photographs were exhibited of apparatus devised by Mr. Whipple for working out the heights and velocities of clouds.

The assistant who develops the photographic records, and attends generally to instrumental photographic work, is Mr. W. C. Gough. There are sixteen assistants altogether in Kew Observatory.

In years past, we spent much time iu Kew Observatory with our friend, the late Dr. Balfour Stewart, but since his time have visited it but at very long intervals. There has not been much change in twenty years, but some of these changes have increased cousiderably the public duties and responsibilities of this nationally valuable establishment.

Patent Intelligence.

Applications for Letters Patent.

12,727. J. T. King, 4, Claytou Square, Liverpool, "Astigmatic Eye-pieces for Optical Instruments."—August 13th.

12,860. A. Wrench, 4, South Street, Finsbury, London, "Optical Lanterns."—August 14th.

12,883. H. D. Dickinson, 13, Temple Street, Birmingham, "Cases for Photographs."—August 15th.

12,913. H. C. Newton, 6, Bream's Buildings, Chancery Lane, London, "Projecting Lanterns."—August 15th.

12,921. W. Donisthorpe and W. C. Crofts, 24, Southampton Buildings, London, "Production and Representation of Instantaneous Photographic Pictures."—August 15th.

12,922. H. B. Sharp and W. Cheffins, 6, Lord Street, Liverpool, "Magic Lantern Slides."—August 15th.

12,972. J. H. Steward, 406, Strand, London, "Optical Lanterns."—August 16th.

Specifications Published.

No. 14,948.—*October 17th*, 1888. "Improvements in Photo-printing, and in the Apparatus Employed therefor." Edwin Chambers John Devis, of the Atheuæum, Glasgow, Engineer.

My iuvention relates to the apparatus for photo-printing.

The apparatus generally employed for making copies of tracings and documents on prepared paper by the action of light consists of a glass plate set in a wooden frame, with a board pressed against it by means of crossbars with springs or wedges. To keep the prepared paper close against the tracing considerable pressure is required; the glass is, therefore, made thick, and the frame is correspondingly strong and heavy to give even support to the glass without liability to twist or warp. The whole apparatus is consequently very heavy, expensive, and cumbrous.

The primary object of my iuveution is to provide an apparatus free from all these objections, and so render the photo-printing processes of wider utility to engineers, draughtsmeu, and others. A secoudary object is to render such processes easily applicable to the copying of subjects bouud in books, such as press copies of letters and other documents.

The coutinuous and approximately uniform pressure of the tracing on the prepared paper I obtain by stretching the former over any suitable curved surface, the prepared paper being between such surface and the tracing. For instance, I take a sheet of any suitable, flexible material—such as cardboard—next to this may be placed a soft pad, such as is generally used for such purposes, though it is not required as thick as usual, next to the pad the prepared paper, and, lastly, the tracing to be copied. The latter is secured along two sides to the cardboard or other sheet, which is then slightly bent by auy convenient means, and secured in the required form. It will then be found that if the apparatus has been properly constructed, the tracing presses against the prepared paper eveuly over its whole surface, and is ready to be exposed to the light.

The flexible sheet may be curved first, and the tracing then fixed to it with a sufficient tension, or the curved surface may be permanently formed on a solid block of wood or other material, but I prefer the method first described.

In applying this method to printing from press copies contained iu books, oue edge of the cardboard or other flexible sheet is butted against the binding of the book, between the page to be copied and the next, and the outer edge of the page is secured to the outer edge of the cardboard, which is then bent and fixed as described.

The attachment of the edges of the traciug or document to those of the flexible sheet may be by means of gum or other cement, or preferably iu most cases by means of clips, to which the cords or rods are attached which secure the card in its curved form. In the latter case I design the clips so that the greater the tension in the tracing, the greater the grip of the clips holding it in place, and preventing slipping.

Correspondence.

PHOTOGRAPHING A MIRAGE.

SIR,—I have just read your note on "Photographing a Mirage," on p. 537 of your latest issue. Permit me to enclose for your inspection a print which to some extent resembles what you describe. The negative was obtained by inadvertently exposing the same plate twice. I obtained it with a Krugener's Patented Magazin-Detectiv Camera whilst travelling in Turkey in the spring of this year. Although the time of exposure was exactly the same both times, the first image is much stronger than the second. It is this peculiar circumstance which produces the effect similar to mirage. The first view taken was that of the monument of the British soldiers killed in the Crimean war; it is built in the shape of an obelisk, and forms the most conspicuous object in the world-famed English churchyard at Skutari. The second view is that of the Validé Mosque, seen from the Bosporus; I took it whilst running up to Therapia in a steam launch. I hope that this little photographic amateur experience of mine may be of some interest to you. OTTO N. WITT,

Westend-Charlottenburg, 33, Lindenallée, August 20.

Proceedings of Societies.

CARDIFF AMATEUR PHOTOGRAPHIC ASSOCIATION.

AN ordinary meeting was held at the studio on Thursday evening, Mr. S. W. ALLEN in the chair. Mr. W. Booth was elected an ordinary member.

The HON. SEC. read a mass of correspondence relating to the forthcoming exhibition. The promises of support from some of the leading photographers of the day were gratifying to the Council.

The Society, having gained some practical and useful knowledge from their first experience last year, will make every effort to give satisfaction both to exhibitors and visitors.

THE BIRMINGHAM PHOTOGRAPHIC SOCIETY.

AN ordiuary meeting of the above Society was held in the Club Room, Colmore Row, on the 15th inst., Mr. E. H. JACQUES, V.P., in the chair.

The following excursions were announced: September 7th, Wrens' Nest; September 21st, Kenilworth.

Mr. W. GRIFFITHS offered a prize for the Stratford excursion, consisting of one of his new lantern slide cameras. This camera was exhibited and explained by the hon. sec., Mr. J. H. Pickard, showing how easily and readily lantern slides can be made by reduction; no focussing is required.

Mr. J. EDMONDS gave a paper on "Light, Lenses, and Stops" (see p. 555), illustrating the same with the lantern and diagrams, and concluded with a number of pictures on the screen.

The subject for the next meetiug is "Lantern Slide Making," by E. H. Jaques.

Talk in the Studio.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Monthly Technical Meeting, Tuesday next, August 27, at 8 p.m., at the Gallery, 5A, Pall Mall East.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.—The third summer excursion took place on Thursday to Loughborough, whence the members had a trip up the river in a steam launch, calling at various places *en route*. Ten members, including the president and vice-president, comprised the party. They sailed as far as Normanton, where the members disembarked and photographed the various places of interest in the village.

THE VELOCITY OF LIGHT IN METALS.—In an article on the "Variation with Temperature of the Velocity of Light in Metals," by A. Kundt (*Ann. Phys. Chem.*), the author describes experiments which appear to show that the velocity of light at different temperatures in a given metal is directly proportional to the electrical conductivity. He expresses his intention of continuing his investigations with more perfect prisms, and in measuring the index of refraction and the electrical conductivity for the same specimens of metal.—*The Engineer.*

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper and Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

H. H.—Thanks for letter; we shall be glad to receive your promised report.

P. W.—Mr. Warnerke described his actinometer at the January, 1880, meeting of the Photographic Society, giving full particulars and working details illustrated by sketches of the apparatus. If you have not succeeded in awakening the phosphorescence, the failure may be attributable to your not having exposed long enough. It may be doubted whether this is so good an instrument for comparing the lime light with ordinary daylight as the common form of wax-paper photometer. You have entered upon a difficult line of research, for is not the lime light itself variable within certain ranges, the lime ball or cylinder hardening and constantly shrinking under the process of heating?

A. D. H.—Replied to by post, your letter having been passed on with special instructions as requested.

PYRO.—The developer has given fairly good results in our hands, but it seems to require the admixture of a bromide restrainer. It may even be used more diluto than prescribed.

B. H. L.—A very common razor-paste is made from flour emery powder and red oxide of iron (crocus) mixed up with melted tallow and a little bergamot as scent.

C. T., Bournemouth.—Although you say the lunar rainbow was very bright and vivid, you could hardly expect to photograph it, for it is only at best reflected moonlight, and this would have little actinic intensity.

H. S., Folkestone.—See answer to "Traveller" in the NEWS of 5th July.

M. E.—John Hubbard's composition picture, "Stolen Moments," was exhibited in November 1869. You will find it in the catalogue of that year, No. 298. Mr. Rejlander's "Two Ways of Life," and Mr. Robinson's "Bringing Home the May," were much earlier.

LEX.—Cannot you offer to refer the matter in dispute to an arbitrator, whose decision you both agree to accept? This course is better than going to law at once and submitting a mass of scientific details to the decision of a judge, who, however "learned," may be incompetent to deal with them off-hand.

F. S. S.—You may get some interesting statistics and historical particulars from the late Peter Le Neve Foster's article on "Photography," published in Stanford's "British Industries Series," 1876. From this we learn that according to the census of '71, there were 4,715 persons in the United Kingdom directly engaged in the practice of photography, of whom 694 were females. There were in that year only "seven makers of photographic apparatus." The census of 1891 is likely to tell a very different tale.

A. J. B.—We fail to see any connection between the phonograph and photography. Is it your idea to copy the wax impressions by the camera, or to ink the cylinders and roll them upon a paper surface, and then copy these by photography? If the records were required to be duplicated, the electrotype process would surely give a better means of doing such a work.

AMATEUR.—The cabinets are fairly good, but a little underexposed. Portraits in the open air are seldom satisfactory; your prints show the inevitable result of too much top light.

ST. PAUL'S.—The illustrations to "Through London by Omnibus," in the *Graphic*, by Mr. Logsdail, are certainly excellent. We have no specific information as to the method by which they are produced, but imagine they are detective camera sketches enlarged and worked upon in monochrome, and then reproduced by the Meissenbach process.

W. S.—Chlorophyll, the green colouring matter of leaves and plants, is very difficult of preparation, and liable to give extremely variable results according to the mode of extraction and origin. There is room for further research into possible photo-combinations. Received: The new prospectus of Technical Classes at University College, London, where Professor G. Carey Foster, W. Ramsay, and Watson Smith undertake the departments of Physics and Chemistry.

YARMOUTH.—Pyrocatechin may, if anywhere procurable, be had of Messrs. Burgoyne, Burbidges, and Co., Coleman Street, E.C.

CAUTIOUS.—If required to be of the *same size* as the originals, we should advise you to decline the order.

THE PHOTOGRAPHIC NEWS.

VOL. XXXIII. No. 1617.—*August* 30, 1889.

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TESTING PHOTOGRAPHIC PLATES.

THE International Photographic Congress, as will be seen by an abstract of the results of its proceedings published in these pages this week, has adopted for the testing of gelatino-bromide plates the amyl-acetate lamp as the source of light, with a screen having an aperture permitting the passage of light from one-fifth of a square centimetre of the flame, placed at a distance of one metre from the plate, and allowed to act for successive intervals of five seconds. The exposures, to be exact, will no doubt have to be effected automatically by means of chronometric apparatus. By this plan, a variable source of light is avoided, and all the possible imperfections due to the employment of translucent graduated screens. For every-day use the chief objection to the new plan seems to be the length of time necessary for testing each plate, but from a scientific point of view an excellent standard method appears to have been adopted.

Probably as good results from a practical point of view might be attained by the following method :—Let A H in the accompanying cut be a sheet of Rives paper pasted upon a truly plane supporting surface, let K be a Spurge's sensitometer with its apertures of varied dimensions, and let N N be two amyl-acetate lamps ; by this arrangement less time will be lost in testing plates, and perhaps the results will be as accurate as in the former case, for Mr. Spurge, with whom the device now suggested originated, informs us that he has not found Rives paper to vary sufficiently in colour to produce appreciable error. When very exact results are required, the exposure in this case also should be automatically made with chronometric apparatus.



In addition to its own method, the Congress recognises employment for practical purposes of the time-honoured sensitometer invented by Mr. Warnerke, the only one which has yet come into general use ; but the Congress will not recognise it when employed with the phosphorescent screen, for which it recommends the substitution of the amyl-acetate lamp.

Some of the other decisions of the Congress are not likely to be so generally accepted as its conclusions about a standard light ; fortunately another International Congress will be held in Belgium next year, and at its meeting in Brussels the Congress which has just concluded its sittings will be represented by a Commission the latter has appointed, and to which it has handed books and papers. Belgium is neutral ground, and its photographers are enterprising in public work.

THE UNHAPPY PHOTOGRAPHERS OF LIMOGES.

ON the 19th of July last, a paragraph appeared in these pages entitled *The Merry Photographers of Limoges*, in which a quoted report of the Limoges Photographic Society said that the address of its president was so commercial as to be unfit for publication, after which the president, M. Varaigne, with a keen sense of humour, signed the report himself, and sent it forth to the world endorsed also with the signature of the Honorary Secretary, M. de Galard. Another explanation may be that the president has not the genius with which this action would crown him, but that the editor of the *Progrès Photographique* interlarded the official report with his own comments, leaving the two signatures still to appear at the end. Our paragraph appears to have disturbed the editorial mind, and the latest he has to say in his journal, received in London last Saturday, will now be stated, not that the affairs of the Limoges Society are of special interest outside that city, but because the utterance is one of the first public expressions we have seen of the bitterness of the amateur-professional controversy being prevalent among a small section of photographers in France, as at home.

The editor sets forth that in the same issue he prints the official report of the Photographic Society of Limoges, but is obliged to state, with the most lively regret, that, like all the others which have preceded it, it contains absolutely nothing of interest. Considering the politeness of the French, this utterance is forcible. The editor adds that his journal is the devoted organ of the Limoges Society—a Society which started so full of hope, so full of promises ; nevertheless, the *Progrès Photographique* has the "imperious duty" of explaining the reason of the scientific poverty of the Photographic Society of Limoges. This is plain speaking.

Now comes the unveiling of the sting. The *Progrès Photographique* adds that briefly the explanation is very simple. Always occupied with purely commercial questions, the council of this society of *photographic amateurs*—the italics of the last two words are put in by it sarcastically—leaves photography on one side to form a syndicate of amateurs intended to make war upon the vendors of photographic goods, and so long as it continues in this course, it will never, no never, achieve its original object, but is in advance stricken with sterility. We say very loudly, adds the *Progrès*, that the Society of Limoges, which claims to be artistic, is engaged in a bad business which it ought to quit in all haste ; it is for the Society a question of "To be, or not to be," a question whether it will let the tradesmen go on with their business tranquilly, and shun subjects with which it has no concern. After this strong language, the *Progrès*, in conclusion, gently pats the Society on the back to revive its drooping spirits, by saying that if it intends to remain faithful to its mission it will stick to photo-

graphy, and nothing but photography; its doings will then be fruitful, and result in prosperity; its future will be assured.

Having detected the offenders in the act, and pointed out two alternatives, the patronising journal thus gives good advice as to the future, and, after all, is mercifully disposed to let off the Society gently. All this is somewhat analogous to a story once told us by Grossmith the elder, the father of the present Mr. George Grossmith. The story was to the following effect:—Once upon a time a man stole a fish, and slipped it into his trousers pocket, but the tail projected and caught the eye of the fishmonger, who, like Dr. Samuel Houghton, of Dublin, was both a humorist and a mathematician, which two accomplishments are rarely found together; so he said to the man, "My friend, the next time you want a dinner, either wear a longer pocket or steal a shorter fish." He was so pleased with his own explanation of the bearing of comparative dimensions that he let off the thief.

UNIVERSAL EXHIBITION OF 1889.

Abstract of the Resolutions of the International Photographic Congress.*

In relation to the various questions submitted to it, the Congress has, to briefly state the case, adopted the following resolutions:—

First Question.—Unit of light, and practical standard for photographic use.

The Congress has adopted as the unit the light given by incandescent platinum, as adopted already by physicists, and known as the Violle unit.

As the practical standard, which will be compared later on with the unit, it has adopted the amyl-acetate lamp, with a screen pierced with an aperture permitting only the use of the most luminous part of the flame.

Sub-Question A.—Appreciation of luminous intensity in photographic operations.

The Congress has decided that the luminous intensity of the objects to be photographed shall be determined by means of photographic apparatus analagous to the portable photometer proposed by M. Mascart for the measurement of illumination. It has appointed a committee to additionally study this subject.

Sub-Question B.—Determination of the sensitiveness of photographic plates.

The Congress has adopted the method proposed by M. Janssen, which consists in determining the time necessary to produce, after direct exposure of a plate to a typical light, under determined conditions and after suitable development, a grey tint of a determined depth. It has indicated a method of constructing, to facilitate measurements, a scale of tints varying from a normal grey tint easy to obtain. For gelatino-bromide plates the typical light will be the amyl-acetate lamp, reduced to a surface of emission of one-fifth of a square centimetre, placed at a distance of one metre, and exposed at successive intervals of five seconds. In addition, because of facility in employment, the Congress recognises the Warnerke sensitometer as capable of rendering useful service, in conjunction always with the amyl-acetate lamp, and not with its phosphorescent tablet.

Second Question.—Method of measuring the focal length of objectives.

The Congress has decided to take the measure of the focal length of the objectives for the nodal point of emergence, and to demand that this point and the principal focal length shall be marked on the mounts of the objectives. It has indicated three methods of measurement for the determination of these elements, to be used according to the degree of precision it is desired to attain.

Third Question.—Indication of the photometric effect of the diaphragms of objectives.

The Congress has adopted, as a normal diaphragm corresponding to the unit of exposure, the diaphragm which admits light by an aperture equal to one-tenth of the principal focal length. It recommends that diaphragms shall be selected in such a way as to make the variations of exposure in simple relations, starting with this unit, and that they shall be marked with numbers giving these relations.

Fourth Question.—Measuring the time of the admission of light regulated by photographic shutters.

The Congress has decided that photographic shutters shall be marked with an indication of their *total duration of action* expressed in seconds and decimal fractions thereof, and with that of their *rendering* expressed by their relation to their duration action to that of an ideal shutter, with instantaneous movements, admitting the same amount of light. These items of information to be given in relation to the largest diaphragm it is possible to use with the shutter, and in relation to the principal degrees of regulation which it bears in reference to rapidity of action, or at all events in relation to the regulated extremes.

Fifth Question.—Means of attachment to the stands, also of the attachment of lenses to cameras.

The Congress has adopted, for the fixing of cameras on their stands, the screw of the Whitworth system, which forms No. 1 of the screws already adopted by the English Photographic Society in the construction of photographic apparatus—a screw 9·5 millimetres in diameter. To attach lenses to cameras it has adopted a normal series of threads for the mounts, and a corresponding series of flanges. It has finally recommended, for existing apparatus, the employment of a system of adaptation indicated by M. Molteni.

Sixth Question.—The sizes of photographic plates.

The Congress has accepted as the normal international plate, one measuring 18 by 24 centimetres, and for other plates the sizes obtained by doubling successively both these dimensions, or dividing them by two. It recommends that dark slides shall be constructed to receive plates of the exact dimensions stated. It has also fixed upon 8·5 by 10 centimetres as the size of plates for projections.

Seventh Question.—Unity of expression in photographic formulæ.

The Congress recommends the employment of units of the metrical system in the stating of quantities and dimensions, and the employment of the true names and exact notations of chemical nomenclature for the indication of chemical products.

Eighth Question.—Names of photographic processes.

The Congress has fixed the basis of a nomenclature permitting the naming of photographic operations and processes, whether for the ordinary production of prints, or for photo-mechanical work, tending to abolish some of the vicious terms which have been introduced in practice. It has equally given rules for the formation of words designating the diverse applications of photography.

Ninth Question.—Custom House formalities relating to the passing of sensitive preparations.

The Congress suggests that the custom houses of different countries shall make the necessary arrangements for opening in dark rooms only, packages containing sensitive preparations. It has adopted a special mark—a red sun on a black ground—with an inscription in two languages, to denote the contents as sensitive plates.

Tenth Question.—Protection of artistic property in photographic work.

The Congress has expressed the opinion that photographs should be protected by the same laws as those which apply to artistic property. It has stated the points which it recommends should furnish the basis of legislation, namely:—Distinction to be established between the proprietary right in a negative and the right to use the

* This official abstract has been forwarded to us by the Photographic Society of France, and by M. Leon Vidal.

negative. In default of a special agreement, the negative shall belong to the photographer who took it, but not the right of reproduction from the negative without the consent of the sitter.

General Arrangements.—The Congress proposes to unite with a new International Congress to be held in Brussels in 1890, and has nominated a committee to make the necessary arrangements. It has handed to this committee various papers and propositions which have been made to it. Finally, it has adopted a special mark—sun, with monogram—to distinguish all apparatus which shall be made in conformity with the decisions of the International Congress of Photography.

ORTHOCHROMATIC PHOTOGRAPHY WITH GELATINE PLATES.*

BY C. H. BOTHAMLEY,, F.I.C., F.C.S.

To address the Convention again on orthochromatic photography presents some little difficulty, because on the one hand there are many in my audience who are well acquainted with the subject, whilst on the other hand there are some to whom it is not so familiar, and possibly even some to whom orthochromatic photography is only a name. I take it, however, that at this jubilee meeting of photographers, it is desirable that the papers should, as far as possible, represent the present position of our knowledge, and I will therefore venture to recapitulate the main points that are already established.

Ordinary gelatine plates fail to represent coloured objects with their proper degrees of relative brightness, or, as artists say, with true "values," because the plates are most sensitive to blue and violet rays, much less sensitive to green, and very slightly sensitive to yellow, orange, and red; whilst the human eye is most sensitive to yellow, somewhat less sensitive to green and orange, still less sensitive to red, and least sensitive of all to blue and violet. The rays which produce the greatest effect on a photographic plate are those which produce the least effect on the eye, and *vice versa*. As a necesary consequence, blue and violet objects are, in a photograph, much too bright, whilst green, yellow, orange, and red objects are much too dark. It follows that all photographs on ordiuary plates of flowers, fruit, paintings, and similar objects, are unsatisfactory; in landscape work the foliage is much too dark, and has lost much of its roundness, water reflecting the light from the sky is much too bright, and a slight blue haze, almost imperceptible to the eye, is sufficient to blot out all the delicate details of the distance, on which the beauty of a view so often depends. In portraiture the flesh tints are much too heavy, and any freckles or similar defects become glaringly prominent.

To some extent these defects may be removed by interposing somewhere between the object and the plate a transparent yellow screen, which absorbs and cuts off the greater part of the blue and violet rays, and gives the green, yellow, and orange rays time to act without any accompanying reversal. True values, however, can never be obtained in this way, because ordinary plates are always more sensitive to green than to yellow, and, moreover, the total sensitiveness to green, yellow, and orange is so small, that under these conditions the exposure required is several hundred times the ordinary exposure. The negatives, too, are usually very deficient in vigour.

Vogel found in 1873 that, by treating plates with certain colouring matters, and especially with certain coal-tar dyes, they can be made sensitive to the green, yellow, orange, and red, or, as we may term them collectively, the less refrangible rays. The value of eosin for this purpose was first pointed out by Waterhouse in 1876, and Tailfer in 1882 was the first to obtain useful results with gelatine plates, an end which he achieved by the simultaneous application of eosin and an alkali.

Subsequent experiments, and especially those of Eder, have shown that the only dyes of practical value are cyanin and the dyes of the eosin group. These may either be added to the emulsion, or applied to ordinary plates in the form of a bath. In the first case the dye is either added to the materials before emulsifying, or to the melted emulsion before coating. According to Tailfer's specification, it is necessary to add ammonia or some other alkali at the same time. In the second case the plates are immersed for a short time in a dilute aqueous or alcoholic solution of the dye, either with or without a certain quantity of ammonia. Sometimes the plate is immersed in a preliminary bath of very dilute ammonia, and sometimes it is washed after treatment with the dye solution, but neither of these courses is essential. A special modification of the bath method of sensitising has been described by Ives, and will be referred to again later on.

My previous communications have dealt mainly with the comparative values of the various dyes of the eosin group, which is a somewhat large group; the efficiency of these and of cyanin so far as regards obtaining true "values," and the relative methods of sensitising in the emulsion or by means of a bath. I also exhibited the results of a number of experiments made with a view to ascertain the value of the methods from a practical photographic point of view. Stated as briefly as possible, the general conclusions arrived at were as follows:—For all classes of work orthochromatic methods have considerable, and often very great, advantages over the ordinary method. This, in fact, is generally recognised, and these methods are now widely and largely applied in the reproduction of paintings, in micro-photography, and in all kinds of work in which coloured objects are dealt with. In landscape work their application is not so general, at any rate in this country, mainly, I believe, because the methods of working required to obtain satisfactory results are not yet generally known and diffused amongst photographers. Orthochromatic methods do certainly require more thought and skill than the ordinary method, and cannot be worked successfully in an unthinking and mechanical way. In the second place, I take it as established that, although plates sensitised by means of a bath are somewhat, though not very much, inferior in keeping qualities to those sensitised in the emulsion, they have a much higher sensitiveness to the less refrangible rays. The testimony from many sources in favour of this conclusion is, in fact, overwhelming. Further, erythrosin, applied with ammonia, gives the highest sensitiveness at present obtainable, but the relative sensitiveness to green is too high, and the values obtained are not quite correct; erythrosin without ammonia gives less sensitiveness but somewhat truer values; rose Bengal with ammonia gives better values than can be obtained with any other single sensitiser, though the degree of sensitiveness is lower than with ammoniacal erythrosin; cyanin is the only dye of practical value as a sensitiser for orange and red, and should be used in conjunction with erythrosin, or, better, rose Bengal, for all objects in which orange and red are at all prominent or important. One of the most important results which I obtained early in my experiments was the fact that a very considerable degree of sensitiveness can be obtained with a bath of erythrosin or rose Bengal containing no alkali at all; with the first dye, in fact, applied simply in aqueous solution, the sensitiveness to the less refrangible rays is as great as that of the commercial isochromatic plates, which are prepared, according to Tailfer's specification, by adding the dye and ammonia to the materials before emulsifying. I understand that Mr. Bedford obtained a similar result when sensitising in the emulsion. Another interesting result was that, contrary to the statements of some experimenters, I obtained the same sensitiveness with an ammoniacal solution of ordinary erythrosin as with a solution of silver erythrosin. This conclusion has been amply confirmed by the later and more extensive experiments of Professor Zettnow, published in *Phot. Correspondenz* in the early part of this year.

Lastly, with all methods of sensitising at present known, the relative sensitiveness to blue and violet remains much too great, and correct values can only be obtained by using a transparent yellow screen to absorb and cut off the greater part of the blue and violet rays.

The bath processes having proved to be the most efficient, it seemed desirable to investigate the various modifications which have been proposed, with a view to determine the best method of working. It was already known that the best degree of concentration of the bath depends on the nature of the dye to be used; that a bath too concentrated gives less sensitiveness; and that considerably greater sensitiveness can be obtained when an ammoniacal bath is used than with a simple aqueous solution. It was customary to treat the plates with a preliminary bath of plain ammonia of one or two per cent. It is stated in the Tailfer specification that it is better to add alcohol to the bath, and that the plates should be washed after treatment. The English exploiter of this patent has indeed repeatedly asserted that this last part of the process is quite indispensable. Three points, then, require *quantitative* investigation: viz., the necessity for or advantage of a preliminary bath; the influence of alcohol

* Read at the Photographic Convention.

in the bath; the necessity for or advantage of washing after treatment with the dye.

The methods of measurement were the same as I described last year. The prepared plates were exposed for ten seconds to the light of the amyl acetate lamp at a distance of one metre, the plate being in contact with a Warnerke sensitometer screen, immediately in front of which was a tank two centimetres across, containing a one per cent. solution of picric acid, which cut off all the rays more refrangible than the Fraunhofer line *b*. The plates were all developed together in the same dish, for three minutes, with a developer containing in each fluid ounce two grains of pyro, one grain of ammonium bromide, and four minims of liquor ammonia, ·880. The details of the experiments are given in the following table. The plates used were Edwards's Instantaneous, and Wratten and Wainwright's Ordinary. The dye was erythrosin, and with Edwards's plates, the bath contained one per cent. of ammonia, and with Wratten's plates two per cent. No preliminary bath was used, and the time of immersion was two minutes.

Dye.	Alcohol.	After-treatment.	Sensitometer. Edwards.	Wratten.
1 : 10000 ...	None. ...	Not washed. ...	22	15
1 : 10000 ...	5 per cent. ...	Not washed. ...	22	14
1 : 10000 ...	5 per cent. ...	Washed. ...	22	13
1 : 10000 ...	10 per cent. ...	Washed. ...	22	13
1 : 10000 ...	25 per cent. ...	Washed. ...	22	12
1 : 5000 ...	5 per cent. ...	Not washed. ...	25	13
1 : 5000 ...	5 per cent. ...	Washed. ...	25	13
1 : 5000 ...	10 per cent. ...	Washed. ...	25	13
1 : 5000 ...	25 per cent. ...	Washed. ...	23	12
1 : 2000 ...	5 per cent. ...	Washed. ...	25	15
1 : 2000 ...	10 per cent. ...	Washed. ...	25	14
1 : 2000 ...	25 per cent. ...	Washed. ...	24	13

A second set of experiments, with special reference to the preliminary bath, was made with Edwards's plates and Paget Prize Plates XXX.

Dye.	Preliminary Bath.	After-treatment.	Sensitometer. Edwards.	Paget.
1 : 10000 ...	None. ...	Not washed. ...	25-22	15-15
1 : 10000 ...	1 p. c. ammonia.	Not washed. ...	23-22	15-15
1 : 10000 ...	None. ...	Washed. ...	23	15
1 : 10000 ...	1 p. c. ammonia.	Washed. ...	22	15
1 : 5000 ...	None. ...	Not washed. ...	22-25	15
1 : 5000 ...	1 p. c. ammonia.	Not washed. ...	25-24	15-15
1 : 5000 ...	None. ...	Washed. ...	25	15
1 : 5000 ...	1 p. c. ammonia.	Washed. ...	22	15

Both sets of experiments were of course made in duplicate. The slight deviations are due to the difficulty of accurately measuring the exposures with the amyl acetate lamp in its original form. Where two numbers are given, the first was obtained with good commercial erythrosin, and the second with specially purified erythrosin.

The conclusions to be drawn from these results are:—(1). Alcohol up to ten per cent. has no influence whatever, and may be dispensed with in all cases where the dye is soluble in water: alcohol in larger proportion produces a distinct decrease in sensitiveness. (2). With a concentration of the dye up to 1 : 5000 the washing after immersion is quite unnecessary. (3) The preliminary bath may be omitted. It is further to be noticed that nothing is gained, at any rate with these three brands of plates, by increasing the concentration of the bath from 1 in 10000 to 1 in 5000. I believe, however, that with plates which have been prepared with hard gelatine, or which have been treated with chrome alum, it is advisable to use the stronger bath, or to increase the time of immersion.

Ives's method consists in flooding the plate with an alcoholic solution of the dye (containing one grain in four ounces), allowing the alcohol to evaporate, and then washing with water. It was not easy to see why this method should give better results than simply immersing the plate in an aqueous solution of the dye. Photometric experiments confirm this supposition. They also confirm Ives's statement that if the plate is treated with the strong alcoholic solution and not washed, no sensitiveness to the less refrangible rays is obtained, doubtless because the alcoholic solution does not really penetrate the film. I was unable to get satisfactory results with cyanin in this way. I observed also that some films showed a great tendency to leave the glass altogether, a result due to the contractile influence of the alcohol. It is not improbable that the results will vary considerably with different specimens of gelatine.

Abney's method of sensitising by means of a collodion or varnish film has completely failed in my hands.

It appears, then, that the best results are obtained in the simplest way. Dust the plate, immerse it for two or three minutes in a solution containing—

Dye solution (1 : 1000)	... 1-2 parts
Ammonia (ten per cent.)	... 1 part*
Water	... 8 parts

Allow the plate to drain for some time, place the lower edge on blotting-paper in order to take off the ridge of liquid which collects there, and dry in the dark in a pure atmosphere. Develop in ruby light with a developer containing about two grains of sodium or potassium meta-sulphite per ounce, in order to keep the liquid clear and thus enable the process to be more readily watched. As a rule, density is obtained more easily than with ordinary plates, and it is not necessary, and often not desirable, to have more than one grain of pyro in each fluid ounce.

Turning now to the question of the use of orthochromatic methods for landscape work, I think I may say that the results exhibited at Birmingham last year were accepted as showing that these methods have considerable advantages over the ordinary method, the improvement being most noticeable in the rendering of foliage, water, and distance. (*Four sets of results obtained in spring, summer, and autumn, were exhibited in the form of lantern slides*). I have since endeavoured to compare the various kinds of orthochromatic plates from this point of view, the comparison including:—(1). Ordinary plates. (2). Edwards's isochromatic plates, used without a screen. (3). Obernetter-Vogel silver erythrosin plates, used without a screen. (4). Plates treated with an ammoniacal bath of erythrosin, and used with a pale yellow screen.

It seems necessary to point out once more that the whole value of comparisons of this kind depends entirely upon whether the experiments have been made fairly and without bias. I do not hesitate to say that many of the so-called comparative results which are exhibited are not fair. In very many cases, for example, the results shown as having been obtained with ordinary plates are very much inferior to the results which might have been obtained if the plates had been properly managed. In all cases the quality of the values obtained depends very largely upon exposure and development, a fact which is by no means sufficiently recognised. Many of the bad, nay, the wretched, results, so far as regards values, which are commonly exhibited, are due to insufficient exposure. If I have not been fair myself in the experiments which I bring before you, it is from want of ability and not from intention. I am an investigator and not an advocate. We have certainly not yet reached finality in orthochromatic processes, but a knowledge of the relative merits of the methods which we do already possess has considerable practical value.

In the first place, I have made a number of comparative exposures with Edwards's isochromatic plates and ordinary plates, both being used without any screen. The ordinary plates were Thomas's thickly-coated landscape, Wratten and Wainwright's Ordinary. (*The subjects exhibited were Worcester Cathedral from across the river; Kirkstall Abbey; a view from Bolton Abbey, with distance and foliage; and a group with foliage*). The differences are comparatively slight. As a rule, I do not think they are greater than might result from different exposure and development of the same plate. There is, at any rate, nothing approaching the striking differences observed when a yellow screen is used. In the case of the group, the isochromatic plate has a distinct advantage; but this was done rather late in the evening, when nature herself had provided a yellow screen in the shape of the water vapour and minute dust particles through which the rays of the setting sun have to pass. Many other experiments besides those shown lead to exactly the same result, and I believe my experience in this respect coincides with that of many other workers.

I have also made comparative experiments with ordinary plates (Paget Prize Plates XXX and Wratten's Ordinary) and the Obernetter-Vogel silver erythrosin plates. Here I have found a distinctly greater difference. (*Subjects shown: Knaresboro', foliage, water, and distance; Bolton Woods, ditto; War-*

* I believe I ought to point out that the use of an eosin dye with ammonia in this way is covered by Tailfer's patent. The ammonia may be left out if erythrosin or rose Bengal is used, but five or six times the exposure will be required.

wick, foliage, and water.) There is, as a rule, a distinct improvement over the ordinary plate in the rendering of foliage, water, and distance, and I consider the differences greater than could arise simply from differences in manipulation. I have exposed a very considerable number of these plates, independently of comparative experiments, and an examination of the results leads to the same conclusions. The plates, however, are not particularly easy to manipulate, and some experience is required to obtain the best results. They show a decided tendency to fog with an excess of ammonia, especially if the proportion of bromide used as a restrainer is too low. I believe the best method of procedure is to put all the bromide which you intend to use into the developer at first, and then add the ammonia gradually as development proceeds. The alkaline bromide at once decomposes the silver erythrosin which is in the film, and thus tends to prevent the fog which would otherwise result from its general reduction. At the same time, the results obtained are not equal to those obtained with a yellow screen, although, as far as my experience goes, distinctly, but not very greatly, in advance of the Edwards's isochromatic.

Some comparative experiments were made with Obernetter-Vogel plates used without a screen, and plates prepared with ammoniacal erythrosin and used with a screen. These results (some of which are exhibited) confirm the conclusion already stated, namely, that so far as present methods are concerned, the best results are obtained with plates prepared with an ammoniacal bath of erythrosin, and used with a yellow screen. If, however, the Edwards's ischromatic or Obernetter-Vogel plates are used with a yellow screen, which must be somewhat deeper in the first case than in the second, the results obtained are not distinguishable from those obtained with bathed plates under the same conditions, but the exposures required are much longer.

This brings me to the question of the use and abuse of the yellow screen, a point which I believe to be, as a rule, very imperfectly understood. All gelatine orthochromatic plates prepared by methods at present known, remain relatively, with respect to the human eye, much too sensitive to blue and violet. The only method, therefore, of obtaining true values is to interpose between the object and the plate a transparent yellow screen, which absorbs and cuts off a certain proportion of the blue and violet rays, leaving the less refrangible rays with a relative degree of intensity and activity more nearly corresponding with their relative action on the eye. It is obvious that any variation in the tint or thickness of the screen will affect the proportion of blue and violet cut off, and hence will determine the relative activities of the various rays after they have passed through it. From an optical point of view it is desirable to keep the screen as thin as possible, but the depth of tint of the screen admits of very considerable variation. As the depth of tint of the screen increases, the amount of blue and violet cut off increases proportionally, and the relative action of the less refrangible rays on the plate—or, in other words, the relative brightness with which green, yellow, orange, and red objects are rendered—increases at the same time. It is obvious, therefore, that it is easy to make a screen so intense that far too large a proportion of blue and violet is cut off; blue and violet objects will then be too dark, and green, yellow, and orange objects too light. In other words, the resulting photograph will be as incorrect in one direction as the ordinary photograph is in the other. In landscape work a screen too deep in tint causes loss of atmosphere, and with erythrosin plates under these conditions the grass and all other yellowish-green objects come out much too light. This effect is well seen in the examples exhibited. For landscapes the proper tint of screen is pale lemon-yellow; for paintings and similar subjects the depth of screen required is usually greater, and is determined by circumstances. Examples were shown illustrating the bad effects of a screen too deep in tint.

The great advantage of the screen in landscape work is that it prevents the failures, or, at any rate, want of complete success, which often results from the presence of a slight blue haze. The details in the distance, which so greatly increase the beauty of many landscapes, are rendered much more satisfactorily, and the more correct values obtained produce a roundness of the foliage, a transparency in the water, and a separation of the various planes of the picture which is rarely, if ever, attained in any other way. This kind of effect is easily seen by looking at any ordinary view with the naked eye and then through a piece of yellow glass; the increased roundness of the objects and the separation of the planes is very striking.

It has been claimed as an advantage for commercial orthochromatic plates that they can be used without a screen, which of course is true, but the results obtained are not such as to lead any one to be enthusiastic about them. It seems as if an attempt were to be made to set up as the ideal of orthochromatic photography a plate which requires no screen. Given that the plate corresponded in sensitiveness with the human eye, that ideal would be realised, but we are some distance from realisation at present so far as gelatine plates are concerned. Moreover, it seems to me that the use of a screen, with the possibility of varying it to suit the work in hand or the result which it is desired to obtain, places in the hands of the artistic photographer a power which he would be unwise to cast aside. With the so-called photographer, who expects his apparatus and plates to do all the thinking for him, I am not at all concerned.

Not very long ago Colonel Waterhouse communicated to the Photographic Society of Great Britain the results of photographing the spectrum on plates treated with *rhodamin*, a comparatively new colouring matter similar to eosin in constitution. I have been able to make a few experiments with a view to ascertain its value for photographic work. The magnitude of its sensitising effect was compared with that of erythrosin in the manner already described. Ordinary rhodamin prepared by the Badische Anilin und Soda Fabrik was used, and also some of the same rhodamin which had been purified. The results obtained are given in the form of a table. No preliminary bath was used, and the plates were not washed after treatment with the dye solution.

Sensitiser.		Ammonia.	Sensitometer. Ilford Rapid.	Pall Mall Rapid.	Wratten's Ordinary.
Erythrosin	1 : 10000	1 per cent.	16	15	11
Rhodamin coml.	1 : 10000	1 per cent.	12	4	5
,, ,,	1 : 5000	1 per cent.	15	7	7
Rhodamin purif.	1 : 10000	1 per cent.	10	3	5
,, ,,	1 : 5000	1 per cent.	15	7	6

It will be seen that with one brand of plate the sensitiveness approaches that obtained with erythrosin, but with the other brands it is considerably lower.

The numbers show clearly the influence of the concentration of the dye; they show also the influence of the nature of the plate. They seem to show that the sensitiveness to the less refrangible rays obtained with rhodamin does not depend on the original sensitiveness of the plate, and that variations in the nature of the plate do not affect rhodamin in the same way as erythrosin. These and other points, however, require further investigation.

I also used plates sensitised with rhodamin to copy some paintings, and obtained results which promise well for the utility of this sensitiser. The experiments were not sufficiently numerous to justify me in bringing them before the Convention. In fact, the photometric experiments must only be taken as provisional, and are liable to correction by subsequent work. I thought, however, the Convention would be glad to have some idea as to the probable utility of this compound, and I hope to have become better acquainted with its peculiarities and capabilities before our next meeting.

Ammonia as an Antiseptic.—This is the title of an article in the *Asclepiad*, in the introduction to which the author says:—"A so-called new discovery has been announced on the Continent during the last few weeks, namely, that ammonia, the leading product of decomposition, is itself an antiseptic. The discovery is simply a practical fact which has been well known and utilised in this country for over a quarter of a century. Nearly thirty years ago I read a paper on the 'Antiseptic Properties of Ammonia,' before the Medical Society of London, which paper was afterwards published in the *Transactions* of the Society, and is well known. But I refer to the matter again, not merely to indicate priority, but also to enforce and somewhat elaborate a very important and useful series of facts—facts which to the profession of medicine are of special interest, and out of which many new advancements in medical science and art may still be elicited under the direction of future research, based upon what has already been obtained and utilised."

THE PHOTOGRAPHIC CONVENTION.

REPORT OF THE COMMITTEE UPON LENS STANDARDS.

To the President and Council.

GENTLEMEN,—Your committee, appointed at the Birmingham meeting of Convention to cousider and report upon the best means of securing uniformity in diaphragms and flanges of photographic lenses and lens mounts, have now the honour of submitting the result of their investigations to the council.

Having gone very carefully into the merits and demerits of tho metric and other systems advocated by various scientific opticians and others, your committee havo uo hesitation in gencrally recommending the adoption of such portions of the "standards" of the Photographic Socicty of Great Britain with such modifications and additions as are set forth below :—

With regard to diaphragms, we recommeud—

1st. "That the aperture of the standard-unit diaphragm should have a diamcter equal to one-fourth the equivalent focus of the lens, and be marked '1,' the approximate equivalent focal length of the lens itself being engraved ou the mount."

2nd. "That diaphragms with smaller openings should have apertures diminishing in area to the extent of one-half from the unit standard downwards, and be marked successively, 2, 4, 8, 16, 32, 64, and so on. Thcse nnmbers would indicate to the practical photographer that, if a given sensitive film requires with the unit stop an exposure of one second, the introduction of a smaller one would necessitate an exposnre of as many seconds as the numbers marked on it; in other words, each stop would require double the exposure of the preceding one.

"Should a lens not admit of a diaphragm with an aperture as large in diameter as one-fourth its focal length, nor exactly any one of the above-mentioned sizes, we still rccommend that all the apertures be madc in uniformity with the above scale, with the exception of the largest, which should be marked with the number its area requires in relation to the nnit diaphragm. In the case of a lens having a working aperture exceeding in diameter one-fourth its focal length, the diaphragms should be marked in fractions—as ·5, ·25, and so on—in uniformity with the standard apertures, according to the sizes of their relative apertures."

[We further advise that diaphragms required to be made with apertures intermediate to the staudard sizes should invariably be marked with nnmbers corresponding to the ratio of their area to the aperture of the unit diaphragm.]

Note.—The paragraph marked above cannot be endorsed by your committee.

FLANGES.

"We advise the construction of flanges with interual and external screw threads of a standard series for attachment to cameras having screw threads adapted for screws, 1½-in., 2-in., 2½-in., 3-in., in external diameter, and made with twenty-four threads to the inch.

"3½-INCH.—The 3½-inch to have twenty-four threads to the inch on the inside, and twelve threads to the inch on the outside. If larger ones are required, we recommend that they increase in size one inch in diameter from four inchcs upwards, with twelve threads to the inch, both internal and external. We also rccommend the manufacture of a series of adapters, with inner screws made to carry any existing lenses, and with outer ones corresponding to the uext or other larger size of the standard flanges above described. Hereafter, whenever practicable, the screws cut on the mounts of all newly manufactured lenses should be suited to one of the above sized standard flanges."

These "standards" are at ouco intelligible and scientific, and, from the fact of their already widespread use, both by the profession and amateurs, it may fairly be argued that they are generally popular and practical.

In addition to the recommendations of the committee of the Photographic Society, as quoted above, your committee would further suggest:

1. That besides the approximate equivaleut focus beiug engraved upou the lens mount, the exact point from which that focus is measured be distinctly marked by a linc or cross.

2. That the diaphragms bo eugraved with their proportionate areas to such equivalent focus, thus: f-4=1, or f-32=64, and so forth.

3. That wherc iris diaphragms are used, a *detent* be fitted to ensure accuracy in the apertures.

Your committe would cougratulate the Photographic Society of Great Britain upon the inception of a "uniform system." Its adoption by many of the leading photographic opticians both at home and on the Contiuent, and the insistence by most thoughtful workers to have their lenses constructed according to this system, being sufficient gnarantees of its usefulness, and a strong proof of the necessity there has been for reform in this direction.

S. G. BUCHANAN WOLLASTON,
Chairman of Committee on Lens Standards.

THE PHOTO-MECHANICAL PRINTING METHODS.*

BY THOMAS BOLAS.

LITTLE did the first makers of sun-pictures imagine that, within the short time of fifty years from the time of their work, what ono may term solid metal photographs would be running to and fro on the "coffins" of our largest aud quickest printiug machiues, and from them impressions, just in all gradations of tint, would be turned off at the rate of something like fifteen hundred an hour. Such is, however, the case at the present time, and probably there is scarcely a typographic printer in London who has not worked from the photo-tint blocks now so common.

Though phototype blocks represent in the aggregato the form in which photo-mechanical printing surfaces are most commonly met with and used, it is desirable to take a brief survey of the most important printing methods which come under the category of photo-mechanical methods, and we may begin with—

PHOTO-LITHOGRAPHY.

In the method which is most common, a sheet of paper coated with gum, albumen, or gelatine, containing bichromate of potash or ammonia, is exposed to light under a clearly defined and intense line negative, and after exposure the sensitive surface is thinly aud uniformly coated with printer's ink, or a special ink of analogous composition, but made up with less pigmeut than is contained in the usual ink. The inked paper being uow immersed in water and the surface very gently rubbed with a soft and long-haired camel's-hair brush, the iuk becomes removed from the parts where tho bichromated colloid has beeu protected from the light by the opaque parts of the negative. The bichromated colloid where acted on by light loses its power of softening in water and retains the ink; where acted on by light it softens in the water and the ink loses its hold. The image with printers's ink thus prepared is called a photo-lithographic transfer.

The following details are sufficient to enable any photographer to make a transfer in fatty ink ready for the lithographer to "put down" on the stone, and print by the ordinary lithographic method, which method need not be described here, as it is in no way photographic, and no special treatment is required in dealing with a transfer made by photography.

A sheet of plain paper is floated on a warm solution of gelatine (containing six per cent. of gelatine), and it is then hung up to dry. When dry it is insensitive to light, and it may be kept any length of time without injury. To make it seusitive to light it is soaked for a few minutes in a solution of potassium bichromate, which contains about three and a half per cent. of the salt, and it is once more hung up to dry, but this time in a dark room, or in a room illumiuated by yellow lights When dry, it is ready for exposure under the negative.

For a short time it is now left soaking in water, gently brushed on the inked surface with a wet camel's-hair brush. The ink gradually comes off, but in order to save time it is often desirable to employ a little warm water, and, at the same time, continue to use the brush. Now, the end of the matter is, that the printer's ink becomes removed from all those parts of the paper which were not exposed to the actiou of light, and an image in fatty ink is thus obtained on the gelatinised paper. From this the excess of water is now removed by means of blottiug paper, and the print, inked face downwards, is laid on a clean and slightly warm lithographic stone. The stone and paper being now passed through the press, the paper adheres firmly to it, but on moistening the paper with a sponge it becomes easily removable. When stripped off, the fatty ink is fixed on the surface of the stone, leaving a perfect but reversed image thereon. All is now ready for the lithographic printer, who gums aud etches the stone, as a preliminary to the ordinary printing process.

Instead of putting the photo-lithographic transfer dowu on a lithographic stone, it may be put down on a zinc plate, and tho

* Read at the Photographic Convention.

plate can be printed from, if treated exactly as the stone was treated.

In its usual form, photo-lithography is only adapted for the reproduction of line subjects, or subjects in extreme black and white, and various attempts have been made to render it available for the reproduction of the gradations of a negative taken from nature. By a modification of Asser's starch process it is easy to get results which are excellent renderings of half-tone as a grain or stipple. A sheet of blotting-paper is covered with ordinary flour paste, containing eight per cent. of flour. The paper having been coated, it is next smoothed with a soft badger brush, and when dry the paper is soaked in a three and a-half per cent. solution of potassium bichromate, in order to make it sensitive to light. This piece of sensitive paper being placed under a negative, and exposed to the light of burning magnesium for a few minutes, or to daylight for a longer time, soon becomes tinted with a brown colour where acted on by light, as you see. The light brown print is next soaked in cold water, in order to remove the unaltered portion of the potassium bichromate, after which it is dried and ironed with a warm flat-iron. This last operation is to harden the coating. I now put the ironed print into water, take it out, lay it on blotting-paper, and dab on printer's ink with a stiff brush. The ink adheres to those parts where the bichromated paste has been made insoluble by the action of light, and it refuses to adhere to those parts where the paste remains soluble. In this way a fatty transfer is obtained, which shows all gradations of a negative taken from nature, not, however, as a true half-tone, but as a grain or stipple well adapted for transferring to stone or zinc. As a fine image of this kind is liable to get clogged up when printed from stone, it is better to transfer it to a plate of zinc, and to make a typographic block from this by the etching method.

Phototypic Blocks.

A fatty ink transfer, similar to that which is commonly put down on a lithographic stone, can be transferred to a smooth and clean zinc plate, and the ink firmly adheres to the zinc, just as it would to the stone. A treatment with gum now protects the clear parts of the zinc plate against the adhesion of printing ink, and the application of the ink roller adds more ink to the fatty image already on the surface of the zinc plate. So far the process resembles the photo-lithographic process; but, instead of printing from the zinc plate, powdered resin is dusted over it, in order to give firmness to the fatty image. The zinc etcher next very slightly warms the plate to make the resin and ink partially blend, and then puts it into dilute nitric acid, containing one part of acid to about forty parts of water. Here it remains for about three minutes, during which time the acid dissolves away those parts of the metal which are not covered by the waterproof coating. The covered parts now stand slightly in relief, but only very little, and if we were to continue the etching without further preparation, the acid would gradually undermine the lines, and the image would be lost. Now, the undermining action of the acid can easily be prevented by washing the plate, drying it, and then heating it sufficiently to just melt the resin. Under these circumstances, the melted resin blends with the printers' ink, and runs down over the sides of the little ridges left by the etching, and protects these sides from the further action of the acid. Having done this, it is well to gum the plate once more, ink again, dry, and dust with resin before proceeding to another etching. This second etching may be done with stronger acid than the first, say one of nitric acid to thirty parts of water, and it may be continued longer, say for six or seven minutes, and when this second etching is finished, the series of operations must be repeated until sufficient depth is obtained, care being taken that the melting of the resin is only carried far enough to allow it to flow just over the sides of the relief left by the previous etching. In ordinary cases, ten etchings are enough to give the necessary depth, but in the case of important work it may be necessary to give twenty or thirty very slight etchings in order to obtain the same depth, without endangering very fine lines or details.

The process of zinc etching has been largely employed for the production of typographic blocks from fatty transfers, either drawn by hand or printed, and this phase of the process bids fair to compete successfully with the art of wood-engraving.

There are other methods of producing phototypic blocks, among which may be specially mentioned the method which is founded on the swelling of gelatine. Mr. Dallas's blocks are done by a process of this kind, but the details have not been made public. Mr. Dallas was the first to introduce phototypic blocks into the English market, and if you carefully examine some of his specimens you cannot fail to be struck by the fineness and perfection of the details.

By the following modification of the swelled gelatine process I have succeeded in overcoming many of the difficulties of the methods already published.

We start with some clear sheet gelatine, about one-thirtieth of an inch in thickness. This can be prepared by drying a layer of gelatine solution on a sheet of waxed glass, or it can be purchased from Mr. Cornelissen, of Great Queen Street. To make this gelatine sensitive to light it is soaked in three and a half per cent. solution of potassium bichromate until it becomes flaccid; it is then laid on a piece of clean glass, and the excess of solution is removed by an application of the squeegee. The plate bearing the wet gelatine is then placed in a warm and photographically dark place to dry, and when dry it can be easily separated from the glass by raising one corner with a penknife. We obtain in this way a flat sheet of sensitive gelatine, having a smooth surface, and all ready for exposure under the negative, and this exposure may last from ten to twenty minutes in sunshine, or a correspondingly longer time in the shade.

I now take the exposed film and put it into water to soak, and those parts which were protected from the light begin to swell immediately, while the exposed parts refuse to swell in the water. The soaking should last several hours, but as we cannot spare that time I will take a gelatine which has already soaked the necessary time, and make a cast from that. For this purpose I lay the wet gelatine film on a piece of glass, exposed side upwards, and squeegee it down as before—you see that it adheres to the glass quite easily—and after having made it surface-dry by dabbing with a soft cloth, a little oil is applied, and distributed over the surface. Now that the excess of oil has been removed by a soft cloth, I pour on the plaster of Paris to a thickness of about an inch, taking care to remove any air bubbles by the application of a camel's-hair brush through the liquid plaster.

This plaster will take about ten minutes to become solid, and if we violently tear the plaster and the gelatine apart, the fine details of the cast are almost sure to be damaged. But, instead of doing this, a good plan is to hold the glass plate in one hand, and gently push the plaster cast with the other. Now the gelatine slowly slides over the glass, and finally it will slide quite off, the gelatine still being adherent to the plaster. It is now merely necessary to turn up one corner of the gelatine film and slowly fold it back, so as to draw it off the plaster gently and without fear of damage, either to the gelatine relief or the plaster, just as a lithographer draws a thin paper proof from the stone. The next step is to make a cast in stearine from the plaster, and for this purpose the plaster should be soaked in rather warm water, about 50° Centigrade, and on this soaked and warm plaster a layer of stearine about an inch thick should be cast. The stearine cast is now dusted over with black lead or bronze powder, and is then put into the electrotyping bath, and when a sufficient quantity of copper has been deposited it is merely necessary to back up with type-metal and mount on a wood block, the work being then ready for the typographic press. If the process I have described is gone through with an ordinary half-tone negative, an exceedingly beautiful electrotype is obtained, in which the gradations of light and shade are represented by varying degrees of relief. These, or even plaster casts, ought, I think, to have a very good sale, if photographers would only take the matter up. The ease with which they can be made is surprising.

I may mention that, instead of taking a cast from the plaster stearine, gutta-percha may be used, a press being employed to force the plaster cast—which should be in an iron chase—into the soft gutta-percha.

The depth of the relief obtainable by the swelled gelatine process is about equal to that of an ordinary visiting card, and where large surfaces of white occur, it is necessary to deepen the plate in these parts. This may be done either by cutting out the metal from the finished plate, or in most cases more conveniently by raising the surface of the mould, let it be wax, stearine, or gutta-percha, on which the electrotypie copper is to be deposited. This is best done by holding a stick of stearine or wax in the left hand, and a warm pencil of metal in the other hand, and so holding the wax or stearine as to let a thin melted stream flow down the warm pencil. This stream is allowed to flow on those parts of the mould which require raising.

(To be continued).

Notes.

It is not surprising that Mr. Gladstone is tired of sitting to artists. Not every artist, like Sir John Millais, is contented with three sittings, and for his portrait in Mr. Lockhart's picture of the Westminster Abbey Jubilee service Mr. Gladstone begged that the formal sittings might be dispensed with, and that he might be sketched while writing his paper on the "Phœnician Affinities of Ithica." This was accordingly done, and the result is one of the most lifelike portraits which has yet been achieved. There is no doubt that the formal "sitting," whether to artist or to photographer, induces a hardness and unnaturalness which very few can avoid. Perhaps the time may come when the photographer's studio will be notable for the absence of the camera—that is to say, it will be so arranged that the camera and lens will be unseen, and that the operator, concealed, will watch his opportunity, and secure a picture when the sitter is perfectly unconscious.

Seaside photographers of what, for want of a better term, must be called the lower class, are moving with the times. They no longer call themselves portraitists, but like to be distinguished as landscape photographers. The meaning of this is that they have given up taking single pictures, cartes, vignettes, and what not in the tumble-down erections dignified by the name of studios, and now lay themselves out for the photographing of groups out of doors. Probably this change is due indirectly to the influence of amateur photography; the orthodox portrait, with its eternal chair, table, book, and flowers, has become positively odious even to those who have little pretension to a taste for art. Something a little more natural and more akin to the efforts of amateurs, in the back garden or elsewhere, is growing into form. This at least is the experience of a seaside photographer who combines a tea garden with his studio. The latter, he says, he has quite given up, because he finds making pictures of the tea parties in the garden much more popular.

A fashion paper is thankful that the automatic photographic apparatus is not capable of taking more than one portrait at a time, otherwise fond mothers with half a dozen olive branches might collect their offspring and avail themselves of the opportunity to secure a cheap pennyworth, and our railway platforms would then be in danger of being converted into amateur studios, to the decided interruption of other business. There is certainly something in this supposition, but little danger of its being realized. Even single portraits may not be expected, for it would require a degree of courage which few possess to stand motionless before an apparatus of this kind, the centre of an admiring crowd. The automatic photographic machine is a very ingenious toy, but we doubt if it has any commercial value.

The photographic beauty show announced by a paper of the "Bits" class can only be looked upon as an advertisement, and whether one lady or five hundred ladies send their photographs will not matter very much to the public. Unless it be intended to exhibit the photographs of the competitors, we are afraid that the contest will be of the most tame and uninteresting character. Still, we do not wish to discourage the promoters, for if the competition leads to an increase of business among photographers, it will not have been held in vain. This possibly may be the case, for we notice that the date for sending in the photographs has been extended, "in consequence of numerous representations made that the time allowed was barely sufficient to permit competitors getting new portraits taken."

One important point, we fancy, the promoters have lost sight of, but it may be that the omission arises through ignorance. We would therefore enquire whether they are aware of the powers of the retoucher's pencil? To be perfectly fair, the conditions should be that only untouched photographs be allowed to compete. If not, the competition will resolve itself into a contest between retouchers, because, in many cases, the retouched and beautified photograph is totally unlike the original. A photographer of reputation figures among the judges; perhaps he will be called upon to decide how much beauty is due to nature, and how much to the pencil. Certainly the matter is one not to be overlooked, because, if when the successful competitor presents herself to receive her prize, and is found not to be equal to her photograph, the judges will be placed in an awkward position.

A law-suit interesting to the enterprising amateur who delights in the detective camera will shortly be heard in the French law courts. At one of the fashionable seaside resorts a lady was going down to the sea in her bathing costume, as is the continental fashion, and just as she was about to plunge into the waves, an amateur photographer, with his camera set up on the look out for "bits," turned it upon the fair bather and took a picture. The husband, however, happened to be standing by, and seizing the photographer and the camera as well, a very lively quarrel ensued, which is destined to have its final issue before a legal tribunal.

Unquestionably it savours of an affront under certain circumstances to be photographed *nilly willy*. The photographer may plead the interests of "art" and a total absence of intention to offend, but this defence will not save him from the strong arm of the avenger, supposing the avenger be within easy reach. The act is one which is difficult to class as a legal offence. Would such a photograph be considered a libel? If so, it would be a libel of a most glaring character, since we are told "the greater the truth the greater the libel," and photography cannot lie. But the remedy for libel is a very roundabout process, and an aggrieved person is not likely to wait for the law to help him, but will most probably take the law into his own hands. Hence, if an indiscreet photographer finds the penalty he has to pay for too much enterprise is a smashed apparatus, he must not be surprised.

THE PARIS FETE OF THE JUBILEE OF PHOTOGRAPHY.

BY LEON VIDAL.

The above fête has more than fulfilled the hopes of its organisers. It consisted of a grand banquet and concert, at which Edison was present, seated at the right hand of the President, Dr. Janssen. The number of convives was about 125, and some exceedingly interesting speeches were made, notably one by the Director of Fine Arts, who gave an eloquent tribute as to the services rendered to art by the photographer.

At the International Photographic Congress among the foreigners present were M. Petersen, President of the Photographic Society of Copenhagen; M. Warnerke, of London; M. Comacho, of Portugal; M. Gylden, Director of the Astronomical Observatory of Stockholm; M. Bonf, Director of the Observatory of Rio Janeiro; M. Stanoiewich, a Servian man of science; M. Wada, of Japan; and the Prince de Molfetta, of Milan.

THE IMPERIAL PHOTOGRAPHIC INSTITUTE OF VIENNA.*

The exceedingly great importance which photography and photographic reproduction methods have acquired, both with regard to the printing industry and to artistic and scientific undertakings, led to the establishment of the Imperial and Royal Institute for Photography and the Photographic Reproduction Processes in Vienna. This institute was called into existence under the initiation of his Excellency the Minister for Worship and Instruction, Dr. Von Gautsch, with the effective co-operation of the Vienna municipality, which contributed the building, as well as undertook the service of lighting and warming the same.

His Majesty the Emperor of Austria has been pleased to display the greatest interest in the operations of this Institute, which is a public one, subsisting by the co-operation of the state, and of the municipality of Vienna. It is a central institute, immediately under the direction of the Minister for Worship and Instruction.

The opening took place on March 1st, 1888, and Dr. Joseph Maria Eder was appointed chief director; Herr J. E. Hörwarter, chief instructor in drawing; Herr V. Jasper, instructor of drawing; Herr A. Lainer, instructor of physics and chemistry; Herr H. Lenhard, instructor in photography and retouching; Herr M. Jaffé, instructor in photography and reproduction processes; Herr F. Von Reisinger, assistant instructor for pigment printing, microscopy, and photography; Herr A. Steinhauser, professor of applied mathematics; and Dr. Krauss, Court advocate, professor on questions of artistic and literary property.

At the Institute during the years 1888 and 1889 the following courses of study were pursued:—

(*a*) *Preparatory and Drawing Class.*—Fees, five florins a year. The instruction in this course took place every evening from five to eight o'clock. The instructors were Herr V. Jasper in freehand and geometrical drawing, Prof. Steinhausser in applied mathematics, and Herr A. Lainer in physics. This course was attended by sixty-eight students in winter, and fifty-three in summer, and afforded opportunities as well for studying ornamental drawing and modelling in plaster.

The pupils also studied modelling of the head, and the preparation of drawings adapted to the purpose of reproduction by zinc etching, photo-lithography, and so on.

Very active interest was shown in this course by lithographers, who constituted nearly half the pupils. Some of the drawings made by pupils of this course were used at the Institute by scholars of the second course for the production of photo-lithographs and deep etchings on zinc.

(*b*) *First Course for Photography and Reproduction Processes.*—School fees, five florins the six months. The instruction in this course was carried on in the hours of the afternoon and evening, so as to give opportunity to the assistants in studios and printing offices to attend them. The instructors were J. E. Hörwartar for drawing, and Herr A. Lainer for chemistry and photography.

This school is opened from five till eight o'clock in the evening. In addition to ornamental and figure drawing, a select number of the scholars are instructed two mornings in the week in water-colour drawing and pastel painting. Heads are painted from nature, and studies made in colour and light and shade.

All scholars must have attended the drawing school with success before being admitted to the department for positive and negative retouching, or as ordinary students in the second course of photography and reproduction processes.

In addition to photographers and retouchers, the course was attended by lithographers, engravers, and workers from printing, enamel, zinc etching, and other establishments.

The first course was attended in summer by seventy-one scholars, of whom seven were females. In the school year in 1888 and 1889, there were eighty-nine scholars, of whom ten were females.

Course for Photography and Reproduction Processes.—Fees for natives, ten florins for six months; for foreigners, forty florins.

In the second course begins the characteristic instruction of the Institute; instruction combined with practical manipulation in photography and reproduction processes which for the most part have to be carried on by daylight. The studios and printing rooms are open from eight o'clock in the morning till three o'clock in the afternoon, and practical work is going on during this time.

The instructors are in photo-chemistry and photography, the director Dr. Eder; in landscape and portrait photography as well as photographic retouching, Herr H. Lenhard; in press printing, photographic, and reproduction process, Herr M. Jaffe; in chemical knowledge combined with laboratory practice, platinum printing and lichtpaus printing, Herr A. Lainer; in pigment printing, micro-photography, and so on, Herr Von Reisinger; in questions of artistic and literary property, Dr. Kraus.

The practical application of photography and reproduction processes is so arranged that scholars in portrait and landscape photography are especially instructed in gelatine processes, whilst the negatives for press printing processes, such as collotype, photo-lithography, and photo-zincography, are principally made by the wet collodion process, and the scholars are engaged in working this on plates up to 18 by 14 inches.

Negative retouching as well as positive is taught in all its applications, both to portraiture and to photographic reproductions, including various methods of shading, and partial weakening and strengthening, as may be required.

Scholars, both technical and artistic, are instructed in the dry processes, and a set of excursions is made for practical instruction in photographing landscapes, architecture, and so on. In special cases the application of photography to medical purposes as well as to microscopy, archæology, and other scientific purposes is demonstrated to a selection of professional men—surgeons, astronomers, engineers, and others. Two persons after the course at the Institute have made journeys for scientific purposes, with photographic equipment, one to Asia Minor, and the other to the Canary Islands. A collection of their pictures is in the Exhibition attached to the Institute.

Photographing paintings, as well as difficult reproductions from ancient Egyptian tapestry, are made by orthochromatic plates, and are reproduced by collotype. Orthochromatic plates are also produced at the Institute, and are applied to the purposes of micro-photography. Especially may be mentioned the taking of bacilli enlarged 1,000 diameters, photographed by sunlight as well as by

* This description has been forwarded to us by Dr. Eder, the Director of the Institute, in the form of an advance proof of an article about to be published in Austria.—Ed.

magnesium and zirconium light, used in connection with coloured light filters. For slight enlargement Siemens' regenerative gas burner is used. The application of magnesium flashlight to photographic portraiture is practically made by the students.

Photographic printing processes are carried on with albumen paper, platinum printing—with and without development—chloride of silver collodion paper, aristo paper, and pigment printing, as well as on silver bromide paper with development; which last process is also applied to enlarging with the sciopticon. Moreover the most practical methods of lichtpaus printing are worked with the students, particularly the cyanotype process—Pellet's gum-iron process, and the aniline process, as well as the more rarely used printing processes, such, for example, as the uranium process, and Obernetter's printing process.

Pigment printing is practised as single transfer process on paper, glass, and porcelain, as well as by double transfer from paper to glass, and from paper to paper. Several experiments were also made by the pupils in making pigment pictures on metal plates in preparation for a later course of instruction in heliogravure and photogalvanography.

In the photo-mechanical processes, collotype, photolithography, and photo-zincography are employed. Collotype is used both with mat surface paper and upon enamel paper, and is employed for portraiture, landscape, architecture, the reproduction of artistic and industrial objects, oil paintings, pencil drawings, and tapestries. Several chalk drawings, which had been made by scholars in the first course of instruction at the Institute, were reproduced in collotype.

Moreover, as experiments collotypes were made from scientific objects difficult to reproduce; for example, collotypes from a twenty-eight times enlarged instantaneous picture of a ball from a gun by Dr. Mach; from an inscription on brick in the possession of Herr Hechler; geological photographs in the Alps by Dr. Wöxhner, as well as photographs taken in the scientific journeys of Count Teleky in Africa, of L. Von Höhnel in hitherto entirely unknown regions, and the like. Photo-lithography is for the most part carried on by transfer from bichromatised gelatine paper, and experimentally by substitution processes, and is principally used for line drawings and copying wood-cuts and copper-plates of large size, lace curtains copied from nature, and hieroglyphs. Photo-zincography is practised by the scholars by the transfer process from gelatine paper, as well as by direct printing on a coating of asphalt or chromo-albumen on the zinc.

In the year 1888 the second course contained thirty-seven scholars. In the school year 1888-1889, forty-one scholars were inscribed from the ages of sixteen to fifty, and forty-seven certificates were granted.

Up to May, 1889, many experiments have been undertaken by the instructors in photographic chemistry and optics, which have been published amongst the "communications from the Royal and Imperial Institute for Instruction and Research" in the *Photographische Correspondenz*. In addition about 280 written communications have been received containing technical questions, of which 160 came from Austria, 80 from Germany, 14 from Switerland, 11 from England, 7 from France, 6 from America, 4 from Russia, 2 from Grecce, and 1 each from Italy, Roumania, and Portugal.

At the close of the school year in 1889 an exhibition opened in the building of the Institute, which consisted exclusively of the works of the scholars of the Institute, photographs, press-prints, and drawings. The abundance of work done is evident from the fact that five rooms were well filled, and the exhibits number no less than 638.

Many of these were photographs taken in the studio—portraits, groups, and studies of children, as well as landscapes, and they were printed by various processes—albumen paper, bromide of silver paper, chloride of silver paper, and carbon printing; and they were very well executed. Especially interesting are the photo-mechanical processes, including collotype, taught at the Institute, which are nowhere taught in such a thorough practical way as in the Institute for Instruction and Research in Vienna.

Vienna possesses in the Imperial Institute presided over by Dr. Eder a remarkable establishment of photography, which must exercise a powerful influence in the education of photographers and printers, as well as in the development of photography itself.

DESENSITISING AND RESENSITISING ALBUMENISED PAPER.*

BY A. HADDON, M.P.S.L., *Demonstrator in Physics, Royal Naval College, Greenwich.*

I MUST at the very outset apologise for appearing before you with such a paper as I have in hand, but the fault is not mine; the responsibility rests rather with others than myself. On the 24th of July of this year I made a few remarks on this subject before the London and Provincial Photographic Association, the task having been kindly thrust on me by our worthy friend and past president, Mr. J. Traill Taylor, and on resuming my seat after the few words, I was told by him that I should be expected to read a paper before you on this same subject this evening.

The object of the few experiments I have been making is to ascertain whether it is possible to thoroughly desensitise paper which has once been made sensitive to light, and again resensitise it so as to obtain passable prints from such paper. Had I made my experiments first I should not, most probably, have chosen the title that appears at the top, because, as far as I have gone, none of the ordinary reageuts that I have employed deprive the paper entirely of its sensitiveness to light. The rate at which it prints is very much modified, and, as a rule, the slower the printing the less satisfactory the result.

The paper I employed, and which I will call normal paper, was prepared as follows:—Ordinary albumenised paper was floated for three minutes on a fifty-grain to the ounce solution of nitrate of silver. Four sheets were thus treated; after the last sheet had been floated, the solution was returned to the bottle, and the dish washed out, and then about three pints of distilled water were poured in. Each sheet was floated on this for about three minutes; this water was then poured out and replaced by a fresh three pints, and the washing by flotation repeated. The paper was after each floating thrown over some blotting-paper on a line, albumenised surface upwards. This was done on Saturday morning; in the evening, when the paper was thoroughly air-dry, each sheet was folded into four quarters and placed in a 12 by 10 printing frame.

The printing was done on Monday and Tuesday, so that the paper was kept about seventy-eight hours between the sensitising and toning.

The first thing to ascertain was what kind of print could be obtained from this my normal paper. It printed but slowly, and the finished result is not very satisfactory.

In most cases I have printed from two negatives paper treated in identically the same manner. One of these negatives takes twice as long to print as the other.

My next experiment was to try the effect of fuming, *i.e.*, of subjecting the normal paper to the influence of ammonia gas, either previous to or during the printing. Two pieces of paper were placed in a box containing ammonia in a saucer, and left there for about twenty minutes, and then printed; the results yielded in this case are far in advance of the normal paper. In order to fume the paper during the printing I took a whole sheet of blotting-paper and folded it so that it was of eight thicknesses, then, having unfolded it, placed it in the fuming box for about a quarter of an hour; at the end of that time it was again folded, and at once placed in contact with the back of the normal paper, which had already been adjusted on the negative. The result in this case is intermediate between the non-fumed and the fumed. In order to prevent the too rapid escape of the ammonia from the fumed blotting-paper or pad, a piece of paraffined paper was placed between it and the back.

Finding that the simple washing of the paper had only partly desensitised it, I was curious to ascertain what would happen if the whole of the pure nitrate of silver were removed from the paper before printing. In order to effect this, I washed the

* Read at the Photographic Convention.

normal paper in three changes of water for about four or five minutes each, and then immersed the paper in a dilute solution of chloride of sodium—common salt. It was again washed in a couple of changes of water, and then dried. The print obtained in this way was very poor indeed, in fact, the most unsatisfactory of all. I then fumed the other piece that had been thus treated, and though it gave a better print, the result is far from satisfactory.

Citrate of soda has frequently been recommended as a preservative when applied to the back of sensitive paper, but, as far as I am aware, no one has shown what its influence is on the quality of the resulting print, or on the time required to produce a sufficiently deep impression. I therefore treated some of my normal paper with a ten per cent. solution of neutral citrate of soda back and front; and in order to find out how such paper would print fumed and unfumed, instead of printing two separate pieces under each negative, I covered one half of the paper when placed on the negative with paraffined paper, and then I placed on the whole pads of blotting-paper, which had been fumed. The portion subjected to the action of the ammonia gave a slightly better image, but the difference was not so great as I expected. A better result would most probably have been obtained had the paper been actually fumed instead of the pads. It was in consequence of this result that I thought it would be better in future to fume the paper before printing, instead of doing it during the operation. The time required to produce a sufficiently dark print was much longer than with normal fumed paper.

At our last meeting in Birmingham, a paper was read on behalf of Mr. Watmough Webster, on the preservation of sensitised paper by means of paper impregnated with dry carbonate of soda, and I thought it might be useful to ascertain the effect of this salt, when actually in the paper, before and during printing. The results I have obtained on paper treated to a ten per cent. solution of the salts are not very good; the prints are what one usually calls *mealy*, and I noticed that those pieces whose backs were floated on this salt became very absorbent, resembling very much certain brands of ready sensitised paper which one comes across at times. Two pieces I fumed before printing, and the results obtained by this method are, I think, equal to the very best that I have obtained by any of the treatments to which I have subjected the paper. In several cases I floated the front of the paper only on the salt in solution; in others I treated the fronts of some and backs of others to the salt in order to see what the difference is, and in the case of the carbonate of soda treated paper the result is decidedly in favour of the back being treated and fumed afterwards.

Rochelle salt—double tartrate of potassium and sodium—has frequently been recommended in different formulæ for printing-out papers, and Mr. J. Barker was, I think, among the first to work out a printing process in which gelatine was used as the vehicle and tartrate of silver one of the sensitive compounds, and I therefore thought some useful information might be obtained by treating paper with a ten per cent. solution of Rochelle salt, as undoubtedly the remaining free nitrate of silver would be converted partly into tartrate. The prints produced on the paper thus treated are poor and mealy, but when the paper has been fumed the results are very satisfactory.

The last set of experiments I made was to treat the paper with nitrite of potash, a salt which, I think, Captain Abney has at different times recommended in conjunction with others as a preservative. In all cases when trying the effects of salts as preservatives, the first consideration ought to be the effect it has on the image independent of its preserving action. In the case of nitrite of potash I find it to improve very considerably the quality of the resulting print when used by itself. I do not know whether this is due to the nitrite or to the fact that this is an alkaline salt, and the alkaline nature of the salt may have acted beneficially. When fumed with ammonia, there is not such a marked difference as in the other cases. Nitrite of potash, therefore, seems to confer a quality on the paper not possessed by the paper when treated with any of the other salts I have employed.

At the meeting of the London and Provincial Photographic Association, it was suggested that I should see what could be produced on paper prepared in the same manner as the other, but unwashed, and I have therefore added to the series of prints one from each negative on plain, freshly sensitised paper.

When time will allow I propose continuing these experiments so as to find out the effects of other salts on washed paper, and, if possible, to work out as regards their preserving action those which are the most promising.

ARAGO ON THE DISCOVERY OF PHOTOGRAPHY.*

Gentlemen,—The interest manifested both within these walls and throughout Europe in those labours, the result of which M. Daguerre recently submitted to the public, has been lively, striking, and unanimous. The Chamber, therefore, in all probability expects of its commission only a simple and entire approbation of the bill presented on this subject by the Minister for the Home Department. After mature reflection, however, it appeared to us that the office with which you had invested us imposed other duties. We have deemed that, while applauding the happy idea of instituting national recompenses in favour of those inventors whose interests the ordinary legislation by patent could not protect, it was requisite, in the very first steps of this new career, to show with what reserve, with what hesitation, the Chamber would proceed. To subject to a minute and rigid examination the work of genius, upon which we are this day called to legislate, will be to discourage ambitious mediocrity, for minds of this character also would otherwise aspire to intrude on your notice their ordinary and inconsequent attempts; it will prove that you intend to place in a most elevated region the recompenses which shall be demanded of you in the name of national glory, that you will never consent to bring them down from this elevation, or by lavishing them to tarnish their splendour.

These few remarks will enable the House to understand why we have been led to examine—

If the process of M. Daguerre be incontestably an invention,—

If this invention will render to archeology and the fine arts services of value,—

If it can become generally applicable,—

And, finally, if we may hope that by it the sciences will be benefited.

Two centuries ago a philosopher of Naples, Giovanni Battista Porta, discovered that if a very small hole be pierced in the window shutter of a room completely darkened in other respects, or, better still, if the aperture be perforated in a thin metallic plate applied to the shutter, all the exterior objects from which rays can enter through this opening will be represented on the opposite wall in dimensions enlarged or diminished according to the distance. He found also that even with this imperfect apparatus, throughout a large extent of the picture, objects were painted in their natural colours, and with considerable truth of linear perspective. A short time afterwards Porta found that it was not necessary to have the opening very small, thus limiting the view, but that if the perforation were covered with a lentiscus or convex glass, it might be of any dimension. He remarked also the great improvement thus produced in the delineation. The images passing through the simple medium of the hole were without distinctness of position, intensity of colour, or neatness of outline. On the contrary, with the lentiscus, the mimic forms rivalled the vivacity and strength of nature herself, the focal distances being properly adjusted. It is well known that all these discoveries of Porta have become truly astonishing in precision of detail and strength of colouring since the art of constructing achromatic glasses has been brought to its present perfection. Formerly a simple lentiscus composed of one kind of glass only, and consequently acting with as many separate focuses as there are colours in the undecomposed white ray, transmitted a comparatively indistinct image of objects. Now that we employ achromatic glasses which combine all the incident rays in one focus, and that a periscopic construction of the apparatus likewise has been adopted, great perfection has been given to its effects.

Porta constructed also portable dark chambers; these

* This is a translation by Mr. J. S. Memes of the address which Arago delivered in the French Chamber of Deputies in July, 1839, when a grant of an annual pension was made to Daguerre and Niépce the younger.

were composed of a tube longer or shorter, armed with a lentiscus as its optic instrument. A screen of white paper or some prepared substance occupied the focus, and upon it the images of external objects were received. The Neapolitan philosopher proposed his simple arrangements for the benefit of those who had not been taught drawing. According to him, nothing else was required in order to obtain the most perfect transcripts of nature than merely to trace carefully the outline of the focal image.

These anticipations of Porta have not been completely realized. Painters and draughtsmen, those particularly who execute large views for panoramas, dioramas, and theatres, have indeed still recourse to the camera. They, however, employ it merely to group objects *en masse*, to trace their contours, and to fix them in their proper position and magnitude, according to the principles of linear perspective. As to those efforts proceeding from the imperfect transparency of our atmosphere, whence arise all the charms of tone and colouring, which by a sufficiently erroneous appellation are designated by the term aerial perspective, the most experienced artists are aware that in reproducing these the camera affords them no assistance. No person, however, has ever witnessed the neatness of outline, precision of form, the truth of colouring, and the sweet gradations of tint, without regretting that an imagery so exquisite and so faithful to nature could not be made to fix itself permanently upon the tablet of the machine. Who has not put up his aspiration that some means might be discovered by which to give reality to shadows so exquisitely lovely? Yet, in the estimation of all, such a wish seemed destined to take its place among other dreams of beautiful things—among the glorious but unpractical conceptions in which men of science and ardent temperament have sometimes indulged. This dream, notwithstanding, has just been realized. Let us take, then, the invention in its germ, and mark carefully its gradual unfolding.

Long ago the alchemists had succeeded in forming a solution of silver in muriatic acid. This compound, which assumes the appearance of white salt, they called *lunar* or *caustic silver*. This salt possessed the remarkable property of becoming black by light, and of blackening more or less rapidly in proportion to the intensity of the incident rays. Cover a sheet of paper with a wash of lunar caustic, or, as we say at present, with a wash of chloride of silver; form upon this by means of a lens the image of an object. The shaded parts of the image—the parts, that is to say, upon which no light falls—will remain white; the portions, on the other hand, strongly illuminated, will become completely black; the demitints will be represented by grays more or less dark. The monochrome, in short, will be the reverse of the real object as respects the lights and shadows.

Again, if an engraving be placed upon a sheet of paper moistened with a solution of chloride of silver, and both be exposed to the solar light, the engraving being uppermost, the dark lines of the latter will intercept the rays, and the corresponding portions of the paper below will retain their original colour. In those parts, on the contrary, which lie immediately under the lights of the engraving, the solar rays, acting through the imperfect transparency of the print, will blacken the chloride wash. The necessary consequence of this operation will be a copy of the engraving, correct in outlines, but reversed in its effects, the lights being reproduced in shadows and the shadows in lights.

These applications of this curious property of the chloride of silver, one would think, might have readily occurred to the alchemists—the first discoverers of the substance—or to their early successors, who devoted more attention to practical results. Not so, however, was the case. We must descend to the first years of the nineteenth century before we detect even the beginnings of the photographic art.

About this time our countryman Charles, in his lectures, made use of a prepared paper to produce silhouettes, or black profiles, by the action of light. Charles died without describing the preparation which he employed. As the historian of science, under pain of falling into inextricable confusion, is not authorized to proceed, except upon printed and authentic documents, it is no more than justice to assign to Wedgwood, the celebrated porcelain manufacturer, and inventor of the pyrometer for high temperatures, the first application of this new art.

The memoir of Wedgwood appeared in 1802, in the number for June of the *Journal of the Royal Institution of Great Britain*. The author there proposed, by means of skins, or with paper steeped or washed in chloride or nitrate of silver, to copy paintings on glass—as in the windows of churches—and also engravings. "The images formed by means of the camera-obscura," we quote faithfully a passage from the article, "have been found too faint to produce, in any moderate time, an effect upon the nitrate of silver."

The commentator upon Wedgwood's experiments, the illustrious Davy, does not contradict the assertion relative to the images of the camera. He merely adds, as to his own experiments, that he has accomplished the copying of very small objects by the solar microscope, but only *at a short distance from the lens.*

Finally, neither Wedgwood nor Sir H. Davy discovered how, the operation once finished, we were to give it permanence, or, if I may be permitted the expression, to remove from the canvas of their pictures the defect of becoming black by the light. It thence resulted that the copies which they had obtained could not be examined in daylight, for in a very short time they become uniformly black, and all lineaments of the previous objects disappeared. What was this in reality but to produce imagery so evanescent that only a furtive glance could be cast upon the work, and that by the light of a lamp? The whole would have vanished in a few seconds if these delineations had been examined in day-light.

(*To be continued.*)

PHOTOGRAPHIC RESEARCHES.

Photographers have been endeavouring for a long while to modify the sensitive films in such a manner as to render them, if possible, more sensitive to the yellow, green, and red rays of light, rather than to the blue rays; but they are still far away from having solved the problem. Even those plates which are termed "isochromatic" or "orthochromatic," inveuted by Vogel, Obernetter, and Attout-Tailfer, which are certainly more sensitive to the green and the red rays than the old plates were, are still very far from being equal to the task.

While endeavouring to obtain photographic films which shall approach in sensibility that of the human retina, it has occurred to M. G. Lippmann that some success might be obtained by a rational and systematic arrangement of coloured glasses. He carried out a thorough investigation of this idea, and at a recent meeting of the Académie des Sciencies at Paris, he gave an interesting account of his experiments.

M. Lippmann operates with an Attout-Tailfer plate. Before the objective a piece of blue glass is placed, and the plate is exposed for the short time necessary for the blue rays to impress an image on the film. Then, without interfering with the apparatus, and taking care not to displace it, he substitutes a piece of green glass, and continues to expose the plate for that length of time which is necessary for the green rays to fully act. The green glass was selected of such a quality that it allowed the least possible trace of blue light to pass through it.

Under these conditions it is possible to allow the green rays to act for the whole length of time that they require, without fear that the blue rays will spoil the picture owing to over-exposure. The red rays are then allowed their turn, a piece of red glass being substituted before the objective in place of the green glass. This red glass must be selected with great care, and must again be of a kind that will permit the least possible trace of green or blue light to pass through it.

The final result of this triple exposure is to give a clear photograph in which green foliage and yellow or red draperies, instead of giving dark tints and blurred outlines, are rendered with a delineation and colour value surpassing the finest engraving.

Yellow glasses have already been employed in photography, and they climinate, it is true, a portion of the blue light. Their nse is described by M. H. W. Vogel in his work, "La Photographie des Objects Colorés avec leurs Valeurs Réelles," p. 1888, published at Paris by Gauthier-Villars, 1887. But the results obtained by M. Lippmann with his successive arrangement of blue, green, aud red glasses, surpass any that have hitherto been described, and they appear to herald the dawn of a new era in photography—especially in landscape photography.

While giving due houour to M. Lippmanu, it is only fair to notice that the idea of using coloured glasses iu photography was foreshadowed by M. Ed. Becquerel in the year 1881. Indeed, the subject was approached as early as 1854 by Becquerel, who, in his process of chromo-photography—or helio-photography, as it was called in France—succeeded in producing a coloured picture, but the hues could not be fixed so as to resist the effect of diffused light, and so it was relegated to the list of scientific curiosities. It was, however, in endeavouring to obtain coloured pictures by employing coloured glasses that he foreshadowed the notion of obtainiug the true effects of light, shade, and quality of colour.

It must also bo mentioned that since the publication of M. Lippmann's paper, M. Delavries has made a communication to La Société Chimique de Paris, iu which he states that he has obtained photographs representing the proper value of the differeut colours by employing orauge-tiuted glass of selected quality and thickness. He believes that, could the quality and thickuess bc carefully adjusted, his method, which is still in embryo, would be much simpler and less complicated than that of M. Lippmann.

Whatever may be the ultimate value of these recently proposed methods, they indicate work iu the right direction, and all similar research will be welcomed as tending towards the production of an iustrument, by the assistance of which the mysterious phenomena of light may be more satisfactorily iuvestigated, and which, in the words of the late Robert Hunt, "shall give the votaries of art tablets upon which nature shall impress herself in all her delicacy and decision, in all her softness and grandeur, and in all her richness of tone and breadth of effect.—*English Mechanic.*

Photographic Labels.—From Messrs. Geo. Wheeler and Co. we reccive sample copy of a book of photographic labels, the special features of which are claimed to be compactness in form; the provision of 386 gummed labels; new forms for compouud developers and solutions; spaces for insertion of date when chemicals were bought or made up, and from whom purchased; labels for sundries in coustant requisition; perforation of labels, by which any given one may be detached without loosening others; numbered labels, 1 to 200, for attachment to negative envelopes or boxes, are also included.

The Photo-Gelatine Process.—Responding to an enquiry as to the possibility of making an exact reproduction of a book by the photo-gelatiue process, the *Photographic Times* says:—In a book of the character described there is usually a variety of type; while some of the cuts may be composed of delicate light lines and fine shadings, and others may require a deep black. For these reasons the exposure required for one page will not be correct for another. Then, again, where wood-cuts or photo-engravings are interspersed throughout the printed matter on a page, it is necessary to photograph the illustrations separately, in order to give them the special treatment which they require. In some cases it may even be necessary to make an enlarged copy of a wood-cut separately, and go through the process of re-drawing, bleaching, and finally reducing to the required dimensions, in order to obtain an accurate reproduction. The collodion and silver baths must also be carefully prepared, as very much depends upou them. It requires experienced judgment to properly time the exposure, prepare the collodion and silver baths for the negative, and develop in accordance with the individual requirements of the special page or subject. There is also room for discrepancy in printing upon the gelatine, for, even if the negative be correct, unskilled or careless printing may seriously alter the original by overcoming the proper gradation of shading. Much depends upon the gelatine itself, however, which, though generally of a proper purity, should always be subjected to a process of rectification. This, of course, requires time and skill. After all has been done, and a really good electrotype has been made from the gelatine reproduction, the work may even then be marred by poor printing aud poor paper. Cheap, soft paper and bad press work will not reproduce the fine details.—*American Stationer.*

CONVENTION NOTES.

The Exhibition.

Among the objects of interest on view at the Exibition at St. James's Hall, one which attracted much attention was apparatus for changing plates exhibited by Messrs. D. Noakes and Son. The plates were kept in suitable receptacles, and passed singly into the back of the camera by passage through a kind of tap with long slit, called by Messrs. Noakes, in telegraphic language, "the key;" thus the plates could be introduced into and removed from the camera in the field. Apparatus of different construction, but on much the same principle and doing the same work, was exhibited in our presence towards the close of last year before the Photographic Society of France, where it also excited considerable interest. It is a class of invention likely to be useful, but which will have to undergo the test of experience. Messrs. Noakes and Son also exhibited a new method of strongly clamping jets, after centreing them with the optical system of projection lanterns.

The Eastman Co. exhibited a series of fine enlargements which they claim to prove the superiority of gelatino-bromide paper for correct reproductions. Among the untouched specimens one was a fine picture, measuring 40 by 60 inches, of a lion, enlarged from a quarter-plate negative, the sharpness and amount of detail in which was remarkable; the negative was taken by Mr. Rau, of Philadelphia. Another untouched specimen was a portrait of Miss Lilian Russell, the actress, enlarged to 40 by 60 inches, from a half-plate negative. Four or five equally large samples of work finished in crayon were on view, including a portrait of Mrs. Brown Potter in theatrical costume. A large-sized head of Miss Seccomb was exhibited, from a negative by Mr. Harold Baker, of Birmingham. The Eastman Company also exhibited the "Acme" burnisher, in which the burnishing tool is a hollow tube, which can be heated uniformly from end to end, and be ready for use in five minutes; the feed-roller is also hollow, so there is no deposition of moisture. It may be mentioned here that Mr. Henry Strong, the president of the Eastman Co., and Mr. Eastman himself, are now in London; they have been travelling in England, France, and other parts of Europe for the past six weeks. Mr. H. S. Bellsmith, the well-known demonstrator to the Company, leaves for New York in a week's time.

Messrs. B. J. Edwards and Co. exhibited negatives and transparencies illustrating good work done with their isochromatic plates. Messrs. R. and J. Beck exhibited, among other things, some celluloid developing dishes of different colours, and not easy to break; also some brass guides, and a special cutting-wheel for cutting out masks for optical lantern slides.

Messrs. Newton and Co. exhibited an electric projection microscope fitted with a traversing table for the accurate centreing of the light with the optical centre of the instrument; the whole apparatus was a fine specimen of workmanship. They also had on view some photo-micrographs by Mr. Freshwater, including one of his fleas which awed the spectators when it was magnified nearly to the size of the end of St James's Hall. This firm also exhibited a frame of coloured and uncoloured photographic lantern slides, which they claimed to prove that coloured slides gave the more pleasing effect when the colouring is properly done.

Messrs. W. Watson and Sons exhibited their "Acme" camera, well-known for its compactness, excellent finish of brass and other work, and ingenious novel device for attaching the front of the camera to the base-board. In their shutters they have a special stop to do away with projecting screws. A clever invention they had on view was a method of applying an iris diaphragm to any lens, without interfering with its original mount, so that in the event of any damage to the iris arrangement the

latter can be removed, and the Waterhouse diaphragms used as before. They had also on view a new time shutter by Mr. Kershaw.

Mr. T. R. Dallmeyer had in his case specimens of lenses in different stages of construction. He also had the usual show of lenses, of which only the mounts were visible; and the same remark applies in a large degree to the exhibits in the cases of Messrs. Swift and Son, and Messrs. Taylor, Taylor, and Hobson, of Leicester.

Mr. F. W. Edwards demonstrated from time to time the beautiful platinotype processes of Mr. W. Willis.

Mr. J. Werge had on view an instantaneous Daguerreotype picture of New York Harbour, taken by Messrs. Mead in 1853; it was fully exposed and full of detail; he also exhibited a modern enlargement of it, measuring 12 by 10 inches. An excellent Daguerreotype likeness of Mr. Jabez Hughes, taken in 1850, exhibited by Mr. Werge, was also of interest. He furthermore exhibited proofs of pictorial backgrounds which had been worked in upon the negative.

Messrs. S. Fry and Co. exhibited a variety of apparatus, including the Blair camera, also a collection of prize pictures taken upon their plates, likewise negatives on their celluloid films and prints therefrom. Messrs. Thomas and Co. exhibited among other things a good collection of lantern slides, and Messrs. Houghton and Son their developing table, and other objects of scientific interest.

The Excursions.

In addition to the excursions described in our last, on Thursday, last week, Mr. F. P. Cembrano and Mr. R. L. Kidd were the leaders of a party which made its way to the Old Palace at Richmond. The next point visited was Cholmondeley Walk, where cameras were called into requisition, for just then the heavy sky was lightened by a sudden gleam of sunlight. Many views of river scenery were secured, including the Bridge. Proceeding along the Twickenham side of the river bank, the "Star and Garter," with Glover's Island in the foreground, formed a picturesque view. They then visited the Terrace Gardens, and photographed many a nook therein. Next they went over Kew Observatory, as described in our last.

On the same day an excursion took place to Hampton Court, to which place the party was conducted from Richmond by Mr. Herbert S. Fry in a steam launch, the *Formosa*. The excursionists numbered thirty or forty, among whom were Messrs. B. J. Edwards, F. York, R. Keene, Samuel Fry, Mr. J. T. Cnaug of the Chinese Legation, H. Sturmey, A. E. Hayman, and J. Turnbull. At Hampton Court about half the number disembarked, and proceeded to the palace grounds, where permission had been obtained by Mr. Fry for the taking of photographs on the occasion. The rest of the party proceeded to Chertsey, and called for their friends on their return. The day was for the most part fine, and many photographs were taken. There was a dark room on board for the use of the excursionists, and a light luncheon and tea were provided. On the return journey the excursionists disembarked at Kingston, and, after a warm vote of thanks to Mr. Fry, returned to London by train.

The excursion on Friday was down river, and under the leadership of Mr. J. J. Briginshaw, started from the Old Swan Pier in the saloon steamer *Alexandra*. A large number of members availed themselves of the opportunity this excursion afforded for instantaneous work during the journey to Gravesend, where the party landed. Here the time was employed in photographing the many shore "bits" that abound; the passing vessels also secured due attention. The day was exceedingly fine.

Photographic Club.—The subject for discussion at its next meeting will be "The Best Shutter for Detective Cameras." Saturday outing at Strand-on-the-Green, Kew Bridge Station.

TESTING GELATINO-BROMIDE PLATES.*

BY EDWARD DUNMORE.

A reliable method of ascertaining the *practical* value of the sensitiveness of gelatine plates is, to use a stock expression, "a want long felt." Many ingenious devices have from time to time been suggested, Mr. Warnerke's sensitometer being perhaps the best—still this, as manufactured, is far from being uniform and above suspicion as a guide. In the suggestion I am about to make, my idea is to have a reliable standard of *comparison*, so that a negative can be justly estimated as to its *printing* qualities, and the length of exposure required to produce it by anyone skilled in photography or otherwise. Hitherto the plan has been to ascertain how the strongest image can be made with the weakest light, under certain specified conditions, a film giving the most detail and strength when exposed for a definite time to somewhat weak artificial light being deemed most sensitive. Now, if the effect of weak artificial light was identical in its effect with strong daylight, no doubt the results would be more reliable, but this does not seem, to judge by ordinary practice, to be the case.

In the first instance I propose to make a series of standard negatives of convenient size, say one inch square or thereabouts, as follows:—Take any good, not too rapid, plate, expose on an ordinary well-lighted landscape for the necessary time—this expression, although indefinite in itself, is easily understood as a period sufficient to impress an image on the sensitive film, so that it is in the best condition for development—this time might be determined by choosing a light that will produce a certain tint on a strip of sensitive paper, such as used for actinometers. A very close approximation to uniformity in the quality of the light would be thus obtained. Use a stop, say No. 128 U.S. We will assume it requires an exposure of three seconds to produce the best image. Several exposures, however, might be made to be certain of this. Secondly, make a series of exposures of the same subject in the same light for varying times, from one-tenth of a second to eight seconds, thus, one-tenth, one-fifth, one-fourth, one-half—1, 2, 3, 4, 5, 6, 7, 8. It stands to reason if No. 3, taking the numbers to represent seconds and fractions of seconds, is right, the others will be too much or too little exposed, as the development, which must be for a *definite* time, all the negatives being developed together, would show either under or over-exposure. The developer itself should be one whose constituents are not likely to vary. By this means we obtain a series of negatives of varying qualities, which may be arranged in two rows of five each on one plate, and to each the time of exposure should be attached. These are now our gauge negatives, and can be reproduced in any quantities, identical in all respects, by means of a carbon transparency and copying. All we have to do to ascertain the comparative rapidity of a plate is to make a proper exposure on the plate to be tested, and develop it by a similar developer, and compare the results with a gauge plate; this will show the actual *printing value* of the negative, which is practically all we require. If the exposure is less than for the best exposure on the gauge, we at once see that it is a more rapid plate; if more, then it is a slower one. I am inclined to think that a direct *comparison* with a *known* high-quality image would be the most useful plan of estimating the printing quality of a negative the photographer could adopt, and a plan that especially recommends itself to those who only have the opportunity of practising occasionally.

Luminous Photographs.—An ordinary positive proof is rendered luminous in the dark by the following process: Spread as evenly as possible a thin coating of starch paste on a sheet of card-board, and when still tacky dust over it powdered calcium or barium sulphide, rubbing with a brush in order to make it adhere everywhere. On the other hand, imbue a positive proof—printed rather light, toned and fixed as usual—with castor oil, and rub off the excess with a clean rag. This done, paste the transparent proof on the prepared card-board, and dry the whole before the fire. When the proof thus backed is exposed to light, the rays are transmitted through it to the sulphide which absorbs them, and afterwards radiates them again as light, it being phosphorescent. The proof will be, therefore, luminous in the dark, and that without much alteration in its general appearance, since the light is necessarily transmitted in proportion to the various intensity of the tints forming the image, the whites being very phosphorescent, while the darks emit but little light. The effect is strange; try it.—P. C. D., in *Anthony's Bulletin*.

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* Read at the Photographic Convention.

Patent Intelligence.

Applications for Letters Patent.

13,603. H. R. Von Dahmen and A. Strauss-Collin, 28, Southamptou Buildings, London, "Manufacturing Magnesium." —August 19th.

13,165. J. Brownlow, Metropolitan Hospital, Kingsland Road, Loudon, "Photographic Shutter."—August 21st.

13,302. H. Duncan, 9, Southampton Buildings, Londou, "Apparatus for Exhibitiug Photographs."—August 23rd.

Specifications Published.

14,171.—2*nd October*, 1888. "Improvements ic Magic Lauterns." Edward Tuckerman Potter, of Newport, Rhode Island, United States, Architect.

The object of my invention is to obviate tLe objections to the use of magic lantern slides heretoforc employed, so that a panoramic picture or a loug written or printed article or address may be shown on a screen by a magic lautern without breaks, and may, without iuterruptiou in the text or picture, be seen or read continuously like a panorama, or an ordiuary letter, or a column of print.

To carry out this object, I use with a magic lantern a contiuuous flexiblc baud or strip upon which the scenes, figures, or text to be reproduced are painted or otherwisc portrayed. Any transparent or translucent and flexible substance may be used for the band, such as paper treated in well-kuown ways, or collodion, or other cellulose compounds. Upon such a band I paiut, or in any suitable manner apply, views of whatever kind or character may be desired. I furnish a lantern with two or morc reels or spools, and wind off the band from one on to another, drawing the band through the beam of light in proper position with reference to the lenses, to project or reflect the views upon the screen.

By the expressiou "continuous strip," I mean to imply an extended strip or baud capable of being rolled or wound, upon which a series of views, or the text of an exteuded article, may be depicted, this in contradistinction to a short sheet plate or slide such as has commouly been employed.

In order to intensify and to vary the effect produced by a magic lantern, I also stamp or puuch out the letters and uumbers, and sometimes parts of the figures and scenes, so as to permit the light rays to pass through the perforations to the screen. In such cases where the sceues on the screen are produced in part or whole by the direct rays of light, it is obvious that an opaque material may be used for the band. The perforations forming any given character or figure may be connected, or may be a number of small perforations. I employ, as a means of impelliug the band, a clock mechanism, or a source of power controlled by clockwork, or its equivaleut, so as to keep up a steady and eveu motiou of the band.

It will be understood that the inventiou is not restricted to any particular form of magic lantern, nor to any particular device or means for drawiug the continuous band through the same.

16,537.—14*th November*, 1888.—"Developing Photographic Pictures." William Oldham, 100, High Street, Eton, Buckinghamshirc, Pharmaceutical Chemist and Optician.

The inventor employs a developer in the form of anhydrous or dry powder, which may be contained as a single powder iu a bottle, or may be in the form of two powders contained in separate parcels.

One form of anhydrous or dry powder developer is prepared from the following materials in about the proportions stated, namely, hydrokinone in powder 3½ parts; sulphite of soda in powder 7½ parts; meta-sulphite of soda or potash in powder 1½ parts; and bi-carbonate of soda, reduced to carbonate—commonly called sub-carbonate of soda—by heat or other means, or the sub-carbouate of soda prepared from any source, dried and reduced to powder, 12 parts.

Thesc materials are intimately mixed, so as to form a dry powder compound, the ingredients of which are equally diffused throughout the mass.

In use, he sprinkles the powder into a developing dish, adds water, and then immerses the photographic plate.

He prefers to prepare the developer in the form of two dry powders contained in separate parcels, as hereinafter described, by which means the said dry powder developer keeps, he says, iu an unaltered state for an indefinite length of time.

In preparing the developer in the form of two dry powders, he forms No. 1 powder of hydrokinone in powder 3½ parts, sulphite of soda in powder 7½ parts, meta-sulphite of potash in powder 1½ parts; these materials are intimately mixed and placed in a separate parcel.

No. 2 powder consists of dried carbonatc of soda, reduced to finc powder, 12 parts. These two powders are separately meted out into the necessary quantities for developing photographic plates of different sizes, and made into separate parcels, which are numbered or otherwise marked to indicate the size of plate for which it is intended to be used.

He claims, "a dry powder developer, for developiug photographic pictures or images," prepared and used substantially as described.

Correspondence.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

Sir,—With reference to the recent decision of this Society to form a museum of photography, the Council invites members and others to send for exhibition any photographic curiosities of historical interest in connection with photography. Such articles as are approved by the Council will be shown during the time that the exhibition is open, without charge to the owners, and will be returned carriage paid at the close of the exhibition. Exhibitors will oblige by writing a short description of the articles sent, and by also stating whether they would be willing to give, bequeath, or sell them to the Society. The exhibits should be sent care of Mr. T. Bourlet, 17, Nassau Street, Middlesex Hospital, London, so as to arrive not later than Wednesday, Sept. 18. A. M. Mantell, R.E., *Hon. Sec.*

THE CONVENTION AND THE PHOTOGRAPHIC PRESS.

Sir,—Your contemporary, the *British Journal of Photography*, August 23rd, 1889, contains in a foot-note the following words: "It had originally been intended by the Council—of the Photographic Convention—that no publication of any papers should be made until after the close of the Convention, but on more mature consideration it was thought that the press should not be fettered in the slightest degree. Hence our publication of two papers in this number."

I flatly contradict the latter part of this note; there was no council meeting held at the time in question, and so the original compact between the Council and the press could not be broken by the Council, but was broken by a single member of the press.

You are exonerated from blame, for, though you published two papers, the circumstances were such that you could not help yourself, and were bound to publish in self-defence.—I am, sir, your obedient servant,

Andrew Pringle, *ex-President.*

[The papers were published iu these pages because on the Tuesday evening the Honorary Secretary to the Convention handed us the proofs in the hall, aud said that the arrangement with the photographic press had beeu rescinded, consequently we might publish them without delay.—Ed.]

A Photograph Contradicting Witnesses. — A photograph of the locomotive of the Rome, Watertown, and Ogdenberg express train that struck a stub at Forest Lawn, New York State, taken before the wreckage was disturbed and while the engine was still in the position it assumed when the collision occurred, shows a feature that has just been made the subject of inquiry at the coroner's inquest. The picture indicates the startling fact that the lever was uot reversed at the moment of collision. The lever by which the link motiou is controlled by the engineer is not visible in the photograph, but a rod running from it to the shaft on which the links are suspended is plainly in view, and its position shows that the steam was operating to move the engine forward instead of the reverse wheu the collision took place. Several witnesses testified that the engineer reversed his engine before the train hit the obstacle. —*Star.*

Proceedings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE monthly technical meeting of this Society was held on Tuesday evening last, the 27th instant, Mr. JOHN SPILLER, F.C.S., in the chair.

Some stereoscopic negatives, taken on celluloid films and developed with eikonogen, were shown by Mr. W. ENGLAND. They were of a colour similar to those produced by ferrous oxalate, and were remarkably clear and clean.

Mr. A. COWAN said that it made a great difference to the colour of negatives developed with eikonogen whether there was sulphite present, and what was the base of the sulphite. A small quantity of nitric acid added to the eikonogen solution had the effect of throwing down so dense a precipitate that a spoon might be stood upright in the mass. All acids did not produce this effect.

Mr. W. ENGLAND exhibited the lenses and shutter that had been used when taking the stereoscopic pictures shown at the commencement of the meeting. They were of French manufacture, and were remarkably cheap, as well as being very fine in quality. The lenses were of the rapid doublet type, and the shutter had an indicator to show the speed at which it might be set to work. He also showed an appliance called the "Porte roudelle," for temporarily fixing a lens to the camera without the necessity of a separate wooden front. The appliance consisted of a flange or ring of ebonite, which had such interior diameter as just to allow it to pass over the screw at the back of the lens tube. The flange of the lens was then screwed on to the lens tube, so as to firmly nip and hold in place the ebonite flange. This ebonite fitted into a short tube that was itself fitted to the camera front. Another short tube then entered the first-mentioned one, and, by means of a bayonet joint, held the ebonite ring firmly in place.

Mr. CHAPMAN JONES handed round for inspection a lens of the kind known as a Harrison's globe lens made in 1862. The lens included a moderately wide angle, and had a field so flat that he could not detect any deviation from flatness. There was, however, a flare spot.

The CHAIRMAN said that at Woolwich Arsenal they had one of these lenses in which the flare was very troublesome.

Mr. JONES showed some lenses made by Swift expressly for detective work, working with an aperture of $\frac{1}{4}$. The field was wonderfully flat. He also asked whether Mr. Bolas considered that this was too large an aperture for detective work.

Mr. BOLAS said that sometimes it was a great advantage to be able to work with extreme rapidity.

Mr. M'LAUGHLIN, from the Government Photographic Department of Ottawa, was introduced to the meeting, and said that nearly all the photographic information obtainable in Canada was by means of the English journals. In the department to which he belonged a good deal was done by the blue printing process. He understood that the employment of photography instead of draughtsmen had effected a saving of 20,000 dollars in one department alone.

Mr. FRIESE GREENE showed a print made as a transparency from the negative, size 20 by 16 inches, taken of the members of the Photographic Convention on Saturday last.

The meeting then adjourned.

HACKNEY PHOTOGRAPHIC SOCIETY.

"GOSSIP" night took place on Thursday last. Messrs. Luckhurst, Vincent, and Pargetes were elected members.

The HON. SECRETARY announced that several important promises of papers had been obtained.

Various prints, negatives, and shutters were shown by Messrs. Hodges, Roder, Dean, Grant, and the Hon. Secretary.

The next excursion has been altered to Wanstead Park, for the 14th prox., by first train after 2 o'clock to Leytonstone.

BATH PHOTOGRAPHIC SOCIETY.

ON the 24th inst. an excursion was made to "Wick Rocks." The route lay along the Upper Bristol Road, through Kelston and Bitton. At the latter place a halt was made to photograph the rural church and its surroundings; at Wick Rocks subjects for the camera were quickly found and taken.

Glastonbury has been selected for the next outing, September 21st, and the first ordinary meeting after the recess will be held at the Royal Literary and Scientific Institution on September 25th.

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper and Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

YARMOUTH.—In our reply last week we inadvertently omitted all reference to the second point mentioned in your letter—blisters on fixing silver prints, accompanied by imperfect toning. This has of late been a matter of very frequent complaint, and seems to arise from a faulty method of sizing the paper, quite irrespective of the operations of the photographer, whereby the albumen rests only on the top of the hard gelatine coating, instead of penetrating a little way into the substance of the paper; thus it happens that when submitted to the action of the various baths, the albumen with part of the top layer of gelatine gets torn away from the paper backing, forming blisters which inevitably lead to imperfect toning, such as you and others have been troubled with lately, and for which there is no cure but by prompt representation made to the manufacturers.

CAUTIOUS.—Thanks for your letter; it solved a puzzle by giving the reason for your being called upon to perform such a remarkable service. Have nothing to do with it.

PROF. MUS.—For portrait of Madame Patti enquire of Mr. J. H. Goldie, Temple Street Studio, Swansea. He might also be able to supply views of Craig-y-Nos Castle.

J. M., Clifton.—Rain-water in town or country is seldom clear enough for photographic use, but a simple filtration through paper or a bed of sand is all that is required to make it so. Do not use any animal charcoal for fear of introducing lime or phosphates.

L. A.—With slow landscape plates and a flap shutter worked by hand, you ought to be able to get some indication of clouds in your out-door pictures. Note in each case the position of the flap which screens off the sky down to the horizon, and give only a final momentary exposure with full aperture to get the clouds.

AUSTRAL.—The fine series of New Zealand views shown at the Conference meeting, 20th inst., were the work of Mr. B. J. Edwards. They were taken long subsequently to those of the late D. L. Mundy.

GRAPH.—We have not yet seen the paper pencils, nor do we know where they may be procured.

A. D. H.—After you have tried the second lot of quick plates, we should be glad to hear which sort has the advantage on the score of rapidity.

EXHIBITOR.—Send off at once your intended contributions; they will only just be in time, for the last receiving day at Falmouth is Tuesday next, 3rd September. See announcement in the NEWS of July 19th, page 478.

J. B. SMITH.—There is nothing better than lamp-black and size or thin glue for recoating the inside of your camera. Apply it warm, and let the surfaces dry well before putting the sliding parts together.

MALTA.—Were you not so far away we should offer to come and stay a week with you to answer all your questions. Here are some replies in brief:—1. Apply to Mr. F. W. Hart, Kingsland Green. 2. "Electro-Metallurgy," by Alexander Watt (Crosby, Lockwood, and Co.). 3. They would be cheap at £8. 4. A use for old capsules. Melt them up and cast into sticks for solder. 5. The best developer for dry plates. Entirely a matter of opinion, probably hydrokinone. 6. Yes, certainly. 7. Raphael Tuck and Co., or Marcus Ward. 8. Tin foil lightly amalgamated, then flooded with mercury, and slide the glass on; apply pressure weights, and rear up to drain. 9. It requires much skill. Clean the frames with a moistened sponge; when dry, apply a thin coating of oil gold size, and upon that lay the pure gold leaf, after moistening in small sections with a camel's-hair pencil dipped in water. 10. The Automatic Supply Machine Company, Limited.

CYMRY.—After all the rain we have had in London lately it seems strange to hear that you are being put to the inconvenience of a limited water supply (deliveries on alternate days) in South Wales. You must economise as on board ship.

M. Co.—The celluloid films always smell of camphor, but it is assumed that the camphor vapour has no power of reducing or affecting a sensitive film. With some forms of xylonite—a similar product—years may elapse before the smell is got rid of, and all the volatile matters have made their escape. The diminished weight, and for some purposes its flexibility, are valuable recommendations.

A. B.—The meeting of the British Association will commence at Newcastle on Wednesday, 11th September. Capt. Abney will be the president of Section A—Physics, &c.; Sir J. Lowthian Bell taking charge of Section B—Chemistry.

M. L. and other correspondents in our next.

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THE PHOTOGRAPHIC NEWS.

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ORTHOCHROMATIC PHOTOGRAPHY.

In Mr. Bothamley's paper on the above subject published in our last number, mention is made of orthochromatic plates, employed without a yellow screen, giving exceedingly slight advantages over ordinary plates when used in bright daylight, but increasing in relative value as the light falls off towards evening. The subjects in his experiments were landscapes. The orthochromatic plates, being sensitive to the yellow rays, had the advantage over ordinary plates when the floating dirt in the atmosphere began to cut off more and more of the violet and blue rays of the spectrum as the sun neared the horizon. The more refrangible rays are absorbed more in proportion than the others by particles floating in the air, and that is why on a misty night the gas flames in the street appear to grow redder and redder the farther they are from the eye of the observer. The normal floating particles are largely spores and minute seeds; in towns, dust and a fair proportion of fine particles of horse dung are among the ingredients we breathe at every inspiration.

Evidently in the murky air of London, especially when photographing under glass instead of in the open air, the conditions prevail during a considerable part of the year, in which orthochromatic have the advantage over ordinary plates. To what extent this can be compensated by giving a longer exposure with ordinary plates might well be investigated by comparative experiments. M. Theophil d'Haoûw, of Ghent University, once showed us a print representing a bouquet of flowers of various colours, which in the negative, upon an ordinary plate, had been rendered in nearly their true values. He managed this by waiting until the evening, then at the opposite end to the window of an ordinary room he placed the vase of flowers on a table; no direct light from the sky fell upon the flowers, because of the houses on the opposite side of the terrace. Under these conditions, with about fifteen minutes' exposure, he obtained orthochromatic results with an ordinary plate and no yellow screen.

In photographing in the Alps, the more correct rendering as the light declines often comes prominently under the notice of the tourist. In cases, for instance, in which a village close at hand forms the foreground, and five miles behind it is a background of mountains covered with snow, let the exposure be made in the middle of a sunshiny day, and the mountains will be nowhere in the picture under ordinary development; but let a longer exposure be given on the same subject towards dusk, a good photograph of the whole scene can be obtained. This is chiefly due to Nature providing her own yellow screen, as in the Ghent experiment.

The subject of the testing of the amount of yellow sensitiveness of plates in daily life in the studio has, we believe, not hitherto been raised, but the recent work of the International Photographic Congress is paving the way to the devising of apparatus to achieve this end. Between the standard amyl acetate lamp and the more or less orthochromatic plate a standard yellow screen might be placed, to test by means of a Spurge's or other suitable sensitometer the sensitiveness of the plate to yellow rays. One way of making a standard screen might be to take a trough of standard dimensions, with sides of optically worked white glass, and fill it with a standard solution of a suitable pure salt in distilled water, giving a definite amount of yellowness by transmitted light. There is no doubt that a standard instrument for the testing the amount of sensitiveness of plates to both red and yellow rays would be a serviceable engine in the hands of photographers, and care must be taken that the screen transmits only the pure yellow or red rays of the spectrum.

THE LIGHTING OF THE SITTER.

The proper method of illumination of the face for portraiture may depend a good deal on the peculiar taste of the operator, and upon the particular demands of the sitter; but one thing is certain—there are current some very bad methods of illumination, which ought not to be tolerated for an instant. Good taste, if not inbred, no doubt is acquired by a study of the work of the celebrated portrait painters, but it will not always do to follow the painters if we have any regard for our credit with the public as first-class photographers. It may be better at times to repress our artistic aspirations, and to follow the prosaic injunctions of a few definite rules of illumination, as set forth by practical men.

There are not many worthy books on the subject of practical illumination, because the practical men are not apt to exhaust their energies in a flow of ink; but some valuable hints may be gleaned from the text-books and photographic periodicals—enough, anyhow, to stimulate to individual endeavour to find out something for one's self—which self-acquired information is the best of all.

Let us be practical. Suppose we take an ordinary billiard ball, and so place it that the illumination comes from above; what appearance will the photographs of it present? Not at all the representation of a perfect sphere, but of a spherical body flattened at the poles; that is, to the eye, but if we actually measure the impression we shall find that the contour of the ball is a perfect circle.

The camera has faithfully drawn the image as it actually is. Its appearance is an optical deception. Now let us admit the light in from the side only, and we have another optical delusion. The ball is depressed sidewise. The state of things, or rather the optical appearance of things, is quite different if we illuminate the ball with a full front

light. We have a perfect circle, but the coudition of the sphericity is gone. The ball is flat, and seems to be compressed front and back. Let us subject our billiard ball to the influence of several sources of light at once, and what is the result? A perfect representation of sphericity. What were the lights we employed? An upper, a side, and a front light at the same time, duly regulated. The highest light on the object will be at a place directly opposite the point where the three lights combine. From this point the gradations go off in opposite directions by imperceptible degrees until lost in the dark shadows.

Now, let us substitute for our billiard ball, another kind of ball—the human head—but we must remember from the start that we cannot treat our human head exactly the same way as we do ivory spheres. In portraiture the task is not so much the rendering of the relations of form, as the subordination of parts to the creation of an agreeable expression in the countenance.

We shall be obliged to deviate from our set method of illumination. The light must not be allowed to fall directly from above upon the head, inasmuch as thereby we would have the projecting forehead casting the eyes in shadow, and we must modify the front light, moderating its force so as to present the due relation of the features, which are like so many depressions and elevations, and must have their shadows so cast as not to transform a beautiful face into something harsh and featureless. The front light must be soft and diffuse.

Now let us turn to the direct upper light, or rather let us turn the direct light so that it is shut off behind the sitter, and converted into a front upper light. The side light must be allowed to have a little dominancy over the others because it is needful in rounding up the countenance, and giving contrast to the shadowed side. The angle at which the head should receive the strongest light cannot be definitely fixed, as some say, at 45°; yet it should not deviate very far from this angle.

Enough has been said in connection with our talk about the billiard ball, to show that it is possible to deceive by adopting certain methods of illumination—that is, to make things look somewhat different from what they are. Now this facility of deception allowed by photography may be made an effectual means for gratifying the whims—no, let us say the taste—of our patrons.

It is a common failing of humanity, quite laudable, to desire to look better in their pictures than they actually know they are, and we must gratify this demand if we have any regard for personal reputation as artists. Really, people are not always to blame because they are displeased with the result the photographer furnishes them as a counterfeit presentment of their image. He cannot be excused before a fair tribunal when he pleads that he gives only what actually exists. This may be true, but he has no right to emphasize, let alone exaggerate, personal defects. His function as an artist is to tone down the irregularities—to make less apparent these flaws in nature.

An operator who thoroughly understands the principles of his art takes advantage of the felicities of proper illumination, and employs them to good purpose in obviating defects, in making his patrons happy, and his exchequer full.

How easily is a beautiful face transformed into a block of ugliness by the simple inteusifying of the front light! The cheeks beneath the eyes are sunken, the bridge of the nose seems much broader, the eyes and month are too sharply defined, and project from the face. In vain all your retoucher's arts to make a thing of beauty out of this Frankenstein.

The case is as bad with injudicious application of the other lights. Unless the fact is demonstrated, no one will believe that the contours are the same in a badly illumined as in a properly illumined face, and that it is only the shadows which are in fault. The picture produced in the strong side-light gives an elongated head to the sitter, a pug nose, a depressed mouth, close-set eyes, low forehead, pointed chin, swollen cheeks. The picture in a strong upper fore light gives a broad forehead, high cheek bones, hollow cheeks, flat nose, large mouth, and a broad, turned-up chin.

It is plain to see that the operator must make a diagnosis of every case that comes to his gallery. He must determine upon the remedies for your great-mouthed, your flat-nosed, your hollow-cheeked humanities.

For patients having low foreheads, projecting eyes, and decided jaw bones, draw down the side curtains, and shut off a good deal of the light from that source, so that the upper light may predominate.

A full, fleshy countenance needs a shielding off of both side and upper lights, but there is danger in this method, as there is a likelihood of destoying the modulations of the face. As we said at the beginning of this article, we cannot always follow the artist in illumination.

Grace of form and harmony of colour often mask the incongruity arising from almost impossible methods of lighting the figure, but there are many portrait painters whom we may follow with good purpose. The moderns seem to take more care in studying illumination. Perhaps photography has given them a few lessons.—J. B., in *American Journal of Photography.*

THE PHOTO-MECHANICAL PRINTING METHODS.*

BY THOMAS BOLAS.

ENGRAVING ON METAL PLATES.

WE now go back to the first photographic process discovered—that is to say, the first process which gave photographic representations which could be exposed to light without destruction—the bitumen process of the hard-working and patient Niépce. This investigator noticed that the residue left on the drying of certain varnishes became insoluble by exposure to light. About the year 1814 he covered metal plates with a bituminous varnish, exposed them in the camera-obscura, and after exposure he subjected them to the action of similar solvents to those originally employed in making the varnish. Under these circumstances, those parts of the film which had been exposed to strong light refused to dissolve, while the unexposed parts dissolved, a negative image being thus formed on the metal plate. To convert this negative image into a positive, those parts of the metal which were uncovered by bituminous matter were darkened by the vapour of iodine, and the bitumen was then removed by the use of a more powerful solvent. By the application of a suitable acid to the bitumen pictures on metal, the bare parts were dissolved away, and engraved plates were obtained. Bitumen or asphalt dissolves readily in benzole, and the solution runs freely through a paper filter. The solution should not be quite as thick as collodion. A carefully cleaned copper plate, such as the engravers use, is clamped down on to a turn-table. The next step is to flood the plate with bitumen solution, and then to make the table revolve quickly. When it has revolved a few secouds the film will be dry. I know of no other method by which such a uniform and compact film of bitumen can be obtained. After coating, it is well to put the plate aside for twelve hours, in order that the film may become harder. It is then necessary to dust it over with French chalk, to remove stickiness; and after this it is placed behind a transparency and exposed to light. The time of the exposure may vary from twenty minutes to two days.

When a plate has had the requisite exposure, the next matter is to dissolve away that portion of the bitumen which has not been made insoluble by the action of light. Now, benzole is generally too energetic a solvent for my purpose, and oil of turpentine is often not sufficiently active; but by mixing these together you can get any degree of solvent power which you may require. The workman commences by flooding the plate with oil of turpentine, and if this has not sufficient action he pours it off and adds a little benzole; this begins to produce an effect, and enables him to judge as to the amount of benzole which he may safely add to the oil of turpentine. When he has added this quantity, and has washed away all the soluble bitumen from the plate, it is next thoroughly rinsed with water to remove the oil of turpentine. The plate is next placed in nitric acid, so as to etch the lines where the metal is bare.

* Continued from page 567.

So much for the liue-eugraving process of Niépce ; but it is worth mention that very perfect half-tone transparency pictures may he produced hy means of bitumen. Let us take some pieces of sheet gelatine, or some pieces of talc, which havo heeu varnished on one side with bituminous varnish.

Supposing that the varnished side of the talc or gelatine is placed in contact with the negative, and the light is allowed to shine through it, those parts of the bitumen film which are under the perfectly transparent parts of the negative hccome insoluhle, let us say, all through. Now, those parts of the film which are nnder less transparent parts of the negative do not become insoluble all through, but a skin of insoluble bitumen is formed on the surface of tho bitumen film, this skin varying in thickness according to the amount of light which has given rise to it. Put a varnished and exposed gelatine sheet of this kind iuto the solvents, and note the effect. When the film is made iusoluble all through, it resists the action and remains ou the talc ; but where only a skin of insoluhle bitumen exists on the surface of the film the solveuts loosen and dissolve the bitumen from underneath this skin, and away it floats. Now you can understand why the bitumen process, iu its ordinary form, is only adapted for the reproduction of suhjects in extreme black and white, such as liue engravings or letter-press. If we wish to preserve the half-tone picture intact, we must expose through tho transparent medium—talc or gelatine—so as to ensure every part of the insoluble image, whatever its thickness, being in contact with the trausparent support.

A picture of this kind is solid, the gradations of light and shade heing due to a greater or less thickness of bitumen, and the essential poiuts in producing them are to varnish a thin, transparent medium with bitumen, to expose to light through this medium, aud theu to dissolve away that portiou of the bitumen which has not been acted on by light. The ordinary black varnish sold for backiug glass positives will answer very well, and so will some samples of Brunswick black.

By the method just indicated very fine lantern slides may be produced, as there is an entire absence of texture or granularity.

Plates from which much printing is to be done are ordinarily covered with a thin film of iron, by the electrolytic method, and as the film of iron is extremely thin, it does not in any way interfere with the printing qualities of the plates. Wheu the surface of a plate begins to wear a little, and the impressions show signs of dcterioration, the film of iron is disolved off hy means of dilute sulphuric acid, leaving the copper plate as good as ever. The film of iron, although so thin as not to injure the printing qualities of the plate, is, nevertheless, sufficiently thick to protect the copper from injury in printing. The plate having been freed from the first worn-out film of iron, is once more coated with a layer of iron, and is again ready for nse. When the second film of irou is nearly woru away, aud the printer approaches near to the true surface of the copper plate, the iron is again dissolved away, and a new coating of iron is put on. According to this system, one really prints rather from a cast of the plate than from the original plate, and new casts are made as required.

I may call your attention to a very simple and expeditious way of making eugraved plates from line suhjects. Take a photo-lithographic transfer made from a positive, instead of from a negative, as is usually the case. The grouud is black and the lines are whitc ; in fact, by far the greater part of its surface is black. It is now laid on a zinc plate, and passed through the press. Now, what will be the result? So much of the paper being covered with printing ink, and so little heing white, moist, aud gelatinous, the transfer will slide over the zinc plate, and we shall merely get a smear. To prevent this, take another transfer similar to the last, exceptiug that white patches are introduced on it wherever they can be introduced without falling foul of the picture. This is donc by painting on the transparency with Brunswick hlack. On putting this transfer down on a zinc plate it adheres properly, and we have a perfect image on the metal. As the white patches are now done with, we varnish them over, and the zinc is covered everywhere except where the lines of the engraving are bare. The covering on the zinc is now made denser hy inking aud dusting with resin, as explained, and the plate is then etched by dilute nitric acid. We now clean off the ink, and you see the lines are engraved on the zinc plate. The plate may now be printed from in the copper-plate press, or, as zinc is not a convenient metal for deep plate-printing, it may be reproduced hy the electrotype process.

An extremely simple and expeditious method of engraving line subjects upon copper plates is the bichromated albumen process, practised with much success by Gobert and others. A plate is covered with a film of bichromated albumen, and exposed under a transparcucy until the whole of the ground—that is, the part not covered by the lines of the transparcucy—is rendered insoluble. The plate is next washed with cold water, so as to remove the albumen from the lines, after which the etching is effected hy an alcoholic solution of ferric chloride.

The following details will be sufficient to enable the method to be carried into practice. One hundred cubic centimetres of alhumen are mixed with a solution of two and a half grammes of hichromate of ammonia in fifty cubic centimetres of water, and, after haviug been well beaten, the mixture is filtered. A carefully cleaned plato of copper is now coated with the mixture, and after the excess has beeu well draiued off, the plate is dried at a very gentle heat, it being retained in a horizontal position meanwhile. The exposure required is by no means a long one, half a minute in moderate sunshine beiug sufficient in ordinary cases ; but this must, of course, he learned by experience. Instead of developiug—washing away the unaltered albumen—in plain water, it is better to nse a weak solution of aniline red or magenta dye, as under these circumstances the ground becomes tinted, and the progress of the development can be watched. When the plate has been dried, nothiug now remains but to varnish the back aud edges with an ordiuary hlack varnish, such as the so-called Brunswick black, aud to etch. The etching bath is made by dissolving one part of perchloride of iron in five of alcohol, and ten minutes is gencrally a sufficient time for etching to the required depth.

The method which Major De la Nöe calls typogravure is, in reality, an intaglio process, but the printing is conducted as in the case of ordinary zincography. The details are as follows :—A prepared ziuc plate is coated with a film of sensitive bitumen by well-known mcaus, and exposure is made under a transparency or a tracing, so that when development is carried on with turpentine or henzole in the usual way, the lines alone are bare. The plate is now etched with dilute nitric acid (1 and 40) until a depth of ahout a 250th of an inch is reached, after which the plate is dried, and once more coated with bitumen. The ground is now polished off with a stick of charcoal, leaving the bitumen in the lines, after which the plate is gummed and printed from hy the nsual zincographic method. This process is admirable for map work, although it is obviously inapplicable for the reproduction of subjects with widely extended blacks ; and it has the advantage that the lines show no tendency to spread.

Before going any further we may, with advantage, look back at some of the older examples of photo-engraving in half-tone. Excelleut work was done hy Talhot's etching process over twenty-five years ago. Some examples of work done by Pretsch about twenty years ago are quite sufficient to prove that good work is not altogether a thing of to-day. Among the newer methods that of Klic deserves special mention. Klic's process is an etching method, the result heing a "carbon" print. A copper plate is dusted with powdered asphalt, and the plate is heated, so that the asphalt hecomes nearly melted. A negative carbon print is now transferred on to the copper plate, and the plate, now covered with the negative iu carhon, is etched—at first by a strong solution of perchloride of iron, which penetrates only the thiunest parts of the picture, then by a weaker solution of the same salt, the solution etching through the thicker parts. By employing more and more diluted solutions, it is possible to etch through thicker and thicker layers of gelatine, so that only the high lights remain unetched.

Major Waterhouse has been remarkably successful during the past few years in making intaglio plates, and he has published the details of his method. The process is a modification of one introduced some time previously by Geymet, and it is hased on the mechauical reticulation or breaking up of the Woodbury relief.

A Woodbury relief is developed upon a plate of silvered copper—but the relief need not be nearly so high as that required for the Woodbury process—in fact an ordinary carbon print will answer—and wheu the relief is taken out of the developing water, it is dipped into a solution of potassium bichromate, draiued, and dusted over with fiue sand—this sand having been previously waxed hy heing heated in an iron pot, and stirred up with a small proportion of wax. The layer of waxed sand is allowed to remain on the film until it is quite dry, when it is brushed off, leaving the gelatine granulated or pitted all over, the pits being deepest in tho thick parts. The plate is now

blackleaded, and a cast is made in the electrotype bath, this cast being the printing plate.

Numerous specimens show what excellent work can be done with this method, and you must remember that Major Waterhouse has not only published full working details, but he has demonstrated the process before several gentlemen interested in the matter; moreover, he has not patented the method.

Some fine examples of the application of photo-engraving to pottery decoration are due to the skill of Mr. F. J. Emery, of Burslem, and one photographic method which this gentleman adopts for the reproduction of pottery designs is of special interest. He coats a plate with sensitive bitumen, puts down upon this surface a transfer from the plate to be reproduced, and exposes to light until the ground is insoluble. Development is now effected with the usual solvents—say a mixture of turpentine and benzole; only those parts of the ground which were protected by the transfer dissolving. The etching is effected by perchloride of iron.

In connection with intaglio plate work, special mention must be made of the method of etching copper by means of a solid image of chloride of silver, due to Obernetter, and called by him *Licht Kupferdruck*. A gelatino-bromide image in film form, and made from an emulsion rich in silver, is converted into chloride of silver by immersion in a chlorinating solution—a weak solution of bichromate of potash acidificd with hydrochloric acid answers well—and this chloride of silver film is laid on a smooth copper plate. The chloride of silver becomes decomposed, the chlorine uniting with the copper and etching it, so that every detail is reproduced as an intaglio. Unless the action is assisted by a weak electric current it is very slow; but when the copper plate is connected with the positive wire of a battery, and the negative wire is conuected with a carbon plate placed behind the film picture, the etching of the plate proceeds quickly. The film picture should be moistened with weak salt and water.

RECENT METHODS OF MAKING TYPE BLOCKS FROM HALF-TONE SUBJECTS.

Any impression in a fatty ink, of the nature of printers' ink, which may be transferred to stoue or zinc for printing after the lithographic method, may be considered as the germ of a typographic printing block, as, if such an impression is transferred to a zinc plate, the uncovered parts may be etched away so as to leave the covered parts standing in high relief. The details of the method of thus etching a zinc plate have already been given. Let us take the reverse case. One has a typographic block, and it is more convenient to print impressions by the lithographic machine than from the block; it is only necessary to make a print from the block and transfer it to the stone. Thus it will be seen that lithographic printing aud typographic printing are very elosely connected, so closely that, when a subject is prepared for one, it may be printed by either, as convenience may indicate. The *Official Gazette* of the American Patent Office is set up in type, but the printing of all, excepting the index sheets and the covers, is done on a litho machine.

These remarks bring us to the point where photo-lithography and photo-typography may be considered together, and that the making of a fatty transfer is equivalent to the produetion of a printing surface suitable for priuting by either method.

In making a type bloek from a gradated photograph, the first step is to translate the evenly gradated tints of the latter into a line system, or a stipple of corresponding intensitics. When a photograph is transferred to a wood block, this is done by the personal skill of the individual who engraves the block; but this is by no meaus to be regarded as photo-engraving proper, so my remarks will be confined to processes in which the translation is effected automatically.

There are so many methods of translating the tints into points, lines, or dots, that even to mention all would be impracticable.

In an earlier part of this paper, the method of Asser was referred to, a photo-lithographic transfer being made on a sheet of starched or pasted paper, made sensitive by means of potassium bichromate; and by putting down such a transfer on ziuc, and etching into relief, execllent results may be obtained. It may also be mentioned that, as long ago as 1866, Messrs. E. & J. Bullock, of Leamington, obtained a patent for a mode of photo-lithography in half-tone, and a print issued during the year in question with *The British Journal of Photography* shows that their work was equal to anything that has been douc since. Why, then, you may ask, did not the process become a great thing commercially, and make its mark? The answer is simply this: the invention came before its time, neither good lithomachining nor zinc-etching being practised at the time. The expired patent of Bullock Brothers (No. 2,954, 1866) will be read with interest, and its value is well illustrated by the fact that the essential points of it have been claimed by very many subsequent patentees. Bullocks claim the production of reticulated transparencies, by copying a negative over which a grained surface is laid; this transparency affords the means of making a grained negative; but the method by which their best work was made is a second process included in the same patent. Ordinary or photographic paper is coated with a glutinous substance, and printed with a reticulated pattern. Let me now quote from the specification:—"In this case, the specks of ink themselves form a medium, and by their aid excessive contrasts are avoided and half-tones secured. Such a picture, when so obtained, is passed to a lithographic stone or zinc plate, and a printed proof produced therefrom; by the aid of chromo-lithography coloured proofs may be produced." The coating of the paper with a glutinous substance may "be conducted in connection with bichromate of potash or bichromate of ammonia." The said transfer paper may be used, "whether the impression be a lithograph, a zincograph, an impression from an electrotype, or from an engraved or etched plate."

By trausferring a coarsely grained collotype to stone or zinc, a very good grain image is obtained, and the coarse reticulation of the gelatine is very much facilitated by adding chloride of calcium to the sensitive mixture. The following answers very well:—

Gelatine	6 parts
Water	60 „
Bichromate of ammonia	1 „
Chloride of calcium	2 „

Printing surfaces thus obtained, whether lithographic or typographic, resemble those of Pretsch or of Dallas on the one hand, and those of Sprague on the other hand.

In order to obtain a transparency in which the tints are translated into points, lines, or dots, Algeyer and Bolhoevener have recently suggested a method in which a collotype plate is exposed under a negative; and after this plate has been soaked and inked up in the usual way, the fatty image is reinforced by dusting with an opaque powder. This method is of course dependent on the reticulation of the gelatine for the production of a grain. From such a transparency a negativo may be mado by contact printing, and from this a photo-litho transfer by any one of the well-known methods.

Meisenbach, of Munich, has recently obtained a patent in which he elaims some details as to well-known methods of breaking up the grain of a photograph by means of a network, and he more especially claims the shifting of the network during the time of exposure. As regards this point, something similar was described by Bertschold in the volume of the PHOTOGRAPHIC NEWS for 1859. Notwithstanding the fact that one cannot find any very striking features in the patent of Mr. Meisenbach, this gentleman has produced some typographic bloeks of surprising excellence.

We now come to an important feature in connection with the subjeet, that is to say, the direct translation, by mechanical means, of the gradations of depth existing in the Woodbury relief into corresponding shades of stipple or granulation; but before entering into these, let me call your attention to a method of granulating the relief itself, which Mr. Woodbury has made the basis of a method by which excellent printing blocks have been made.

Mr. Woodbury exposes his ordinary relief tissue under a transparency with a piece of network interposed, the effeet of this being to produce a decided grain all over the high portions of the resulting relief, and no grain over the deep parts, intermediate portions being grained to an intermediate extent. A reverse east from the grained relief thus obtained is the printing block. This mode of procedure is subject to one disadvantage in actual practice, as the various printing parts of the resulting block do not lie accurately on one plane, as is the ease with a block made by etching a plate of zinc into relief. Mr. Woodbury, however, overcame this objection by a modification of the process in which a transfer is obtained directly from tho relief.

The following quotation from Woodbury's specification of 1873 will serve to fully elucidate the naturo of the process referred to:—"I prepare sheets of bichromatised gelatine, such as is used in the process called 'Woodburytype,' and expose these nnder a photographic positive to the action of

light, but interposing between the positive and the gelatine film a transparency on collodion or mica of what is known as mosquito netting, Brussels net, tulle, and so forth, which has the effect of breaking up the resulting relief into a multitude of fine, square, hexagonal lines; or for some subjects I interpose a transparency on mica or collodion of any design of a similar nature that will have the same effect, such as an impression from a grained stone, or the same from a number of fine ruled lines. The sheet of gelatine, when washed, will give a relief having the positive photograph represented by a number of lines, instead of the simple half-tone it originally possessed. I then take an impression from this by means of hydraulic or other pressure in any soft metal, and use the block so obtained for printing at a typo press where only a few copies are wanted; but where large numbers are required, I electrotype the same in the ordinary way. I prefer to use diffused daylight or sunshine through ground glass or tissue paper to produce the relief, as in that case the light in the parts that represent the white creeps round the lines, thus partially obliterating them in that part, and leaving them strongest only in the parts printing dark. I sometimes adopt another method. I take a negative of the network by transmitted light, and copy this together with the negative to be reproduced, thus producing a positive with the lines already thereon, from which I proceed to make a relief and blocks as stated."

Mr. Fred. E. Ives, of Philadelphia, published, in 1878, a method of translating the smooth photo-relief into stipple and this method may be regarded as a new departure, According to the method of Ives, as described by him in 1878. and patented in the United States, the essential features of his method consist in inking the Woodbury relief, and pressing against paper which has been grained or embossed, somewhat after the fashion of bookbinders' cloth. Under these circumstances the projections on the paper become completely crushed down by the inked relief where the gelatine is thickest, and a solid black results, while the more shallow parts of the relief only tip the projection on the paper with ink. Intermediate thicknesses of relief produced a medium effect. You will now please note the effect of pressing this sheet of grained paper against the inked Woodbury relief, a picture in black and white resulting, the shades of the original being represented by the varying extent of the closely packed dots which constitute the picture. The translation into stipple thus obtained may be used as a transfer for putting down on stone or zinc, but if preferred it may be re-photographed. Ives also made printing blocks by casting from the grained surface which had been compressed by the gelatine relief, although these were not found to be quite equal in quality with those obtained by the first-mentioned method. A subsequent modification of Mr. Ives's method gives results much more easily and economically, as he has succeeded in substituting a "swelled gelatine" relief for the more expensively produced Woodbury relief. In a letter to me, Mr. Ives says:—"The relief which I now employ is a plaster cast from swelled gelatine, which is secured so easily that an apprentice, seventeen years of age, makes them acceptably for Crosscup and West. On the relief the lines and stipple are impressed by means of a printing film of elastic, V-shaped, stippled lines, in a manner which gives the operator considerable control of the effect. The line and stipple picture on the plaster relief is then stripped off for lithographic transfer or etching, by a method so simple and perfect that it astonishes all who see it done. Formerly, I had to produce the impression by photography in the camera, and by this operation could not avoid losing much of the delicacy of the original, which is wonderfully delicate, sharp, and clear in line. I have to secure ruled plates for moulding closer lined printing films before I can apply the transfer method of reproduction for fine work; so it may be months before I shall show you what fine results I can secure in this way."

The following reprint of Ives's original declaration will be of interest:—"Ithica, New York, August 12, 1878. I, the undersigned, have to-day invented a method of obtaining relief plates for the typographic printing press, from ordinary photographic negatives, which may be described as follows:—1st, From an ordinary photographic negative, a relief in gelatine, similar to that used in the Woodburytype process, but perhaps in lower relief, is obtained. 2nd, This relief is carefully and uniformly inked with fine printer's ink, and pressed between two flat surfaces (or between rollers) against paper or other material, upon which is stamped or otherwise produced a fine grain or other suitable surface. The inked relief being highest in the black parts, presses down the grain of the paper on the corresponding parts, and the removal of the ink by the paper from those parts of the relief produces a black impression, while upon those parts where the relief of the gelatine is lower, the grained surface is pressed less, and the ink taken up in spots, the size of which depends upon the grain of the paper, and the amount of pressure, and producing an effect similar to that of crayon sketches made upon such a surface. 3rd, Relief plates may be made from this impression, either by the usual photo-typographic processes, or, perhaps, by obtaining a cast or electrotype of the impressed surface of the paper or other material used to receive the impression from the gelatine relief.—Fred E. Ives."

The broad principle of the Ives method, which consists in pressure of the relief against a grained or stippled surface, has been the subject of several subsequent patents and inventions. We find that in 1879, Petit, of Paris, took out an English patent for a method nearly identical with that of Ives, and soon after another patent by Dredge followed; this latter, however, indicating novel methods of working. A process of quite a similar character is the "Crayontype" of Ad. T. Eggis, which was published more recently. Mr. Eggis, instead of inking the relief, takes an inked film, such as manifold copying paper, and lays this on the relief. The grained paper is now placed over and pressure is applied. If the grained paper sold for producing crayon effects in lithography is used, very excellent transfers are obtained.

Mr. Eggis, writing in the Photographic News, thus describes the method:—"This process gives results good enough to have allowed the taking of a patent, but I find it preferable to describe it for the public benefit. I call it crayontype, for the images it produces are much like those obtained by the artist with a lead pencil (crayon in French). This is how I proceed. I procure or produce, to begin with, a gelatine positive on best plate glass (*glace*) obtained by the known ways, in relief. The highest point when dry should not have more than one millimetre. The other necessary implements are, first, grained (or lined) paper, of same kind as is used by the artists for their drawings destined to be etched; second, a few sheets of blue or black transferring paper (*papier a calquer*, thin paper coated with a greasy substance and coloured); third, a small press. Having these at hand, I take the gelatine positive, lay it on the stone or metal table of the press; on the relievo I place a sheet of transferring paper, the prepared face turned upwards. On this I lay the stippled or grained autographic paper, face downwards, touching the greased sheet. Over all this I place a fine polished steel sheet, well planed. I put the whole under the press, and slowly pull down the lever in such a manner as to give a smooth and graduated impression. Afterwards separating the whole, I find on the grained paper a good and often a perfect stippled reproduction of the gelatine relief. This reproduction being formed by a greasy substance, I am able to transfer it at once directly on stone for lithographic purposes, or on metal to be etched in the usual manner. The production of such an image will be easily understood; it is much the same as the direct drawing with a pencil on the paper. Instead of the artist pressing more or less his graphite on the paper, the gelatine relief (which corresponds more or less to the lights or shadows of the photograph) presses more or less on the paper, and gives the true gradation of the original. The work of the hand is mechanically imitated very closely indeed. The crayontypes present a different grain, which may be chosen according to the work to be done. It is at least more artistic than the usual regular stippling."

Other modes of effecting the translation of the relief by pressure on grained surfaces have been patented by Mr. Zuccato.

The first method consists in first planing a piece of type metal or similar surface in a series of ridges, or a series of pyramids, as the case may be. The plate is then inked, and instead of pressing the relief directly on the inked plate, a piece of very thin paper is interposed; the relief crushes down the pyramids in proportion to its depth. The pyramid of type metal is spread out, and forms a sharply cut outline on the paper, and in this way a transfer is obtained which has a remarkable clearness of outline, almost like the cleanest cuts of the graver.

It will illustrate the matter better if, instead of inking the plate first, the relief is pressed directly against it, and you will then be able to see the flattening of the lines or pyramids.

Two other modes of working have also been patented by Mr. Zuccato. In one he interposes between the relief and a sheet of transfer paper a piece of gauze, or a piece of silk which has been inked with transfer ink. Of course, what then takes place is

similar to what happens in the case of the plate; the threads of the gauze get crushed out to a greater or less extent, and form lines of greater or less width, but this method in which the gauze is crushed down is not nearly so perfect as the method with the plate of type metal.

A third mode of working, which Mr. Zuccato also claims in one of his specifications, is the pressing of the relief upon a lithographic or zincographic surface on which an ink stipple has been impressed. The stipple gets crushed out more or less, according to the extent of the pressure; this, of course, depends on the thickness of the relief.

The Woodburytype process and the Collotype process, not having undergone any very remarkable developments of late, and being generally known as regards their main features, do not need special consideration in relation to our present subject.

FOX TALBOT—HIS EARLY EXPERIMENTS.*

BY FRIESE GREEN.

MR. TALBOT was the only child of the marriage of William Davenport Talbot, of Lacock Abbey, in the county of Wiltshire, with Lady Elizabeth Theresa Fox-Strangways, eldest daughter of the second Earl of Ilchester. He was born at Melbury, in Dorsetshire, the seat of the Earl, on the 11th of Febuary, 1800. His father, William Davenport Talbot, died July, 1800, when his son was only five months old. His mother married, secondly, in 1804, Captain, afterwards Rear-Admiral, Charles Fielding, by whom she had two daughters—Caroline, Countess Dowager of Mount Edgcumbe, and Horatia, late wife of Thomas Gaisford, Esq. Mr. Talbot was educated at Harrow, where he displayed marked abilities at a very early age, for in a letter written by Dr. Butler to Lord Winchelsea in December, 1812, occurs the following paragraph:—"Little Talbot goes on capitally; he has just finished his trial for the fifth form, and has done himself credit. I am really distressed at removing him at so early an age into the fifth form, but if his acquirements are beyond his years, how can I help it?" His acquirements were beyond his years, and the ordinary school work soon became insufficient to satisfy his intellectual powers. He took up chemistry, and one of his experimeuts resulted in an explosion, which alarmed Dr. Butler for the safety of his house, and made him declare that he could only allow the theory of chemistry to be studied at Harrow. Dr. Butler himself was fond of chemistry, and very kindly offered to lend his pupil any of his books on the subject. The prohibition was, of course, respected, but the ardent student arranged to carry on his future experiments in the shop of a neighbouring blacksmith, and thus continue, by his own manipulation, to illustrate and test the statements contained in his text-books.

On leaving Harrow he read with a private tutor, and then entered Trinity College, Cambridge, where, in 1820, he gained the Porson prize for Greek verse. He graduated in honours in 1821, being twelfth wrangler and second chancellor's medallist. About 1821 he left England, travelling, not as an idle lounger, but with the aims of a scholar and man of science; his education and bias of mind qualified him for observation and study. His love of plants and flowers remained with him until the last, and was exhibited in his greenhouses at Lacock Abbey. He appears to have always been in pursuit of knowledge in pure mathematics, in physics, and in chemistry; for the range and character of his researches, reference may be made to many papers in scientific journals from 1836 to 1847. The attention of the leading men of science was naturally attracted to the successful researches of Mr. Talbot, and he was elected a Fellow of the Royal Society on the 17th of March, 1831. The Royal medal of the Society was awarded to him in 1838 for his papers, published in the *Philosophical Transactions* for the year 1836 and 1837; in 1842 the Rumford medal was awarded to him for his "Discoveries and Improvements in Photography." His other researches in science are less popularly known than his brilliant discovery of a method of fixing the image of an object in the camera obscura, in the completion of which the art of photography consists. This invention was not a mere chance result of a chemical experiment; on the contrary, it was a calculated series of results. It was a profound application of optical and chemical knowledge to the solution of definite problems, the solution of each being one step towards the grand result. You can see this by what Fox Talbot says of the invention of the art of photography in the first volume of *Pencil of Nature*, published by Longmans, Brown, Green, and Longmans, 1844. I have the original copy here, so any member who wishes to look at it can do so, and he will find it very interesting, especially the pictures, which are very good, considering they were finished so many years ago. I have read it over and over again, and always find some new idea started, when you compare photography as it was at that time, and photography as it is at the present time. Well, this is what he says on the third sheet:—

"One of the first days of the month of October, 1833, I was amusing myself on the lovely lake of Como, in Italy, taking sketches with Wollaston's camera lucida, or rather, I should say, attempting to take them, but with the smallest possible amount of success, for when the eye was removed from the prism, in which all looked beautiful, I found that the faithless pencil had only left traces on the paper melancholy to behold; after various attempts, I laid aside the instrument and came to the conclusion that its use required a previous knowledge of drawing, which unfortunately I did not possess. I then thought of trying again a method which I had tried many years ago; this method was to take a camera obscura, and to throw the image of the objects on a piece of tracing paper laid on a plain piece of glass in the focus of the instrument; on this paper the objects are distinctly seen, and can be traced out with a pencil with some degree of accuracy, though not without much time and trouble. I had tried this simple method during former visits to Italy, in 1823 and 1824, but found it in practice difficult to manage, because the pressure of the hand and pencil upon the paper tends to shake and displace the instrument (insecurely fixed, in all probability, whilst taking a hasty sketch of a roadside, or a view from an inn window), and if the instrument is once moved, it is almost an impossibility to get it back again so as to point truly in its former direction: besides which, there is another objection, viz., that it baffles the skill and patience of the amateur to trace all the minute details visible on the paper, so that, in fact, he carries away with him little beyond a mere *souvenir* of the scene, which, however, certainly has its value when looked back to in long after years; such then was the method which I proposed to try again, and to endeavour, as before, to trace with my pencil the outlines of the scenery depicted on the paper; and this led me to reflect on the inimitable beauty of the pictures of nature's painting, which the glass lens of the camera throws upon the paper in its focus—fairy pictures, creations of the moment, and destined as rapidly to fade away. It was during those thoughts that the idea occurred to me—how charming it would be if it were possible to cause these natural images to imprint themselves durably and remain fixed upon the paper. 'And why should it not be possible?' I asked myself."

Now here you see is the genius of Fox Talbot, the question why and the determination to know at the particular moment; and he says, if you read on, "I made a careful note with such experiments as I thought would be most likely to realise it if it were possible;" so the knowledge of chemistry which Talbot must have had was the main link which brought floating philosophic visions to reality. So in January, 1834, Fox Talbot procured some nitrate of silver—strange to say we have not found a substance yet to better nitrate of silver for our principal processes, but I am under the impression that it won't be long before nitrate of silver will be put aside and something cheaper will take its place; he made a solution, and with a brush spread some on a sheet of paper; he put it in the sunshine, and was disappointed to find that the effect was very slow in comparison to what he anticipated. What would he say now if he were alive? In one thousandth part of a second you can get a picture full of detail, which at that time would take a man a lifetime to draw, and then not so full of minute detail and so true to nature. Then his next experiment was to wash the sheet of paper with a strong solution of salt, and when this was dry it was washed again with nitrate of silver. Of course chloride of silver was then formed in the paper, but he found this was not much quicker; but he noticed where there was not much salt it darkened much quicker, so he tried a weaker solution of salt, and it immediately manifested a far greater degree of sensitiveness. Here he established beyond doubt the important fact that a less quantity of salt produced a greater effect, and no doubt many of us here in experimenting are as near important discoveries as he was with the first solution of salt, but not the fortune to have a weak spot to notice, and if we have, we have, perhaps, not the power of perception to notice it. Fox Talbot not only found out the quickness through the spot, but we find his first fixing solution was a strong solution of salt to stop the further action of light upon sensitive paper. Now Mr. C. H. Talbot, his son, who I have the honour of knowing, has some of these pictures in good preservation which were done by his father in 1835, signed and dated. He very kindly brought a series of these before the Bath Photographic Society, and I had

* Read at the Photographic Convention.

the pleasure and good fortune to have a good look at them, and I can assure you I was immensely surprised to find these early results in such good condition, especially taking into consideration the camera and lens and the difficulty of obtaining chemicals at that time for working photography.

Now it took an hour or two to procure a picture at that time, so he tried no end of experiments to make the paper more sensitive; and here he says, during his experiments, how necessary it was to trust to nothing but actual experiment. He tried repeated alternate washes of salts and silver, and using it in a moist state, so he reduced the exposure from an hour to ten minutes. These being Fox Talbot's important discoveries in 1835, I wonder he never brought them before some society until Daguerre made known to the world his important discovery; but then, at that time, there was not in England an Arago who kept on extolling Daguerre's discovery to the Assembly of Science, which surprised the whole scientific world. Besides, Fox Talbot was of a modest nature, and his results were achieved only by steady work continued year after year. Strange to say, all the principal processes used now—such as transparent paper, films, &c.—are the outcome of Fox Talbot's experiments. Here are some of his first paper negatives, which his son kindly gave to the Bath Photographic Society; and here are some more which Mrs. Calvert Jones kindly lent me, taken by her husband and Fox Talbot in the early days. Mr. Calvert Jones was the first to whom Fox Talbot taught his process, and he was a personal friend as well. The unique box of Daguerreotypes was also taken by them. Now I want you to look at these negatives carefully, and, as they are passed round, give your honest opinion upon them, and see if you do not come to this conclusion, that though we have advanced so much, it seems so little. There is also a complete set of *Pencil of Nature*, which is very rare and valuable. Look how well some of the pictures have kept—and nearly fifty years old!

In spite of high birth and good means, Fox Talbot was one of the few men who devote themselves to scientific research during the greater part of their lives. Fox Talbot's genius was very versatile, for he did good work in spectrum analysis, and, with Rawlinson and Hincks, was one of the first to decipher the cuneiform inscriptions brought from Nineveh. We also owe to Talbot the use of albumen employed for printing photographs; and on September 20, 1840, he discovered the latent image—which, by-the-bye, none of us understand yet—and the mode of its development, which altered the whole system of his work. During the British Association's visit to Bath last year, I had the pleasure of seeing the place where Fox Talbot's first experiments were tried, and recognised the places in the pictures which are here; and, during the time I was admiring the noble mansion, a profound sense of feeling and respect for Fox Talbot, the English father of photography, came over me.

He died at Lacock Abbey on the 17th of September, 1877, full of years and honour. It is greatly to be regretted that no public memorial has yet been raised to his memory; why, at the French Society, when I was at Paris a fortnight ago, they had three busts of Daguerre in the room. By Fox Talbot's discovery we are getting to love the beautiful symmetry of nature's secrets; even in the invisible portion—to the eye—of the insects, we now, by the aid of enlarged photographs, trace the beauty and form—a love and appreciation which were repulsive to us before. It seems as if we have a new world to investigate; many great truths are half known and half enjoyed for centuries; the means and the wish to know the other half is the essence and the substance of all great discoveries. Now photography is launched upon the restless ocean of the human mind, we can safely calculate for advancement which will calm down mysteries, and bring things home to us as they really are. Photographers should always be in a good humour, for people always put on their best look to be photographed, and the reflection from these charming faces we see should be sufficient in itself to make us always happy. Besides—

> "Photography is like magician's charm—
> We nurse the absent, in affection warm
> Present the distant, and retain the dead
> Shadows remaining, but the substance fled;
> For faces vanish like the dreams of night,
> But live in portraits drawn by beams of light.
> Exquisite Nature caught in changing dress;
> Motion in photography appears at rest."

PHOTOGRAPHIC CLUB.—The subject for discussion on Wednesday, September 11th, will be "Doctoring Negatives." Saturday outing at Hampstead; meet after at "Bull and Bush."

THE EASTMAN NEW TRANSPARENT FILM.*

BY G. D. MILBURN.

THE advantages of these films to the photographer over glass dry plates, and all other films on the market, briefly summed up, are as follows; superior transparency, greater flexibility, lightness, compactness, practicability of printing from either side of the negative, and lack of halation.

Heretofore, non-transparency has been a great stumbling block to a flexible film; but this is entirely overcome in these films, as they are about as transparent as glass, and the great flexibility of these films makes it practicable to wind as many as one hundred exposures on one spool to be carried in one "roller holder." In fact, experience has taught us that the best method to keep films of any kind absolutely flat during exposure is to keep them strained over a board from spool to spool, in the manner of the Eastman-Walker roll holder. The films carried in this manner make a view outfit very light as compared with the glass dry plate outfit. One hundred of these films ready for exposure will not weigh much more than six of the same size dry plates, and a transparent film view outfit will not occupy over one-tenth part the room of a glass dry plate outfit of the same size.

These films are so thin that it will be possible to print from either side of the negative, and being so thin, there will be practically no halation to be met with in the negative. The backing of these films is impervious to water and unaffected by chemicals in the developer; therefore there is practically no contraction or expansion during the operations of development, drying, and printing from the negatives, which must stamp this as the very best basis to hold a sensitive film.

This company's improvement, by the addition of the single revolution audible indicator and intermittent marker on their roll holders for these films makes this system of photography perfectly practicable for the studio and field.

The following formula is recommended for these films.

Pyrogallic Acid Solution.

Pyrogallic acid	½ ounce
Nitrous or sulphuric acid	20 minims
Water	32 ounces

Soda Solution.

Sulphite of soda—crystals	6 ounces
Carbonate of soda—crystals	4 „
Water	32 „

To develop, take—

Pyro solution	1 ounce
Soda solution	1 „
Water	2 ounces

Restrainer.

Bromide of potassium	1 ounce
Water	6 ounces

Restrainer is to be used only in case of over-exposure.

As soon as developed, rinse slightly, transfer to a saturated solution of common alum for two minutes; rinse again, and fix.

Fixing Solution.

Hyposulphite of soda	4 ounces
Water	16 ounces

If a number of films are fixed together in one tray, they should be put in face down, to avoid scratching or cutting the sensitive side by contact of the sharp corners.

After fixing, wash thoroughly; immerse for one minute in the

Soaking Solution.

Wood or grain alcohol	16 ounces
Water	16 ounces
Glycerine	½ ounce

Remove from the soaking solution and pin up each film by the corners to dry spontaneously.

SUGGESTIONS.

A good way to dry these negatives is to pin them by two corners to the edge of a shelf, and then to pin the lower corners to a light strip of wood. Any tear drops of the soaking solution should be removed with a bit of blotting paper or absorbent cotton. When the negative is thoroughly dry, wipe off the back with a soft cloth.

The object of the soaking solution is to prevent the film from cutting when dry. The negative must not be rinsed after the soaking solution.

Always keep finished negatives flat—do not roll them up.

* Abstract of a paper read before the Society of Amateur Photographers of New York.

Notes.

A sojourn at any watering place where the country round is tolerably picturesque soon reveals the popularity of photography as a pastime. Take the Isle of Wight, for instance. It is impossible to be out for a day without meeting some one who has a camera either boldly exposed or modestly concealed by its leatheru covering. Shanklin is a favourite haunt of the amateur, and the celebrated Chine has generally one if not more taking shots at the far end where is the dribble which passes for a water fall. Quite alive to the requirements of the times, a Shanklin photographer places a dark room at the service of amateurs at the moderate charge of five shillings per week, and no doubt the boon is generally appreciated, because anyone knows that the amateur who has just started photography is unhappy until his plates are developed and he has seen what he has got.

It is curious to note, when accommodation in the way of a dark room for amateurs has been provided by professional photographers, that the arrangement has been forced upon the latter maiuly in self-defeuce. It comes about in this way. In popular holiday resorts favoured by amateur photographers, it is no uucommou thing for a lady or gentleman to call upon a local professional, purchase a dozen plates, and then ask permission to fill three or four double backs. Supposing the dark room is free, the request is grauted, and the lady or gentleman retires. Soon after comes in a sitter, and the photographer is nicely cornered, for he cannot get to his dark room. Only those who have had to do with photographic novices can tell how long it takes them to fill, say, three double backs. Every plate is examined minutely, turned over two or three times, and held up to the light, in order to make sure which is the coated side, and the minutes fly swiftly. All this goes on while the unfortunate photographer is waiting to carry on his legitimate business, and though the tardy amateur may overwhelm him with thanks and apologics, these hardly compensate him for the loss of time. Hence, to avoid this inconveuience, and, at the same time, to accommodate amateurs, photographers who are thus pestered have been compelled to fit up separate dark rooms, as iu the case mentioned above.

Perhaps the best evidence of the number of amateurs is furnished by the boats which run between Portsmouth aud Ryde and Cowes and Southampton. Rare indeed are the occasions wheu the camera is not to be seen. But it is nearly always at rest, aud the picturesque "bits" in the Solent and Southampton Water, and the innumerable little pictures of shipping, go unnoticed. The truth is, it wants not only self-possession, but experience, to photograph with a crowd of people at your elbows, whose criticisms and speculations on your possible succcss are not always pleasant to hear. It ought not to go without record that a good many of the photographers are ladies, and we witnessed a couple of ambitious fair ones the other day between Saudown and Brading making an attempt to photograph the train. Fortunately for them the rate of speed attained on the Isle of Wight railways is not a very high one, and they may have succeeded. Ou the whole, the holiday season this year, while it must make the professional photographer a little sad, shows that a vast industry has sprung up in the manufacture of photographic apparatus and the consumption of chemicals.

The artist who devotes himself to portraiture may expect a troublous life: the criticisms are so candid. No two people ever agree as to whether a portrait is like, while everybody, whether he knows anything of art or not, considers himself qualified to pronounce an authoritative opiniou. An artist friend, who is drawing portraits from life aud from photographs every day of his life, and who certainly is master of his art, tells us that he has given up passing an opiuion on his owu work, for what he considers to be a faithful reproduction, whether of nature or of art, has generally met with adverse criticism. There is one class of face which he specially dislikes, and that is the type with a beard cut short and in mathematical fashion, without any marked characteristic. These faces, without an atom of expression, are nearly always unsuccessful wheu drawn, and the critics are most difficult to satisfy. The reasou, as every portrait photographer knows, is pretty plaiu. A man who has his mouth and chiu concealed by a simple mask of hair is dependent chiefly upon his eyes for expression. But this expression is the crux both of photography aud the peucil: hence the artist's trouble. His prayer, therefore, to bearded men is to let their beards grow naturally, or shave them off, a petition which, we are afraid, will go unheeded.

Perhaps of all unnatural things in photography, the retouched baby's photograph is the most unnatural. We were the other day looking at the show-case of a photographer of some stauding, and our feeling was one of amazement that the photographer was not conscious of the absurdity of producing faces which were neither more nor less than the faces of pigmy men and women. The peculiarity of iufantile form consists in, paradoxically speaking, the absence of form. The outlines of the features are indicated rather than defined, and the whole effect is that of softness and roundness. Iu the specimeus referred to, the noses had been carefully drawn, the mouths were hardened, the eyes had a preternatural stare in them, and in some cases eyebrows, the supply of which among infants is rather limited, added. Certainly the portraits were "sharp," but it was the shai pness of petrifaction.

A very unique photographic feat has just been accomplished iu New York. Every yard on the banks of the Hudson River between New York and Albany has been photographed from mid-stream. Upwards of eight hundred negatives were taken, and from these process blocks were made, the result being a volume so arranged that the shores are on each side and the river in the centre. Such a project would probably entail too much labour and expense so far as the Thames is concerned, but what a picture it would present of the greatest city in the world could it be carried out!

PATENT OFFICE LIBRARY

PHOTOGRAPHIC OPTICS.*

BY W. K. BURTON.

CHAPTER VI. (*continued.*)

Correction for Chemical Rays.—The lens having proved satisfactory in the two points just mentioned, we may proceed to test it for the coincidence of chemical and visual focus. It may be here mentioned that appreciable want of this coincidence is not a very common fault even amongst second-rate lenses of the present day; but with older lenses, in other respects of the very highest quality, it is by no means uncommon. Indeed, some of the best opticians were, at one time, in the habit of purposely leaving an appreciable residuum of chromatic aberration, because more perfect correction of certain other defects could then be made. It was in those days customary to allow for this by either having the plane of the plate in the dark slide a little different from that of the ground glass, by racking the lens a measured distance after focussing, or by introducing during the time of focussing a supplementary lens of very long focus, so as to shorten the focal length of the whole combination by the precise amount due to the want of correction. Such things would not be put up with at the present day, and a lens which shows want of coincidence between chemical and visual focus must at once be condemned.

The method of testing is as follows. A row of cards, or of other similar objects, is placed upright in a line so nearly behind each other as is compatible with seeing a number written on the top part of each to distinguish it from the others. There may be, say, seven cards, with a space of six inches between each two. The camera is placed at a distance of, say, fifteen feet, and card No. 4, that is to say the central one, is carefully focussed. A plate is placed in the dark slide, and a photograph is taken with full aperture of the lens under examination. If, in the photograph, card No. 4 appears the sharpest, the result is satisfactory. If, however, a card either in front or behind appears to be sharpest, the lens must be condemned. It is assumed that the ground glass and the dark slide are in perfect register.

To Compare Lenses as Regards Flatness of Field, Marginal Definition, &c.—We shall suppose that two lenses of about equal focus have stood all the tests mentioned, and that it is desired to discover which of these is on the whole the best. Let us suppose them both to be portrait lenses.

The camera is placed opposite to some object consisting of well-defined vertical and horizontal lines. An old-fashioned window frame makes an excellent object. Modern plate glass window frames show too few lines.

If the lenses have different maximum angular apertures, that which has the largest aperture must be stopped down, so as to have the same as the other. The image is made sharp in the centre of the plate, and the falling off of the definition towards the edges is observed, first one lens being used, then another. It will probably be found most convenient to take a photograph by each lens, and to compare the images. That lens which shows the least falling-off of definition at the edge is the best. Should the falling-off be about equal, but in one case be in the form of ordinary blurring, in the other in the form of astigmatism, the lens which shows merely blurring is to be preferred, as the fault can be corrected by the use of a small stop, which astigmatism scarcely can. If the lenses appear equal as regards falling-off of definition, that which has the largest maximum aperture is the best.

To Test for Distortion.—If it be suspected that a lens gives distortion, a weight should be hung with a fine cord, so as to get a straight vertical line; the camera should be placed opposite to this at some distance, with the length of the ground glass vertical, and should be turned till the image of the string falls quite on the edge of the plate. A straightedge is now applied to the ground glass to discover if the string is represented as a straight or as a curved line. If the latter, the lens distorts.

To Measure the Angle Included by a Lens.—The camera used for the purpose must be of such size that the lens cannot quite cover the ground glass. The smallest stop is inserted in the lens, a bright distant subject having been focussed, and the diameter of the circle which is illuminated is taken. As it is sometimes very difficult, with a very wide angle lens, and a small stop, to see the image of those portions of a landscape which fall near the edge of the circle at all, it will probably be best to proceed as follows.

The sun is focussed on the centre of the plate at some time when it is pretty near the horizon. The smallest stop is inserted, and the camera is slowly swivelled till the image of the sun disappears. The spot where it was last seen on the ground glass is marked. The camera is now turned in the opposite direction, and the spot where the image of the sun was last seen is again marked. The distance between the two marks is the diameter of the circle covered. To tell what the angle is the following construction is made. A line A B is drawn = the focal length of the lens. At B a line B D is erected perpendicular to A B, this line is produced. B D and B C are each made = radius of the circle. A C and A D are

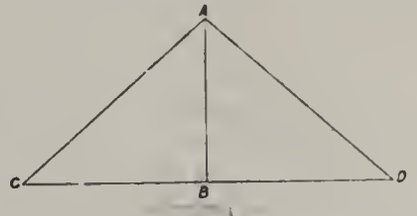


Fig. 34.

joined. The angle C A D is then measured with a protractor or otherwise, and is the angle of the diagonal of the largest plate that can be used. To discover if the lens will cover any given size of plate, the circle is drawn out on paper, and it is found by actual experiment whether or not the plate will come within it. For example, the diameter of the circle is 16 inches. It is desired to find if a plate 12 by 10 will come within it. The plate is laid on the circle, and it is found that it just comes within it. Again, a plate 13 by 11 is tried, when it is found that it does not come within the circle, but that the corners project beyond it.

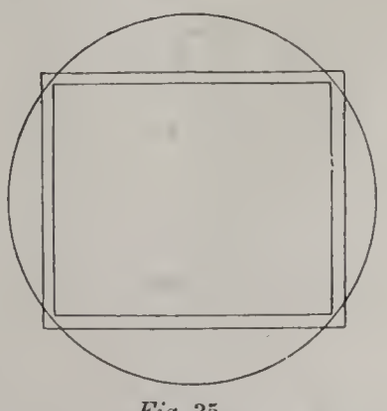


Fig. 35.

If it be wished to discover the angle subtended by the base line of the plate—the actual angle of view—the construction shown in fig. 32 is repeated, but C D is made equal to the length of the plate in place of to the diameter of the circle. Thus, in the case imagined, it is made twelve inches in place of sixteen inches long.

It is to be observed that lenses advertised as having an angle of view of fully 100° and so forth never have anything of the kind. A lens to have such an angle of view would require to cover a plate of length about two and a-half times that of the focus of the lens. Thus a lens of

* Continued from p. 535.

five inches equivalent focus would have to cover a plate 12 by 10. An angle of about 80° is the largest ever included in practice, if we leave out of consideration certain obsolete forms of lens, such as Sutton's water lens.

To test the definition given near the margin of the circle illuminated by a very wide angle lens, it is necessary to make a negative of some well-defined subject, in a plane at right angle to the axis, and at some distance from the lens, using the largest plate that the lens will cover. The image on the ground glass is always too dull to judge by.

(*To be continued.*)

INTELLIGENT USE OF THE DETECTIVE CAMERA.*

BY H. WILKINSON.

SEEING that most amateur photographers nowadays either possess, or are about to possess, a detective camera, and this being the season of the year when it can best be used, I thought a few words on the subject might be acceptable to some, if not all, of you. There are so many various kinds of detective cameras now in the market for the amateur to choose from, that it would be impossible for anyone to say which is the best, as most of them have all and every movement that can be required, the chief difference being that some are more convenient to use than others—more notably one lately brought out by one or two members of this Society. This, however, is not so important a factor as knowing how and when to use the camera for its special purposes. As I am anxious not to weary you, I will commence by calling your attention to some of the advantages of this class of photographic work. As to the former, it is well known that its chief characteristic is concealment of purpose, thus enabling the operator to obtain "shots" at bits that probably could not be obtained with the ordinary uncovered camera, even though the same be held likewise in the hand. Again, the detective camera is very conveniently carried, always set up, and ready for an exposure. And last, but not least, we can alter the stop of the lens or speed of the shutter in less time than it takes one to write it. Many persons seem to think that this is all that is needed to enable them to take any kind of picture. That this is far from correct is only too painfully understood by the thoughtful worker.

When speaking of instantaneous pictures Mr. H. P. Robinson says :—"Instantaneous pictures of a sort have become so easy of accomplishment, that our exhibitions are flooded with them. The photographs may be very useful to painters because they are real bits from nature—real machine views at least—but they are not art. Yet if you look through an acre of them you will find every now and then you will come upon a 'gem.'"

On looking through my work done with the detective camera, I have noticed that the greatest failures arise from bad focussing, or shake of the camera when pressing the trigger of the shutter. Of course there are other faults, such as that some of the subjects were not worth taking; but then this applies to nine-tenths of photographic work, let it be with the detective or field camera, it matters not.

Focussing.—This is a most important matter, for however good otherwise the picture may be, if it is not in good focus, then it is practically useless for enlarging from or making lantern slides, whilst as a print it is anything but satisfactory. On looking over the many faults and errors made by myself and others, I find that perhaps 20 or 30 per cent. of the exposures made are, to a more or less extent, faulty in this respect. In some price lists of lenses we are told that a certain lens of 6-inch focus will define sharply all objects over 19 feet away when using the lens at f_8. That this is not borne out by my $5\frac{3}{4}$ inch Wray lens there can be no doubt, for with f_8, and keeping the distance reasonably sharp, the objects in the foreground to be in focus must not be nearer than 40 feet, whilst with f_{22} neither I nor a photographic friend can get any sharp focus at all, thereby showing that this power, as a working one, is purely imaginary. We are also told by experts that the depth of definition of a lens is governed solely by its length of focus, or to put it in other words, that all lenses equal in focal length have the same power of depth of definition. This, then, being so, it can be easily understood why a lens of comparatively short focus (that will cover the plate well) is the best for use in the detective camera, for its real value and suitability lie in its power of giving great depth of definition, which is so valuable in a picture. This, then, brings us to the question, what is the proper focus, say, for for a 5 by 4 plate? Having worked two lenses on this sized plate of $5\frac{3}{4}$ and $8\frac{3}{4}$ inches focus respectively, I find that the best focus for general use is one not over 6 inches, not even excepting shipping work, which is usually considered to require long focus lenses. Of course if you cannot get near enough to the objects, then a long focus lens is a necessity. Many of you use finders with your detective cameras. I do not, as it requires but very little practice to enable one to know the angle the lens gives; besides, how can anyone snap his shutter at the right moment unless he is carefully watching the object instead of looking at a finder, which gives so small an image that makes it practically impossible for him to see the various changes properly. If I do use a finder it will be for the purpose of obtaining a finer focus of the objects exposed upon. For instance, I would first place a man just sufficiently far away from the camera as would with, say, f_8 or other stop in general use, give me the man and extreme distance equally sharp. On the ground glass of the finder I would then mark in parallel lines the length of the man; I would then place him at a nearer point, and again show the length of the man on the ground glass, and so on, until the man was of such a size that it would be unwise to proceed further on account of the great lack of depth obtainable in the picture. About three different sizes would be found sufficient. And now another matter: when working with very large apertures, pictures are often found faulty in focus on either the margin or middle. Now this is not always the fault of the lens, but of the worker, for two persons may work with the same lens and stop, and on the same view, yet one picture may appear better focussed than the other, for while one focusses sharply on the centre of the plate, the other does so on the whole of it, and thereby obtains sharpness generally. To illustrate this I will ask you to look at this group taken on board ship: you will notice how sharp the persons in front are, whilst those at the back and sides are far from sharp; the stop used was f_{16}, and this, one might have thought, would have brought all into focus; but no, the picture has been spoiled by my not focussing a point further off, which would have brought the two sides of the picture into better focus, and then have equalized the focus all over the plate, which the lens would do if properly used. Therefore, when I determine an object to be in focus at, say, five yards distance, I choose that it be only just in focus, and thus throw the difference on further objects into focus at the same time also. It is only by careful attention to these trivial points that the detective camera can be used successfully, not to say intelligently. And now we come to consider how the camera should be held when the plate is being exposed. Some, or perhaps I ought to say most people, hold it under their arm, at the same time peering into the view finder. I myself prefer to bring the camera up in front of me, and whilst keeping my eyes fixed on the object, waiting for the correct moment to press the trigger. I may here mention that some time ago I developed some instantaneous shots for a professional friend (or I should say dealer) who did not like to risk spoiling the plates himself, as they were for a customer who was an artist. They were all views of fishing boats and men, and I think I never saw such a capital collection of incidents. Somehow or other the figures were all caught at the right moment, neither too soon nor too late. Quoting Mr. Robinson once more, he says: "Nothing but a sound knowledge of those laws, and constant practice, will enable a photographer to make the immediate and lightning-like application of them which is necessary in instantaneous photography. In photographing scenes containing groups of figures, the best artists will get the best pictures. A photographer without a knowledge of art would simply 'fire into the brown of them,' as a sportsman would say, and trust to luck; while a photographer who knew something of the rules of composition would wait until his figures arranged themselves to advantage, and would know when was the best moment to pull the trigger of his camera."

Development.—After many trials of different developers for instantaneous work, I decidedly prefer the following :—

Sulph. pyro	...	...	...	...	20 min.
Saturated solution of soda	...	...	...	...	90 „

to each ounce of developing solution. The sulph. pyro referred to is that made by Messrs. Sharp and Hitchmough, of this city, which is said by them to contain 1 grain of pyro in every 10 minims of solution. The saturated solution of washing soda is made by putting into a jug a pound or so of the soda, and then pouring over it a small quantity of boiling water, after

* Read at the Liverpool Amateur Photographic Association.

which the saturated solution is poured off, and then filtered into the stock bottle; when quite cold, crystals are formed, clearly showing that the solution is really a saturated one. I use no bromide whatever, as I have not found it at all necessary, even with plates over-exposed in the ordinary camera. As an instance of this, I may mention that not long ago I gave a 10 by 8 plate eleven seconds with $\frac{1}{4}$ stop on an open landscape, and developed the plate with the maximum quantity of soda, and I neither got fog nor flatness of image, because, as soon as I noticed the image flash up, I quietly made up a fresh developing solution with plenty of pyro in and no soda, then poured off the first developer and applied the latter, which quickly gave me the density—or rather, I should say, gradation—desired in the negative. With the detective camera all the plates, being under-exposed, require forcing in development; therefore I would advise that on no account should the pyro be at any time stronger than 20 min. to each ounce of developer, as, if so, the resulting negative is certain to be too hard or chalky—a disadvantage which afterwards cannot well be remedied; whilst a thin negative is always capable of being improved by intensification during development, or even after being fixed. The importance of keeping back the pyro cannot be too strongly put before you—this, and not the accelerator, being the keynote of the resulting negative.

Plates.—Those I prefer are Edwards's isochromatic. My reason for this is (1) they are better coated, (2) a trifle more sensitive, and (3) more suited to the ever varying conditions of light than any other plate in the market. If expense is an object, this may be met by being more particular as to choice of subject, and thus expose a less number of plates, or, when changing the double backs, have half only of those mentioned, and the other half either Fry's or Ilford ordinary—using the latter when the light is at its best. That this is an important point in detective camera work I will prove to you by the four negatives I now pass round for inspection. The plates used were Wratten's special extraordinary; time of exposure about 6·30 in the beginning of June; light, bright sunlight, but very yellow, so much so, in fact, that do all I would I could not get density, even in the sky, and yet where the whitewashed or painted roofs of the warehouses and the white sails of the boat come in, these are dense enough. I am certain that, had these plates been Edwards's isochromatic, I should have obtained a much better quality of negative. In dull or cloudy weather also isochromatic plates are much more sensitive than the others named, thus enabling the operator with these plates to obtain detail in his negatives that would without doubt be lost if the cheaper ordinary brand of plates were used. There is also another advantage these—and indeed Carbutt's and other expensive plates—have over the cheap brands, and that is the ease with which they will re-develop up to proper density after all detail is got out of the plate. This is a most important factor, inasmuch as all plates used in the detective being under-exposed, this allows us to first develop out all detail, after which the pyro may be added, and a negative made that will do for silver or other printing, as the operator wishes.

Shutters.—The form of shutter I use is, as you see, a Kershaw, the release being a press button. I don't know that this can be beaten, as unlike the string and other arrangements for this purpose, the release does not jerk the camera. I do not, however, find the Kershaw fast enough for athletic sports or rowing subjects, but as I am not anxious to make silhouettes, but pictures, the speed is all I require. I would, however, prefer a Thornton Pickard "time and instantaneous" shutter if I were buying another one, it being, I think, a faster and certainly more generally useful article. Referring again to speed of the shutter, unless the objects are very close and large, about eight turns of the tension spring are quite sufficient, my object being to get the maximum of exposure consistent with the non-blurring of the objects in the picture. I confess to a liking for a small amount of blur in street pictures, as they give some idea of motion, and do not look so stiff as when without blur, or absolutely sharp. The distance of the subject must rule the speed of the shutter. If very close, the speed must be great, but if reasonably distant, then a few turns is all that is required.

In the foregoing I have dealt with my method of working the camera, and must now confess that the results of detective work are far from being satisfactory, or all that can be desired. I honestly believe that it in one way or another costs more, or at least as much as working a whole-plate, and then, what is the average of good work? It is almost fearful to contemplate, but of course some persons may be so easily satisfied that they put all their negatives down for gems, provided they give a print at all. As an instance of this, I remember reading in a photographic annual an article written by a well-known amateur, who claimed for a certain picture he had taken that the principal object was quite sharp and full of detail; whereas, having seen a print from the negative, I find that the object is not even in proper focus, and it possesses little or no detail whatever. The latter I do not find fault with, as such a speed of the shutter must, of necessity, not admit of much detail being secured. It may be thought clever to photograph trains quite sharply running at the rate of, perhaps, fifty miles an hour; but, at any rate, it is not art. It would be interesting to criticise some of the many pictures which some writers speak so glibly of in our photographic journals. I am afraid the gilt would fall off some of them if carefully analysed.

And now in conclusion. Those who intend going in for detective work need not despair of success in the highest degree, provided they will work it in an intelligent manner—or, in other words, not expect their machine to do all that is requisite, but use their brains also.

PAST AND PRESENT.*

BY W. M. ASHMAN.

WHEN the gigantic strides which photography has made amongst the arts, and the enormous advantages it confers on mankind at large, are considered, it is really a matter of surprise that until recently such a comparatively small proportion of literary work should have served for the dissemination of its marvellous capabilities. But this apparent state of quiescence as regards the development and spread of photographic knowledge is fast melting away before the fierce heat of popular enthusiasm now to be met with on all sides, and in every civilised community societies formed for the express object of advancing photography are making great headway; the number, which increases at an astonishing rate, can now safely be estimated at a hundred in this country alone, there being hardly a centre of importance where a band of the brotherhood does not exist. It would be difficult to comprehend the amount of energy displayed by active members of these many societies, or appraise the value of this work, only a tithe of which gets recorded in the respective societies' archives, to slumber indefinitely within the recesses of the Secretary's minute-book of proceedings. The process of referring to such an *omnium gatherum* being at all times tedious, and owing to its limited scope in a great many instances proving of but dubious efficacy, outside publication of the sayings and doings of individual members has grown to be a necessity to photographic society existence, and one which it would not be difficult to show has sprung up in a ratio with the growth of photographic society discussions rather than to the popularity of any particular quantity or quality of photographs, such as are produced on a strictly commercial basis.

Looking back through the pages of our brief history to the incipient stage, if we may so phrase it—to the period when Fox Talbot, Herschel, Brewster, Hunt, Reid, Ponton, and many others in this country, contrived in a brief space of time to introduce to the scientific world a constant series of discoveries of more or less *immediate* importance—we find that in many instances a very meagre record appears to have been kept. It may be that little was then thought to be necessary which did not bear directly upon the process occupying the experimentalist's immediate attention; but who can judge of what recorded experiments may or may not at some future date be of intrinsic value, and perhaps be the means of stemming the progress of an over-ardent patent seeker? Indeed, owing to the scarcity of reliable information on several matters, it has, in so short a period as a trifle over half a century, become no easy task for the historian to assign to our English experimentalists their due share of honour for the discoveries they made. A writer of history is dependent upon former works for much of his narrative; therefore, should the material he has to deal with be incomplete, and there are doubts concerning the accuracy of the earlier publications, future students are almost certain to be led into error. In the pre-journalistic days of photography, we learn that the record of progress was restricted to stray paragraphs, which from time to time appeared in the public press, or the printing of papers on photography in the "Philosophical Transactions," the authors having read them before the Royal Society. These, together with a few works written by well-

* Read at the Photographic Convention.

known experimenters of the time, whose names have since become household words, were the available sources of information, and, based upon this material, the English portion of the early history of photography has been built up. There yet remains to be brought to light investigations recorded only in note-books, some of which are known to be carefully preserved, awaiting a fitting and convenient opportunity to be placed in history. It is fortunate that, as time passed on, one or two societies sprang into existence whose business was the advancement of photography as a separate and distinct branch of science, and the result of their work was published by themselves. The information so meagre at that period, and so much in request, led to the founding of journals devoted exclusively to the interests of photography from a scientific as well as a commercial point of view, and henceforward the advancement of photographic knowledge, and the elucidation of all that pertains to the fundamental principles underlying processes, have been steady and quite unmistakable.

At this period, however, the general interest exhibited in the study and progress of the art, as distiuguished from the novelty created, may very well be guaged by the number of societies existing for the mutual interchange of ideas, and for the general advancement of photography. The possibility of producing a pictorial representation by the aid of light and the alteration of some chemical compound was known early in the "thirties," and abroad at a still earlier date. Yet it was not until about twenty years afterwards, in 1852, that the first photographic society was formed, followed in 1853 by the present Photographic Society of Great Britain, then known as the London Photographic Society. Manchester came next in 1855, and ranks second in point of venerable activity at the present time. The South London Photographic Society, founded in 1859, did most excellent service, but upon the death of the President, the Rev. F. F. Statham, in 1884, fell into almost complete lethargy, and, as a consequence, after some twenty-five years' work, succumbed from inanition.

Running down the list as published at the time, we find between 1860 and '70 that seven more were formed: the Amateur Photographic Association, also societies at Sheffield, Edinburgh, Glasgow, Liverpool, Cheltenham, and Oldham. In the following ten years seven others were added: Bristol and West of England, 1871; Photographers' Benevolent Association, 1873; Sheffield, 1876; Photographic Club, Dundee and East of Scotland, Photographic Society of Ireland, 1879. Now the influence of rapid dry plate photography becomes apparent, four societies within our own border having been formed in the one year 1879. Since the advent of 1880 to the present time the number of societies started in this country and busily engaged may be estimated at no less than eighty, about a dozen and a half of which were established last year. The majority of these many centres of enlightenment are very active ones, ranging in membership force from twenty-five as a minimum, to considerably over four hundred as a maximum. The present strength of the membership roll of the Convention of the United Kingdom I do not exactly know, but, judging from the large and representative committee elected to carry on the work this jubilee year of English photography, one is naturally led to the conclusion that the Society is as numerous as it is important, and, further, that the great energy displayed by those gentlemen who have undertaken to guide the ship will call forth the hearty response which such unselfish labour deserves. The objects of the Convention—at least, such as I imagine them to be—are so distinct from those of the general run of photographic societies, that I am led on the present occasion to leave out of this short paper matters of a purely technical nature, such as may be regarded as the legitimate business of any one of our hundred or more societies, and to crave your patience while I state a case which many are agreed ought to be dealt with at once.

I have already mentioned certain familiar names in connection with the beginning, so to speak, of that photography we are so proud to be now associated with, but to relate anything like a chain of circumstances, or to dilate upon those original researches which contribute so much towards the present position held by photography, would not be fitting here, where so much work is contemplated in a very brief period. Every one will readily admit that we owe a deep debt of gratitude to our English fathers of photography, a debt that mere words introduced into papers and manuals by way of preface does not adequately recognize, since such expressions are those only of the individual authors, though, let us hope, they record the general sentiments of us all. We who are situated in the provinces or abroad are looking forward with interest to the result of this meeting of the Convention in 1889 at St. James's Hall, London, where the jubilee of the discovery of English photography is to be celebrated. Several celebrations termed "jubilee" have already taken place in connection with our art, but have any steps been taken to establish a permanent testimony to our great benefactors? Monuments have been talked of in honour of William Henry Fox Talbot as a set-off against those erected in France to honour the illustrious Frenchmen, M. Daguerre and M. Nicephorus Niépce, but the wisdom of building monuments of such a kind is doubted by many who would gladly help in some other scheme to perpetuate the esteem we of the present generation have for those veterans who have gone before. It would be presumptuous for me to come to the Convention with a cut-and-dried scheme and ask you to give me your support in carrying it out, but I will ask you in the interests of photographers to consider whether this Convention week is not an opportune time to appoint a committee with power to bring forward a definite plan, and submit the same for general approval as early as possible. In my own opinion Fox Talbot stands first in the importance of his successful researches. Some of his photographs, produced as far back as 1835, are, I believe, preserved at Lacock Abbey, Wilts, by his son; but these historical treasures have been publicly exhibited at a photographic society's meeting, held in the early part of the present year at Bath. An album of calotypes produced by the inventor has also been placed on view in the hall by permission of the society referred to, and I am sure those who have an opportunity of examining these valuable prints will be struck both with the excellence of selection and the degree of permanence they exhibit.

Mr. Friese Greene, who had been entrusted with the album, will doubtless in his capacity of delegate deal with this matter more fully than it is my purpose to do, for other names also await their share of recognition. Mungo Ponton is thought by many to be as deserving of monumental adoration in Scotland as the great Frenchmen in their own land, or Talbot in this country. Sir John Herschel's researches were by no means meagre; whilst to Robert Hunt, Claudet, Goddard, Sutton, and others, due prominence ought in justice to be given. To erect a statue in honour of every scientist who has discovered a photographic process is out of the question, but to found an institute for the advancement of photography may seem practical to commemorate this period of our history. There is ample work to do, and, if properly managed, such an institution might prove useful in many ways. Within its walls the future photographer might find the portraits of the fathers of photography, a record of their experiments, and examples of their work. Starting with such material, later inventions, improvements, or discoveries, would doubtless follow improper sequence, and something like a national institution would be the result. Whatever is done to commemorate the early work in photography could not have a better start than at this Convention gathering of photographers, representative of all the different photographic societies of the United Kingdom, and the numerous industries which the birth of this art has given rise to.

PHOTOGRAPHING A PREHISTORIC FROG.—Some of the papers say that during the progress of the Manchester Ship Canal works, as the quarrymen on the Barton section were lifting with a crane a block of stone weighing 10 tons, they were amazed to find a live frog in a small pool of water which had percolated through the red sandstone and settled in a cavity. Like the fly in amber, the thing was neither rich nor rare, and the wonder was how it got there. The frog was carefully tended, and is now an object of curiosity at the offices of Mr. W. L. Bourke, resident engineer for Barton. It was found on the 29th ult., and has changed colour since its exposure to the air. There is a film over its mouth. Its eyes also, which are large, are apparently sightless. How it has lived and grown in its prison-house is somewhat of a mystery. A plaster cast has been taken of the cavity, and the other day Mr. J. Ambler, photographer, of Market Street, Manchester, took a photograph of the frog. It sat still whilst the operation was performed, and then jumped on to the floor. A correspondent of the *Christian Life*, in writing to that paper on the subject, says: "You have many readers in the neighbourhood of Manchester; can any of them verify this account?"

ARAGO ON THE DISCOVERY OF PHOTOGRAPHY.*

AFTER these imperfect, these unimportant essays, of which we have just given an analysis, we arrive at the researches of Messrs. Niepce and Daguerre, without encountering in our course any intermediate experimenters of any country.

The late M. Niepce was a country gentleman, who lived on his property near Châlons, on the Saône. He devoted the leisure of a studious and retired life to the pursuits of science. One of his discoveries in reference to a contrivance for substituting heated atmospheric air in place of steam in machinery, underwent, with considerable success, a very rigorous trial—an examination before the Academy of Sciences. The *photographic* researches of M. Niepce appear to have begun so early as the year 1814. His first connection with M. Daguerre dates from the month of January, 1826. The indiscreet revelations of an optician at Paris disclosed to him the experiments of Daguerre, then also engaged in researches, whose object it was to fix by some chemical or other process the images obtained with the camera. These facts are authenticated by letters which have been submitted to our perusal. In the event then of dispute or previous claim, the first photographic labours of Daguerre can thus be determined with unquestionable certainty to have attained some shape in the year 1826.

In the following year M. Niepce repaired to England. In the month of December, 1827, he presented a paper on his photographic experiments to the Royal Society of London. This memoir was accompanied with several sketches on metal, produced by methods then already discovered by our countrymen. On an attempt having been made to establish a priority of invention, these sketches, still in a state of good preservation, were immediately and honourably produced from the collections of certain English philosophers. They prove beyond dispute, as respects both the photographic copies of engravings, and the formation, for the use of artists, of plates in the state of advanced etchings, that M. Niepce in 1827 was acquainted with a method of making the shadows correspond to shadows, the demi-tints to the demi-tints, the lights to the lights. These early essays further prove that he had discovered how to render his copies, once formed, impervious to the erasing and blackening effects of the solar rays. In other words, the ingenious experimentalist of Châlons, by the composition of his grounds, and so early as 1827, resolved a problem which had defied the lofty sagacity of a Wedgwood and a Davy.

The deed of co-partnery between Messrs. Niepce and Daguerre, for mutual investigating and following out the subject of photography, is fortunately registered among the public records, and bears date December 16, 1829. Later deeds entered by M. Isidore Niepce, as his father's heir, and M. Daguerre, distinctly mention, in the first place, the improvements made upon the earlier methods of the philosopher of Châlons by the Parisian artist; in the second instance, they also particularize processes entirely new, invented by M. Dagnerre, and possessing the advantage, in terms of the deed, "of producing images with sixty or eighty times greater rapidity than the earlier applications of the photographic principle."

In what we have just observed regarding the studies of M. Niepce these restrictive expressions have doubtless been remarked—"*for the photographic copy of engravings.*" It was only, in truth, after a multitude of fruitless attempts, that M. Niepce himself had almost renounced the idea of ever being able to fix the image in the camera. The difficulties which presented themselves in the course of his investigations were chiefly the following. The preparations which he at first employed as the ground of the future design did not yield with sufficient rapidity to the action of the solar rays, so that ten or twelve hours proved hardly sufficient for producing a single design. During an interval so protracted the shadows cast upon the various points of view were very much altered—indeed, entirely changed in place, form, and extent; they had passed, in fact, from the left to the right of objects, and this traverse, wherever it operated, gave birth to flat and uniform tints, without life or distinctness. In the results of a method so imperfect, all the effects arising from the contrasts of light and shadow were lost. Again, amid these manifold inconveniences, the operator was by no means sure of succeeding; after infinite precautions, causes unassignable or fortuitous gave him sometimes a tolerable result; at others, he obtained only an incomplete image, with here and there extensive blanks. In fine, when exposed to the solar rays, the grounds upon which the images were impressed, if they did not become black, cracked and came off in small scales. By taking the opposite of each of these defects, an enumeration nearly complete will be obtained of the merits of the method discovered by M. Daguerre, after an immense number of minute, difficult, and expensive experiments.

The feeblest rays impress the substance of the Daguerreotype. The effect is produced before the shadows have had time to change in any appreciable degree. The results are certain, by the operator's acting according to a few very simple directions. Finally, the images being once produced, the solar rays continued for years affect neither their purity, brightness, nor harmony.

Your commission have made the necessary dispositions for enabling all the members of the Chamber, during the day appointed for the discussion of the Bill, if they judge it proper, to verify the results of the Daguerreotype, and to form for themselves an opinion on the probable utility of such an apparatus. Upon examining several of the pictures to be submitted for your inspection, all will consider the immense advantages which would have been derived, during the expedition to Egypt for example, of a means of reproduction so exact and so rapid; all will be struck with this reflection, that if photography had been known in 1798, we should this day have possessed faithful representations of many valuable antiquities now, through the cupidity of the Arabs, and the vandalism of certain travellers, lost for ever to the learned world.

(*To be continued.*)

* Continued from page 572.

Patent Intelligence.

Applications for Letters Patent.

13,493. J. R. HUGHES, H. B. PHILLIPS, and W. MITCHELL, 5, High Street, Bow, London, "Automatically Delivering Photographs."—August 27th.

13,523. W. P. THOMPSON, 6, Lord Street, Liverpool, "Fixing and Developing Solutions."—August 27th.

13,676. W. J. LANCASTER, 6, Livery Street, Birmingham, "Photographic Camera Shutters."—August 30th.

13,695. H. PINCERS and O. SELLECK, 52, Chancery Lane, London, "Optical Apparatus."—August 30th.

13,699, W. H. R. KERRY, 6, Lord Street, Liverpool, "Photographic Cameras."—August 30th.

13,712. R. D. BOWMAN, 22, Southampton Buildings, London, "Producing Oxygen Gas."—August 30th.

13,739. W. H. PHILLIPS, 73, Colmore Row, Birmingham, "Photographs and Apparatus."—August 31st.

13,748.—J. G. CUMMING, 154, St. Vincent Street, Glasgow, "Automatic Delivery of Photographs."—August 31st.

Specifications Published.

8,378.—*May 20th*, 1889. "Photographic Cameras." WILLIAM SANDERS, 91, Mount Pleasant, Liverpool, Boot Manufacturer.

The invention has for its object a photographic camera formed with two parallel tubes, similar to the tubes of an opera glass, and either with or without the external appearance of the same. It is applicable for the use of detectives, and, owing to its external appearance, can be directed towards a scene or object for the purpose of producing a photographic picture thereof, without suspicion being aroused as regards the real purpose

which the operator has in view. The apparatus being, the inventor says, of very compact form, and easily portable, is also applicable for tourists, surveyors, civil engineers, and others. A pair of telescopic tubes, having parallel and simultaneous adjustment, is employed as in an opera or other like binocular glass, one of which is adapted for focussing, and the other for receiving the sensitized surface or plate which is exposed to the actinic action of light. The apparatus is so arranged that when an object is focussed by the one tube, the sensitized surface in the other tube is in the proper focus to receive the image of such object.

10,322.—*25th June*, 1889. "Translucent Enamel and the Application of the same in Relief for the Decoration of Glass, Metal, or any Ceramic Ware." WILLIAM LUTWYCHE, 187, Wardour Street, London, W., Stained Glass Manufacturer.

My invention relates chiefly to the use of the materials employed in the preparation of translucent enamel. I am aware that translucent enamel has already been made, but I claim that by the use of the method and materials hereinafter described, an article is produced superior in quality to any hitherto made. The translucent enamel so far produced has been in very few colours, and the translucence has been comparatively ineffective; but by the methods hereinafter described I am able to produce translucent enamels of any desired colour or shade. It is premised, however, that the operator must have experience in treating the materials, and that the same materials treated by an ordinary enamel maker may not produce the desired result.

In the production of white translucent enamels the following materials are employed, and in approximately the proportions specified:—150 to 200 parts of minium; 80 to 120 parts of boracic acid; 50 to 80 parts of oxide of zinc; 30 to 40 parts of stannic acid; 50 to 60 parts of clean sand; 20 to 30 parts of finely ground soda; 5 to 10 parts of feldspar; 5 to 10 parts of fluor spar; 4 to 8 parts of carbonate of potass.; 2 to 5 parts of carbonate of lime; 2 to 5 parts of borax; 2 to 5 parts of nitrate of soda. Add 10 to 30 per cent on the whole of glass flux.

The whole is mixed, melted in a crucible, and poured out on to a clean iron plate, after which it is broken up in a mortar and then ground to a fine powder.

I find that the use of fluor spar, carbonate of potass, and borax materially improves the translucence of the enamel. For colours the above materials, ground or unground according to the amount required, are placed in a crucible and the following colouring matters added:—

For brown...	...	Black oxide of manganese.
„ pink ...	...	Purple of cassius.
„ red ...	...	Red oxide of iron.
„ yellow ...	...	Chromate of lead.
„ blue ...	...	Black cobaltic oxide.
„ green ...	...	Red oxide of copper
„ turquoise	...	Black oxide of copper.

The whole is then melted and ground as already described.

The various tints and shades are made by varying the quantity of colouring matter introduced.

The material is applied to the glass or other material in the form of a paste, which is made by mixing the fine enamel powder with water, and applying the same to the surface of the glass or other material by means of a brush or spatula. The glass may be either with or without a traced line. It is then placed in a kiln and fired until the enamels are melted and left on the glass in relief.

What I claim is:—

1. The method of making translucent enamel substantially as described in the foregoing specification.

2. In the manufacture of translucent enamel the use of fluor spar, carbonate of potash, and borax approximately in the proportions hereinbefore specified.

3. The application of translucent enamel in relief as made by my improved method to the decoration of glass, metal, or any ceramic ware.

10,885.—*5th July*, 1889.—"Producing Grained Surfaces on Lithographic Plates." JABEZ GORHAM HARRIS, 31, Pearl Street, Providence, Rhode Island, United States of America, Lithographer.

The invention consists in a plate-holding bed, provided with raised sides for holding a quantity of sand and a number of balls, with means for imparting a reciprocating movement to the said bed whereby the sand and balls, with water if desired, will be made to traverse to and fro over the surface of the plate, the balls operating as rollers to press the sand against the surface to be grained.

The inventor claims:—

1. A plate-holding bed, provided with raised sides, and holding a quantity of sand and a number of balls, with means for reciprocating the said bed to agitate the sand and balls upon the plate.

2. A plate-holding bed, provided with raised sides, and holding a quantity of sand, a number of balls, and a quantity of water, with means for reciprocating the said bed to agitate the sand, balls, and water upon the plate.

Correspondence.

WOMEN AT PHOTOGRAPHIC MEETINGS.

SIR,—May I ask your kind assistance in helping a photographic association of seventy members to settle the question as to whether it shall admit lady members? It was my duty as president to move at a special general meeting that ladies be admitted; to this an amendment was proposed, but lost, the voting being ten for, eleven against. The original resolution was put, when twelve voted for the ladies and eight against; but at the next meeting of the Society an objection was raised to the minutes being put recording this resolution, on the ground that the voting did not fairly represent the feeling of the society; and several members threatened resignation. The majority, not wishing to injure the Society, or accept any vote not expressing the absolute wish of the Society, have generously agreed to have the question rediscussed on the 16th inst. I wish to spare my Society the odium of publishing conduct so ungallant and illiberal, and venture to ask your opinion anonymously, except that I enclose to you my name and address, and also to ask the secretaries of any photographic societies who admit ladies, to write to me through you, stating how they find their admission work, and if their presence be disagreeable or otherwise. I may state we have a large room over a suite of offices, at one end of which is erected a large and well-fitted dark room. One of our chief objectors has formulated the following reasons for ladies' non-admission; some of which are very amusing, and some scarcely worth a consideration, but they appear to carry weight with certain members:—

1st. All members are admitted by latch keys.

2nd. That the rooms are open thus at all hours to members.

3rd. That the dark room likewise is open to all comers.

4th. That smoking is permitted and indulged in by members.

5th. That the privilege existing of allowing members to bring out from their lockers alcoholic refreshments proves another source of objection.

6th. That when lady members were admitted it might by the wives of certain married members be regarded as a club of an objectionable character, just below a certain place of entertainment to which women members had free access by latch keys at all hours.

7th. That jokes of varied kinds would arise, and tend to lower the reputation of the Association as now existing.

To these objections I have urged that the ladies would be properly proposed, seconded, and ballotted for, like any other member. It is, however, threatened to black ball them on proceeding to election. I have offered to withdraw their claim for latch keys, and admit them only to lantern exhibits, lectures, demonstrations, and excursions; but my minority are irreconcileable. They say, "Not at any price." We do not any of us wish to break up the Society. I say, and the majority who voted with me, that ladies would improve the tone, and add to the interest. May I ask you, sir, to receive and post to me any replies you may have to this letter, so that I may peruse and use the advice therein contained before the 16th. If you wish, I will return them to you for selec-

tion for publication after that date. I think the discussion a very interesting one, as it has certainly proved an amusing one. PERPLEXED.

[We cannot begin the system of looking after and forwarding letters for correspondents, but shall be glad to receive communications on the subject for publication. As to the question put directly to us by our correspondent, the fact may be mentioned that the lower savages and others are in the scale of civilisation, the worse do they treat women. At the meetings of the Photographic Society of Great Britain women are invited and welcomed.—ED]

THE BRITISH ASSOCIATION.

SIR,—Kindly allow me to intimate to those of your readers who may be visiting Newcastle during the coming visit of the British Association, that a large and commodious dark room is at their disposal at Mr. J. Roberts', 1, New Bridge Street, Newcastle-on-Tyne, and that any information with respect to places of interest in the neighbourhood will be willingly given by J. PIKE.

Proceedings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE members held their usual meeting in the 29th ult., after an interval of a fortnight. There was no meeting the previous week, giving members an opportunity of attending the Convention at St. James's Hall. On Thursday, Mr. J. B. B. WELLINGTON occupied the chair.

Mr. H. D. ATKINSON exhibited a small camera, named the "Demon Detective," and also showed some negatives taken with it; these were more or less fogged.

Mr. ATKINSON said he was quite unable to account for the fogging of the negatives; he did not think it resulted from any imperfection of the camera, which he passed round for inspection.

The CHAIRMAN gave some account of his recent visit to Norway, also showing a number of platinotype prints from negatives taken on his tour. He described the scenery as being rather monotonous, the features consisting principally of mountains and streams.

Mr. L. MEDLAND exhibited a series of silver prints from negatives taken on the Convention excursions.

Mr. T. KERR also showed a series of photographs taken with his detective camera on the occasion of the Convention outings.

The CHAIRMAN gave particulars of his method of printing-in clouds, and also keeping a white margin on his prints. A mask is first inserted between the paper and negative, after the landscape is printed, a small piece of india-rubber cement is put on each corner of the print, the cloud negative is attached, and the printing completed.

In answer to a question as to the best method of drilling holes in glass, Mr. A. HADDON recommended a dead hard drill; this could be made by sharpening a piece of steel triangular shape, and then hardening it. Great care was necessary when the drill was passing completely through the glass, as the plate was then apt to split. To lessen the risk of this, he suggested binding another plate of glass to the back of the one to be pierced, or to drill the hole only half-way through, and complete the piercing from the reverse side.

LIVERPOOL AMATEUR PHOTOGRAPHIC SOCIETY.

THE fifty-seventh meeting was held on Aug. 29th, in their rooms, 3, Lord Street, Mr W. BEER in the chair. Messrs J. W. Smith, Wm. Whiteside, Walter De Wolf, and C. Mortimer Booth were elected members

Reports were given upon the excursions recently held. That to Tonge, Boscobel, and Lilleshall Abbey, consisted of a small party, who enjoyed fine weather and had a pleasant outing; twenty exposures were made with fair results. The excursion to Ponty-Pant, on July 22nd, took place in less favourable weather; the party consisted of six, and fifty exposures were made. The excursion to Eastham Rake on Aug. 10th was affected by rain more or less, indifferent weather prevailing; seventeen took part in the excursion, and sixty exposures were made. Mr. Forrest showed prints taken on the occasion. The excursion party to Risley Mere on Saturday, Aug. 24th, consisted of twelve; sixty plates were exposed; the weather was mixed.

Mr. H. WILKINSON then read his paper on "The Intelligent Use of the Detective Camera" (see page 586). A short discussion followed, in which Mr. ILLINGWORTH, Mr. PEARSON, and Mr. LANGE took part.

The PRESIDENT was of opinion that Kershaw's shutter was quite quick enough, as seen by Mr. Wilkinson's prints. He considered that it mattered very little how the camera was held, so long as the results were satisfactory, and thought the discussion would be useful in throwing minor lights on the subject.

Messrs. EARP and SWINDEN'S detective camera was then exhibited, the principal features being twenty plates carried, or any less number; plates changed instantly by a single action, and without opening the camera or attracting attention; compact and of small dimensions; an intermediate shutter which cuts off all light from the plates is provided, has a door at the side, so that exposed plates may be removed when required; no carriers used, each plate being backed with non-actinic paper. Provision is made for vertical as well as horizontal pictures; it may be used on the tripod for ordinary or slow exposures, has a rising front, the lens carrier is moved by rack and pinion, worked underneath, so as to focus for various distances; it is provided with a view finder and Kershaw shutter.

Mr. H. J. NICHOLLS explained a recent improvement he had applied to his hand camera, by which the "cannon-like optical hole" was covered by a metal plate, made to hold an address card which, upon being moved to one side, wound up the shutter.

Referring to eikonogen as a developer, the PRESIDENT said: By the kind attention of our hon. secretary, I have been enabled to give a practical test to the new developing agent prepared by Dr. Andressen, Berlin. This material, of a pinky dead colour, and of an earthy character, is, without doubt, of the quinol group, but its exact component parts are not revealed. The formula supplied to me I made up, with a slight but useful alteration, and is as follows :—

No. 1.—Soda sulphite	... ...	1½ ozs. 30 grs.
Eikonogen	... ...	3 drms.
Amm. bromide	... ...	20 grs.
Water	... ...	26½ ozs.
No. 2.—Carb. soda (washing soda)	...	3 ozs. 5 drms.
Water	... ...	26½ ozs.

You must mix and use these two solutions with discrimination. For instance, the published instructions say 3 parts of No. 1 to 1 part of No. 2. Now I have found very few occasions when that was the best proportion for the developer. I commenced by developing lantern slides by contact, and found that the full strength of developer was only suitable for strong negatives and correct exposure, and that *one-third* less of No. 2—soda—gave better results. At the same time, except a slight decrease of time required for development, I could not find that it had any advantage whatever over hydrokinone. As a matter of fact, it seems to me to have certain disadvantages compared with that reagent. Hydrokinone is as near an approach as we are likely to obtain to an automatic developer. If the subject is not over-exposed, one may almost drop the plate in the hydrokinone developer and leave it alone until it is completely developed. Not so eikonogen, which requires as careful watching and constant rocking as our old friend pyro. The development certainly proceeds with much greater rapidity, but I do not consider that any particular advantage. I intensified some transparencies developed by the eikonogen formula, to test the receptiveness of the film, and found that it took Werner's intensifier very well. Turning to negatives, I found I had three undeveloped 10 by 8 plates, and as it happened, they were by three different makers, viz., Thomas, Kingston Special, and Britannia, all landscape, and with normally correct exposures. These three were all developed with the same three ounces of developer, and they might be all from the same batch of plates. I must mention that my system of printing requires *thin* negatives; the developer was in this case diluted by two-thirds of an ounce of water to three ounces of the mixed developer; and I think I added a few drops of a ten per cent. solution of bromide potassium. There seems to be great reducing power in the developer, and when an accurate knowledge of the best restraining medium to use with it is obtained, we may find it a capable and useful developer for general all-round work.

Samples of eikonogen were distributed for members to experiment and report on by Mr. Paul Lange, and he also exhibited Tylar's lantern mask cutter with a revolving table.

SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.

AT a special meeting of the above, Mr. G. D. MILBURN read a short paper on the new Eastman film (see page 583), and gave the first public demonstration of its practical value as a substitute for glass. Samples of 8 by 10 negatives with accompanying silver prints were shown. The thinness of the film led some to suppose that it was too delicate and would easily tear, but this point was disproved by simply trying to tear it, when its extraordinary toughness became apparent. Another noticeable point was the non-curling quality and pliability of the film. The new 1887 model roll-holder for carrying the film was shown, and in addition to the regular four audible clicks usually given, which at the same time makes corresponding punctures in the edge of the film, there is a special automatic intermittent audible click and visible register, which sounds when one length of a picture has been wound off, and, at the same time, punctures the edge of the film opposite the usual four marks, a dividing mark between the pictures. Mr. Milburn said that the company's chemist had met with obstacles in endeavouring to perfect the film, but by carefully conducted experiments had solved the mysteries relating to a few of the strange markings sometimes observed in celluloid films. Among other things, Mr. Milburn mentioned that while the film might be successfully developed with different developers, such as pyro and potash, yet the emulsion was prepared in such a way that the pyro and soda gave the best results, and he advised that it be used. The films do not frill, but he preferred, during hot weather at least, to immerse them in a weak alum solution before and after fixing. The mixed alum and hypo bath he could not recommend. Very fast emulsions sometimes indicate, soon after the beginning of development, a slight veil or chemical fog, which does not show as strongly on the edges of the plate as the portions that have been exposed. In such cases it was advisable to continue development until the details were well out; then to pour over the film an old developer or one containing more bromide. The fog was so slight as to do no damage, while one was certain of getting a more vigorous negative by prolonging the development, and it was safe to keep this up so long as the unexposed edges of the film kept clear. To render the film more pliable and cause it to lie flat, it is immersed in an alcohol and glycerine solution after the final washing. Such a proceeding is not absolutely necessary, but is advisable. It is not necessary to immerse the film in water prior to pouring on the developer. It will adhere evenly to the bottom of the tray with, perhaps, a slight curling up at the corners. The developer is poured over the dry film and moved rapidly to quickly cover the surface. The curling corners are then pressed down with finger under the developer, and remain flat.

— The PRESIDENT stated that he had received notice from the Secretary of the Photographic Society of France that it had presented and would send to this Society a bust of Daguerre.

THE *Journal of the Photographic Society of India* is suffering from the temporary absence of its able editor, who possesses good critical capacity, and is thoroughly efficient.

MESSRS. TAYLOR & Co. demur to our statement that their exhibit at the Convention largely presented brass mounts to view; they say that the caps were off the lenses.

IN one of his recent lectures at the Royal Institution, Lord Rayleigh said that Fox Talbot wrote little, but what little he did write deserves more study now than it seems to receive.

WORCESTERSHIRE CAMERA CLUB.—The first exhibition of photographs, photographic appliances, and apparatus, will be held in the Museum and Art Gallery, school of science and art, Kidderminster, from March 1st to March 15, 1890. The Committee will be prepared to receive exhibits on February 24th, the last day for their reception being February 26th. All communications respecting the matter should be sent to the hon. secretary, Mr. William Ray, Worcestershire Camera Club, School of Science, Kidderminster.

"PHOTOGRAPHIC DODGES" is the title of a handy tractate issued by our publishers. The dodges are one hundred in number, collected, classified, and arranged by Mr. W. Ingles Rogers. The compiler explains the object of his little book to be to provide a ready means of surmounting difficulties by acquainting the unsophisticated with a few "dodges" not generally known except to a few veterans in the art, and also to form a handy reference book for the old hands. A carefully arranged index to the contents of the pamphlet facilitates reference.

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper and Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

M. L.—We have not been able to find the patent specification, but will later on make another search. Perhaps it is not yet printed.

JAP.—You cannot do better than consult a small work to be had of our publishers, entitled "Photo-Micrography," or how to photograph microscopic objects, by J. H. Jennings, with a chapter by Dr. Maddox. In this you will find all the information required to make a start.

N. W.—For so small a surface probably a coating of Aspinall's enamel would answer. Choose an appropriate colour, and it soon dries.

J. T. S.—The portrait group taken on the last day of the Conference by Mr. Friese Greene has come out very satisfactorily; all the faces are recognisable, and your figure-head is particularly good. The picture, 20 by 16, was shown at the last Technical meeting of the Parent Society.

F. R. M. S.—The average annual rainfall for Greenwich is about 25 inches; last year it amounted to 26·67 inches. For the present year to date only about 16·5 inches have fallen, with about half that amount yet due to us according to the normal average; this we are likely to get in the remaining four months, most of it probably in October and November. Mr. Robert Warington has recently been determining the amounts of ammonia and nitric acid in rain water at Rothamsted, and finds them about equal (·5 of each) in one million parts of rain. The quantity in town rain-water would doubtless exceed these proportions, with a notable quantity of sulphuric acid in addition.

A. D. H.—Thanks for sending specimen prints from your extra rapid negatives. We agree with you in your estimate of superiority, No. 1. M. having a clear advantage; as is seen also in the plate which is unfortunately marred by a stoppage in the flow of the developer. This defect might be almost, if not entirely, overcome by carefully papering the top of the negative diagonally when printing from it. Such a very pretty picture is worth an effort to save it. The lake subject, with a man sitting on the bank, and cattle in the distance, is also remarkably good. The Platinotype Company advertise that they are ready to supply the materials for preparing the paper, although they recommend the original hot-bath process.

J. W.—The two photo-lithographs are eminently satisfactory, and show high relief in consequence of the half-tone, and gradation being so good. The process, especially if embracing features of novelty, must be worth further consideration and experimental development, your preliminary results being so full of promise.

J. H. B.—In the case of the *wet* gelatine process the desired amount of relief with true gradation might, we think, be got by following the ordinary camera process, and for your purpose it may not be necessary to fix the negative. In order to get a *dry* gelatine pellicle in fairly bold relief you cannot do better than follow the Woodbury process with bichromated gelatine.

L. S.—The remark in the *Chemical News* is quite true for the length it goes, and you would hardly expect a scientific journal to deal with purely art questions.

ASSISTANT.—Mercury intensification may be resorted to with advantage in most cases, but be careful not to block up the fine lines. Why not employ the usual silver cyanide?

W. SINCLAIR.—Alum is always acid to test-paper, even if many times crystallized. There is an article called "Neutral Alum" made by the cautious addition of sodium carbonate in dilute solution to ordinary alum, but it cannot be dried down without forming a precipitate.

NOT A MEMBER.—The names of the judges at the forthcoming exhibition have been already published two or three months ago. They were appointed at the June meeting, all the names being men of mark. Apply to Mr. E. Cocking, at the Gallery, 5A, Pall Mall East, for a printed copy of the regulations and official advice note. You will have about ten days yet to get ready; Wednesday, 18th inst., is the last receiving day.

S. MC. L.—Sorry not to have been at home when you called; the letter of introduction was sent on last week according to promise.

SUBSCRIBER.—The explanation is, of course, that the then editor asked for and received contributions to the YEAR-BOOK; his successor in office now takes the same course by virtue of his official position.

A. W. C.—Answered by post.

W. H. M., Reading, and another correspondent in our next.

THE PHOTOGRAPHIC NEWS.

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THE BRITISH ASSOCIATION.

THE British Association for the Advancement of Science, which is now holding its annual meeting at Newcastle, was founded in the year 1831. The Association has been not inaptly compared to a phœnix; it lives but for one week in each year, but on the following year a new assemblage rises from its ashes. As the present is the time for photographers to talk about jubilees, it may be mentioned that the jubilee meeting of the British Association was held in York in 1881, under the presidency of Sir John Lubbock; two or three persons who had been present at its first meeting were then in York, but the fact remained publicly unnoticed both by the press and by the Association. Perhaps the venerable survivors had no ambition to pose as fossilised specimens of humanity. The word "Jubilee" is supposed to mean "the year of the blowing of the horn," which now means the year in which every photographer may blow his own trumpet, such being also an extra-congenial task when he has wares to sell. The Jubilee was a Jewish festival embracing three main enactments, namely, (1) That the soil should rest untilled during the year, and man live upon its natural produce; (2) That all landed property should go back to those former proprietors who had been compelled by poverty to sell it; (3) That all slaves should be set free. These features of the Jewish Jubilee were not put in force during the great national one held a few years ago in England.

The idea of founding the British Association was first started by Sir David Brewster, who had seen how well the German annual congress of scientific men had answered in that country from its foundation by Dr. Oken in 1822, downwards. Sir H. Davy, Professor Philips, Sir John Herschel, and Professor Playfair, were among the first to join Sir David Brewster in working out his idea, and they undertook the task under much ridicule, for "brutality to the weak" is considered by foreigners to be an essential part of the British character. During a visit to him at Oxford shortly before his death, one of the founders—Professor Philips—told us about their anxieties over the first meeting, which was held in York. In the morning of the opening day he took a walk in the Museum Gardens, at York, to note the arrival of illustrious strangers and scientific visitors, but found nobody, until a little later four or five personal friends of his own appeared on the scene. More arrived afterwards, and after all, the opening meeting did not prove a bad one. From this small beginning grew the vast organisation now so influential; the Association, in fact, had to pass in the public mind through the three stages of all new things in this country, namely—1. It is a mad idea of ambitious idiots; 2. Not so bad, after all; 3. It is an admirable institution, and we always said so.

To follow in detail the fortunes of the British Association down to the present time would be foreign to our present purpose; but it may be mentioned that in relation to photography some of the discoveries of Herschel, Brewster, Claudet, and others, were first made known at its meetings. At those meetings, Mr. James Glaisher was for many years a regular attendant and active worker. The subjects with which he dealt were chiefly researches carried on at the Royal Observatory at Greenwich. His friend, Sir James Douglass, who in these pages to-day gives information which may be of use to photographers, was president at Birmingham of the Mechanical and Engineering Section (G).

Some of the meetings of the Association have not been without their dramatic incidents. For instance, at the Dundee meeting fierce contention arose between the anthropologists and the ruling authorities of the Association; the former wanted more official recognition, and the latter, while disinclined to do anything to debar the scientific study of man, were in terror lest any of the more rabid anthropologists should strain the feelings of the Scotch by reading papers on such subjects as the alleged ape origin of the human race. Now, they may read what papers they like, and nobody takes much notice. At Norwich, all articles for the cloak room at a *conversazione* were given in gradually to attendants through a small hole in a brick wall; at the close, the said articles were all demanded within a short time, with the result that the ideas of the attendants became mixed, and they mixed up the articles in their charge, so that some members went home without hats or bonnets, or wore raiment which did not belong to them; the other members had to wait until one or two o'clock in the morning, and then make a selection from the remaining articles, which the desperate attendants brought out and strewed upon the floor of the hall.

At Exeter the Association was saddened by the awfully sudden death of Dr. Hunt, the president and founder of the Anthropological Society. He was talking to us for about a quarter of an hour in the reception room in a state of intense excitement about certain grievances; half an hour afterwards the news spread through Exeter that he was a dead man, and the rumour proved to be but too true. It is to be hoped that the Newcastle meeting will not be marred by any incidents resembling those just stated.

Captain Abney is now the president of the Physical Science Section, so a due amount of attention is likely to be given to photography, although of late years this Section has been deluged with papers on electricity, chiefly because a number of active young men at the Universities have been giving special attention to that subject. It would be well if these electrical subjects had a department to themselves; this would be another illustration of the growth of the Association, for the higher an organism the more highly is it differentiated. Captain Abney and

the managers of this Section might do yeoman's service to the British Association by keeping the electrical features in this department in proportionate relation to the other subjects within its scope, by taking seventy five per cent. of the electrical papers "as read"; we shall then again find Section A as generally interesting as it was in the olden time, in the days of Mr. George Griffith, of honoured memory. In confidence, it may here be mentioned that the older members often affectionately speak of the Association as "the dear old British Ass," but this language is not permitted to newcomers, and must not fall from irreverent lips.

THE JUBILEE PHOTOGRAPHIC EXHIBITION AT BERLIN.

[FROM OUR CORRESPONDENT.]

THE International Photographic Exhibition at Berlin, under the auspices of the hereditary Princess of Saxony-Meiningen, which was opened the 19th of August in the rooms of the Royal Academy of War, was excellent in every way. A number of eminent exhibitors of Germany, as well as of England, America, Russia, and other countries, which exhibitors numbered 212, joined to give a correct idea of the development of photography, and of its present high degree of perfection. The exhibition is by no means like that of the year 1865, confined to portraits; it includes all the modern performances of photography, its application to astronomical observations, to geology, botany, zoology, geography, military ends, and to the illustration of books.

Of authorities and institutes of the goverment the following have been contributors to the exhibition:—The Imperial Printing Establishment, the Ministry of Public Worship, the Staff, the Technical High-school, the Royal Hygeian Institute; then the Astrophysical Observatory of Potsdam, the Ducal Polytechnic Institute of Brunswick, the Paris Observatory, the Hopkins University of Baltimore, the Imperial Russian Observatory at Pulkowa, the Observatory of the Harvard College, Boston, U.S.A., and the Liek Observatory, Mount Hamilton, California. Highly interesting is the historical exhibition, which has been located in the western gallery, and which, by a number of selected proofs of different periods, represents a summary of the development of the photographic art-science. Among other things, there is to be seen a picture of the Palais Royal of Paris, taken by Daguerre himself on a silvered plate, besides the first camera sent by Daguerre to the director of the Royal Industrial Institute, authenticated by his autograph and seal.

The scientific section of the exhibition is accommodated in the large festival hall of the building. Here Professor Tromholt, of Christiana, exhibits three photographs of the aurora borealis, taken on red-sensitized azalin plates; Prof. Vogel shows spectra of Geissler tubes, of oxygen, hydrogen, selenium, and other elements, also taken on azalin plates. Professor Rowland, of Boston, has sent his new photograph of the solar spectrum, which is forty-five feet long, and greatly surpasses the photograph of the solar spectrum which he exhibited three years ago at the Berlin Exhibition of the Naturalists, and which then was much admired. Portrait photography is, perhaps, not so numerously represented as might have been expected; even many of the eminent Berlin firms are absent, which is to be regretted, as this gives a false idea of the efficiency existing in the metropolis. The comparatively few portraits that have been sent are good without exception, more especially the beautiful platinum prints by Herr C. Pitzner, the excellent portraits and groups by Herr H. Fechner, the genre pictures by Loescher and Petsch, and the excellent groups and single portraits taken by magnesium flash-light by Herr Van Delden. In the section "Instantaneous Work" are to be seen the celebrated motion pictures of Herr Ottomar Anschütz, and a great number of excellent pictures made by amateurs. In the "Landscape" section the collection of Dr. Paul Gussfeld, who attended the German Emperor to the North Cape, excite great interest. One of these pictures bears the note, "His Majesty held in person the tripod stand." In this section England is ably represented by Emerson, Paul Lange, Williams, Cembrano, and others, whose pictures are much admired by the public. The photo-mechanical printing processes are excellently represented by Josef Albert, Hanfstaengl, Bruckmann, Obernetter, Autotype Company (Munich), Angerer and Göschl, Riffarth, and others. The latter has fitted up a copper-plate printing machine, in which a photogravure plate after a negative by Dr. de Lima, an excellent amateur, is printed off before the eyes of the visitors. The section containing photographic apparatus is good, though it contains no very striking novelty.

CELLULOID FILMS.

AT the recent American Photographic Convention at Boston, Mr. John Carbutt said:—"The advantage of the celluloid film over the glass, I think, will be appreciated before long by the professional photographer. There has been some difficulty in the material not working satisfactorily. The manufacturers of it, as well as the maker of the film, have united their efforts to overcome a difficulty that has been supposed to arise from the camphor in the film. But from late experiments which have been made, I am glad to say that the matter has been brought to a practical issue, and that the difficulty has been entirely overcome. . . . . The use of the film among the profession, I think, will soon become common. Although I have no assurance from the manufacturers that the price of the raw material will be reduced very speedily, yet I think, from the recent sales they have offered us, that it certainly must come about. There are at present only two manufacturers of it, as I understand, in the country; and only one making the product which I have used, because the other was not in a state perfect enough for me to use. I would say that when I commenced the investigation of this, the largest piece I could procure was about 8 by 10 inches, and was very uneven, and could not be made smooth. About last June, when I again sought the company, I found they had been able to increase the size up to 20 by 50 inches, but there was a good deal of the film that was still very imperfect; but they assured me of the high cost of the machinery, and the great care with which they selected the material. It may interest you to know, as far as I am able to describe it, the way this celluloid is made. It is this: They buy the very finest of tissue paper, bleached as white as possible; that is nitrogenized; it is then ground up with camphor and pressed out into a large slab. After some evaporation has taken place, it is shaved off in thin slices, and put into frames and stretched; taken down and put into a press, through which air is forced, and it takes about six weeks to cure it, as they term it. Then the finishing process is brought on, and my object in selecting and inducing them to manufacture it with a fine matt surface was to prevent halation, so much complained of in glass, and it certainly does effect that purpose. I think by the transparent film, with either white or black backing—black would be preferable—that halation would be prevented. The cut film has this advantage, in my opinion, that larger sizes may be used, and they can be handled with a great deal more ease and rapidity."

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.—An Exhibition of photographs and photographic apparatus will be held on October 28th to 31st, and November 1st, in the Old Grammar School, Coventry. Silver and bronze medals will be awarded, and the classes will be open to amateurs and professionals. Messrs. George Davison, Edwin C. Middleton, and H. R. Leech, M.R.C.S., are the judges. Further particulars may be obtained from the hon. secretary, F. W. Dew, The City Studio, Coventry.

THE BRITISH ASSOCIATION.*

CAPTAIN W. DE W. ABNEY'S PRESIDENTIAL ADDRESS TO SECTION A.

THE occupant of this chair has a difficult task to perform, should he attempt to address himself to all the various subjects with which this section is supposed to deal. I find that it has very often been the custom that some one branch of science should be touched upon by the President, and I shall, as far as in me lies, follow this procedure.

This year is the jubilee of the practical introduction of photography by Daguerre and Fox Talbot, and I have thought I might venture to take up your time with a few remarks on the effect of light on matter. I am not going into the history of photography, nor to record the rivalries that have existed in regard to the various discoveries that have been made in it. A brand-new history of photography, I dare say, would be interesting, but I am not the person to write one; and I would refer those who desire information as to facts and dates to histories which already exist. In foreign histories perhaps we English suffer from speaking and writing in a language which is not understanded of the foreign people; and the credit of several discoveries is sometimes allotted to nationalities who have no claim to them. Be that as it may, I do not propose to correct these errors or to make any reclamations. I leave that to those whose leisure is greater than mine.

I have often asserted, and I again assert, that there should be no stimulus for the study of science to be compared to photography. Step by step, as it is pursued, there should be formed a desire for a knowledge of all physical science. Physics, chemistry, optics, and mathematics are all required to enable it to be studied as it should be studied; and it has the great advantage that experimental work is the very foundation of it, and results of some kind are always visible. I perhaps am taking an optimist view of the matter, seeing there are at least 25,000 living facts against my theory, and perhaps not 1 per cent. of them in its favour. I mean that there are at least 25,000 persons who take photographs, and scarcely 1 per cent. who know or care anything of the "why or wherefore" of the processes, so far as theory is concerned. If we call photography an applied science, it certainly has a larger number who practise it, and probably fewer theorists than any other.

He would be a very hardy man who would claim for Niepce, Daguerre, or Fox Talbot the discovery of photographic action on matter. The knowledge that such an action existed is probably as old as the fair-skinned races of mankind, who must have recognised the fact that light, and particularly sunlight, had a tanning action on the epidermis, and the women then, as now, no doubt took their precautions against it. As to what change the body acted upon by light underwent, it need scarcely be said that nothing was known, and perhaps the first scientific experiment in this direction was made rather more than a hundred years ago by Scheele, the Swedish chemist, who found that when chloride of silver was exposed to light chlorine was given off. It was not till well in the forties that any special attention was given to the action that light had on a variety of different bodies; and then Sir John Herschel, Robert Hunt, Becquerel, Draper, and some few others carried out experiments which may be termed classical. Looking at the papers which Herschel published in the "Philosophical Transactions" and elsewhere, it is not too much to say that they teem with facts which support the grand principle that without the absorption of radiation no chemical action can take place on a body; in other words, we have in them experimental proofs of the law of the conservation of energy. Hunt's work, "Researches on Light," is still a text-book to which scientific photographers refer, and one is sometimes amazed at the amount of experimental data which is placed at our disposal. The conclusions that Hunt drew from his experiments, however, must be taken with caution in the light of our present knowledge, for they are often vitiated by the idea which he firmly held, that radiant heat, light, and chemical action, or actinism, were each of them properties, instead of the effects, of radiation. Again, we have to be careful in taking seriously the experiments carried out with light of various colours when such colours were produced by absorbing media. It must be remembered that an appeal to a moderately pure spectrum is the only appeal which can be legitimately made as to the action of the various components of radiation, and even then the results must be carefully weighed before any definite conclusion can be drawn. No photographic result can be considered as final unless the experiments be varied under all the conditions which may possibly arise. Coloured media are dangerous for enabling trustworthy conclusions to be drawn, unless the character of such media have been thoroughly well tested and the light they transmit has been measured. An impure spectrum is even more dangerous to rely upon, since the access of white light would be sure to vitiate the results.

Perhaps one of the most puzzling phenomena to be met with in photography is the fact that the range of photographic action is spread over so large a portion of the spectrum. The same difficulty of course is felt in the matter of absorption, since the one is dependent on the other. Absorption by a body we are accustomed, and indeed obliged by the law of the conservation of energy, to consider as due to the transference of the energy of the ether wave-motion to the molecules and atoms comprising the body by increasing the vibrations of one or both.

In the case where chemical action takes place we can scarcely doubt that it is the atoms which in a great measure take up the energy of the radiation falling on them, as chemical action is dependent on the liberation of one or more atoms from the molecule, whilst, when the swings of the molecules are increased in amplitude we have a rise in temperature of the body. I shall confine the few remarks I shall make on this subject to the case of chemical action. The molecule of a silver salt, such as bromide of silver, chemists are wont to look upon as composed of a limited and equal number of atoms to form the molecule. When we place a thin slab of this material before the slit of the spectroscope we find a total absorption in the violet and ultra-violet of the spectrum, and a partial absorption in the blue and green, and a diminishing absorption in the yellow and red. A photographic plate containing this same salt is acted upon in exactly the same localities and in the same relative degree as where the absorption takes place. Here, then, we have an example of, it may be, the vibrations of four atoms, one of which at least is spectrum. The explanation of this is somewhat obscure. A mental picture, however, may help us. If we consider that, owing to the body acted upon being a solid, isochronous or partially so, with the waves composing a large part of the visible spectrum, the oscillations of the molecules and atoms are confined to a limited space, it probably happens that between the times in which the atoms occupy, in regard to one another, the same relative positions, the component vibrations of, say, two of the atoms vary considerably in period. An example of what I mean is found in a pendulum formed of a bob and an elastic rod. If the bob be made to vibrate in the usual manner, and at the same time the elastic rod be elongated, it is manifest that we have a pendulum of ever-varying length. At each instant of time the period of vibration would differ from that at the next instant, if the oscillations were completed. It is manifest that increased amplitude would be given to the pendulum swings by a series of well-timed blows differing very largely in period; at the same time there would be positions of the pendulum in which some one series of well-timed blows would produce the greatest effect. In a somewhat similar manner we should imagine that the

* This Address was delivered yesterday before the Mathematical and Physical Section.

ethereal waves should produce increased amplitude in the swing of the atoms between very wide limits of period, and, further, that there should be one or more positions in the spectrum where a maximum effect is produced.* I would here remark that the shape of the curves of sensitiveness, when plotted graphically, of the different salts of silver to the spectrum have a marked resemblance to the graphically drawn curves of the three colour sensations of the normal eye, as determined by Clerk Maxwell. May not the reason for the form of the one be equally applicable for the other? I only throw this out as evidence, not conclusive indeed, that the colour-sensitiveness of the eye is more probably due to a photographic action on the sensitive retina than to a merely mechanical action. That this is the case I need scarcely say has several times been propounded before.

The ease with which a silver salt is decomposed is largely, if not quite, dependent on the presence of some body which will take up some of the atoms which are thrown off from it. For instance, in chloride of silver we have a beautiful example of the necessity of such a body. In the ordinary atmosphere the chloride is, of course, coloured by the actian of light; but if it be carefully dried and purified, and placed in a good vacuum, it will remain uncoloured for years in the strongest sunlight. In this case the absence of air and moisture is sufficient to prevent it discolouring.

If in the vacuum, however, a drop of mercury be introduced the coloration by light is set up. We have the chlorine liberated from the silver and combining with the mercury vapour, and a minute film of calomel formed on the sides of the vessel.

Delicate experiments show that not only is this absorbent almost necessary when the actiou of light is so strong or so prolonged that its effect is visible, but also when the exposure or intensity is so small that the effect is invisible and only to be found by development. The necessity for this absorbent is not far to seek. If, for instance, silver chloride be exposed to light in vacuo, although the chlorine atoms may be swung off from the original molecule, yet they may only be swung off to a neighbouring molecule which has lost one of its chlorine atoms, and an interchange of atoms merely takes place. If, however, a chlorine absorbent be present which has a greater affinity for chlorine than has the silver chloride which has lost one of its atoms, then we may consider that the chlorine atoms will be on the average more absorbed by the absorbent than by the subchloride molecules. The distribution of the swung-off atoms between the absorbent and the subchloride will doubtless be directly proportional to their respective affinities for chlorine, and so for the other salts of silver. If this be so, then it will be seen that the greater the affinity of the absorbent for the halogen the more rapid will be the decomposition of the silver salt. This, then, points to the fact that if any increase in the sensitiveness of a silver salt is desired, it will probably by brought about by mixing with it some stronger halogen absorbent than has yet been done.

The questiou as to what is the exact product of the decomposition of a silver salt by the action of light is one which has not as yet been fully answered. For my own part, I have my strong beliefs and my disbeliefs. I fully believe the first action of light to be a very simple one, though this simple action is masked by other actions taking place, due to the surroundings in which it takes place. The elimination of one atom from a molecule of of a silver salt leaves the molecule in an unsatisfied condition, and capable of taking up some fresh atom. It is this capacity which seemingly shrouds the first action of light, since when exposure is prolonged the molecules take up atoms of oxygen from the air or from the moisture in it. Carey Lea, of Philadelphia, has within the last three years given some interesting experiments on the composition of what he calls the photochloride of silver, which is the chloride coloured by light, and Professor Hodgkinson has also taken up the matter. The conclusions the former has drawn, are, to my mind, scarcely yet to be accepted. According to the latter experimentalist the action of light on silver chloride is to form an oxidised sub-salt. This can hardly be the case, except under certain conditions, since a coloured compound is obtained when the silver chloride is exposed in a liquid in which there is no oxygen present.

This colouration by light of the chloride of silver naturally leads our thoughts to the subject of photography in natural colours. The question is often asked when photography in natural colours will be discovered. Photography in natural colours not only has been discovered, but pictures in natural colours have been produced. I am not alluding to the pictures produced by manual work, and which have from time to time been foisted on a credulous public as being produced by the action of light itself, much to the damage of photography, and usually to the so-called inventors. Roughly speaking, the method of producing the spectrum in its natural colours is to chlorinize a silver plate, expose it to white light till it assumes a violet colour, heat till it becomes rather ruddy, and expose it to a bright spectrum. The spectrum colours are then impressed in their natural tints. Experiment has shown that these colours are due to an oxidised product being formed at the red end of the spectrum, and a reduced product at the violet end. Photography in natural colours, however, is only interesting from a scientific point of view, and, so far as I can see, can never have a commercial value. A process to be useful must be one by which reproductions are quickly made; in other words, it must be a developing and not a printing process, and it must be taken in the camera, for any printing process requires not only a bright light, but also a prolonged exposure. Now it can be conceived that in a substance which absorbs all the visible spectrum, the molecules can be so shaken and sifted by the different rays that, eventually, they sort themselves into masses which reflect the particular rays by which they are shaken; but it is almost—I might say, quite—impossible to believe that when this sifting has only been commenced, as it would be in the short exposure to which a camera picture is submitted, the substance deposited to build up the image by purely chemical means would be so obliging as to deposit in that the particular size of particle which should give to the image the colour of the nucleus on which it was depositing. I am aware that, in the early days of photography, we heard a good deal about curious results that had been obtained in negatives, where red brick houses were shown as red, and the blue sky as bluish. The cause of these few coincidences is not hard to explain, and would be exactly the same as when the red brick houses were shown as bluish, and the sky as red in a negative. The records of the production of the latter negatives are naturally not abundant, since they would not attract much attention. I may repeat, then, that photography in natural colours by a printing-out process—by which I mean by the action of light alone—is not only possible, but has been done; but that the production of a negative in natural colours from which prints in natural colours might be produced appears, in the present state of our knowledge, to be impossible. Supposing it were not impracticable, it would be unsatisfactory, as the light with which the picture was impressed would be very different from that in which it would be viewed. Artists are fully aware of this difficulty in painting, and take their precautions against it.

The nearest approach to success in producing coloured pictures by light alone is the method of taking three negatives of the same subject through different coloured glasses, complementary to the three colour sensations which together give to the eye the sensations of white

* The effect of perfect and nearly perfect synchronism of one oscillation upon another is also to be found exemplified in my "Treatise on Photography," Text Book of Science Series.

light. The method is open to objection on account of the impure colour of the glasses used. If a device could be adopted whereby only those three parts of the spectrum could be severally used which form the colour sensations, the method would be more perfect than it is at present. Even then perfection could not be attained, owing to a defect which is inherent in photography, and which cannot be eliminated. This defect is the imperfect representation of gradation of tone. For instance, if we have a strip graduated from what we call black to white—it must be recollected that no tone can scientifically be called black, and none white—and photograph it, we shall find that in a print from the negative, the darkness, which is supposed to represent a grey of equal mixtures of black and white, by no means does so unless the black is not as black nor the white as white as the original. The cause of this untruthfulness in photography has occupied my attention for several years, and it has been my endeavour to find out some law which will give us the density of a silver deposit on a negative corresponding with the intensity of the light acting. I am glad to say that at the beginning of this year a law disclosed itself, and I find that the transparency of a silver deposit caused by development can be put into the form of the law of error.

This law can be scarcely empiric, though at first sight it appears that the manipulations in photography are so loose that it should be so. It is this very looseness, however, which shows that the law is applicable, since in all cases I have tried it is obeyed. That there are theoretical difficulties cannot be denied, but it is believed that strictly theoretical reasoning will eventually reconcile theory with observation.

This want of truth in photography in rendering gradation, then, puts it out of the range of possibility that photography in natural colours can ever be exact, or that the three negatives system can ever get over the difficulty.

One of the reproaches that in early days was cast at photography was its inability to render colour in its proper monochromatic luminosity; thus, whilst a dark blue was rendered as white in a print—that is, gave a dense deposit in a negative—bright yellow was rendered as black in a print, or nearly so—that is, as transparent, or nearly transparent, glass in the negative. To the eye, the yellow might be far more luminous than the blue, but the luminosity was, in the photograph, reversed. I need scarcely say that the reason of this want of truth in the photograph is due to the want of sensitiveness of the ordinarily used silver salts to the least refraugible end of the spectrum. Some fifteen years ago Dr. H. W. Vogel announced the fact that when silver salts were stained with certain dyes, they became sensitive to the colour of the spectrum, which the dyes absorbed. This at once opened up possibilities, which, however, were not at once realised, owing, perhaps, to the length of exposure required when the collodion process was employed. Shortly after the gelatine process was perfected, the same dyes were applied to plates prepared by this method, which, although they contained the same silver salts as the old collodion process, yet, *per se*, were very much more sensitive. A new era then dawned for what has been termed isochromatic and orthochromatic photography. The dyes principally used are those belonging to the eosin group and cyanin—not the ordinary cyanine dye of commerce, but that discovered by Greville Williams. For a dye to be of use in this manner, it may be taken as an axiom—first propounded by the speaker, it is believed—that it must be fugitive, or that it must be capable of forming a silver compound. The more stable a dye is, the less effective it is. If we take as an example cyanine, we find that it absorbs in the orange and slightly in the red. If paper or collodion stained with this colouring matter be exposed to the action of the spectrum, it will be found that the dye bleaches in exactly the same part of the spectrum as that in which it absorbs, following, indeed, the universal law I have already alluded to. If a film containing a silver salt be dyed with the same, it will be found that, whilst the spectrum acts on it in the usual manner—viz., darkening it in the blue, violet, and ultra-violet—the colour is discharged where the dye absorbs, showing that in one part of the spectrum it is the silver salt which is sensitive, and that in the other it is the colouring matter. If such a plate, after exposure to the spectrum, be developed, it will be found that at both parts a deposit of silver takes place; and, further, when the experiment is carefully conducted, if a plate with merely cyanine-coloured collodion be exposed to the spectrum and bleached in the orange, and, after removal to the dark room, another film containing a silver salt be applied, and then a developer, a deposit of silver will take place where the bleaching has occurred. This points to the fact that the molecules of a fugitive dye, when altered by light, are unsatisfied, and are ready to take up an atom or atoms of silver, and other molecules of silver will deposit on such nuclei by an action which has various names in physical science, but which I don't care to mention. This is the theory which I have always advocated—viz., that the dye, by its reduction, acts as a nucleus on which a deposit of silver can take place. It met with opposition; a rival theory which makes the dye an "optical sensitizer"—an expression which is capable of a meaning which I conceive contrary to physical laws—being run against it. The objection to what I may call the nucleus theory is less vigorous than it has been, and its diminution is due perhaps to the more perfect understanding of the meaning of each other by those engaged in the controversy. To my mind, the action of light on fugitive dyes is one of the most interesting in the whole realm of photography, as, eventually, it must teach us something as to the structure of molecules, and add to the methods by which their coarseness may be ascertained. Be the theory what it may, however, a definite result has been attained, and it is now possible to obtain a *fair* representation of the luminosity of colours by means of dyed films. At present the employment of coloured screens in front of the lens, or on the lens itself, is almost an essential in the method when daylight is employed; but not till some dye is discovered which shall make a film equally sensitive for the same luminosity to the whole visible spectrum will it be possible to make orthochromatic photography as perfect as it can be made. The very fact that no photograph of even a black-and-white gradation will render the latter correctly must of necessity render any process imperfect, and hence, in the above sentence, I have used the expression "as perfect as it can be made."

The delineation of the spectrum is one of the chief scientific applications to which photography has been put. From very early days the violet and ultra-violet end of the spectrum have been favourite objects for the photographic plate. To secure the yellow and red of the spectrum was, however, till of late years, a matter of apparently insurmountable difficulty; whilst a knowledge of that part of the spectrum which lies below the red was only to be gained by its heating effect. The introduction of the gelatine process enabled the green portion of the spectrum to impress itself on the sensitive surface; whilst the addition of various dyes, as before mentioned, allowed the yellow, the orange, and a portion of the red rays to become photographic rays. Some eight years ago it was my own good fortune to make the dark infra-red rays impress themselves on a plate. This last has been too much a speciality of my own, although full explanations have been given of the methods employed. By preparing a bromide of silver salt in a peculiar manner, one is able so to modify the molecular arrangement of the atoms that they answer to the swings of those waves which give rise to these radiations. By employing this salt of silver in a film of collodion or gelatine, the invisible part of the spectrum can be photographed, and the images of the bodies which are heated to less than red heat may be caused to impress themselves upon the sensitive plate. The greatest wave-length of the spectrum to which this

salt is sensitive so far is 22,000λ, or five times the length of the visible spectrum. The exposure for such a wave-length is very prolonged, but down to a wave-length of 12,000 it is comparatively short, though not so short as that required for the blue rays to impress themselves on a collodion plate. The colour of the sensitive salt is a green blue by transmitted light; it has yet to be determined whether this colour is all due to the coarseness of the particles, or to the absorption by the molecules. The fact that a film can be prepared which by transmitted light is yellow, and which may be indicative of colour due to fine particles, together with an absorption of the red and orange, points to the green colour being probably due to absorption by the molecules. We have thus in photography a means of recording phenomena in the spectrum from the ultra-violet to a very large wave-length in the infra-red—a power which physicists may some day turn to account. It would, for instance, be a research worth pursuing to photograph the heavens on a plate prepared with such a salt, and search for stars which are nearly dead or newly born, for in both cases the temperature at which they are may be such as to render them below red heat, and therefore invisible to the eye in the telescope. It would be a supplementary work to that being carried out by the brothers Henri, Common, Roberts, Gill, and others, who are busy securing photographic charts of the heavens in a manner which is beyond praise.

There is one other recent advance which has been made in scientific photography to which I may be permitted to allude, viz., that from being merely a qualitative recorder of the action of light, it can now be used used for quantitative measurement. I am not now alluding to photographic actinometers—such as have been brought to such a state of perfection by Roscoe—but what I allude to is the measurement and interpretation of the density of deposit in a negative. By making exposures of different lengths to a standard light, or to different known intensities of light, on the same plate on which a negative has to be taken, the photographic values of the light acting to produce the densities on the different parts of the developed image can be readily found. Indeed, by making only two different exposures to the same light, or two exposures to two different intensities of light, and applying the law of density of deposit in regard to them, a curve is readily made from which the intensities of light necessary to give the different densities of deposit in the image impressed on the same plate can be read off. The application of such scales of density to astronomical photographs, for example, cannot but be of the highest interest, and will render the records so made many times more valuable than they have hitherto been. I am informed that the United States astronomers have already adoped the use of such scales, which for the last three years I have advocated, and it may be expected that we shall have results from such scaled photographs which will give us information which would before have been scarcely hoped for.

One word as to a problem which we may say is as yet only qualitatively and not quantitatively solved. I refer to the interchangeability of length of exposure for intensity of light. Put it in this way. Suppose, with a strong light, L, a short exposure, E, be given, a chemical change, C, is obtained: will the same change C be obtained if the time is only an nth of the light L, but n times the exposure? Now this is a very important point, more particularly when the body acted upon is fairly stable, as, for instance, some of the water-colour pigments, which are known to fade in sunshine, but might not be supposed to do so in the light of an ordinary room, even with prolonged exposure. Many experiments have been made at South Kensington as regards this, more especially with the salts of silver, and it is found that for any ordinary light, intensity and exposure are interchangeable, but that when the intensity of light is very feeble, say the $\frac{1}{100000}$th of ordinary daylight, the exposure has to be rather more prolonged than it should be, supposing the exact interchangeability always held good; but it has never been found that a light was so feeble that no action could take place. Of course it must be borne in mind that the stability of the substance acted upon may have some effect; but the same results were obtained with matter which is vastly more stable than the ordinary silver salts. It may be said in truth that almost all matter which is not elemental is, in time and to some degree, acted upon by light.

I should like to have said something regarding the action of light on the iron and chromium salts, and so introduced the subject of platinotype and carbon printing, the former of which is creating a revolution in the production of artistic prints. I have, however, refrained from so doing, as I felt that the President of Section A should not be mistaken as the President of Section B. Photogravure and the kindred processes were also inviting subjects on which to dwell, more especially as at least one of them is based on the use of the same material as that on which the first camera picture was taken by Niépce. Again, a dread of trenching on the domains of art restrains me.

Indeed, it would have been almost impossible, and certainly impolitic, in the time which an address should occupy, to have entered into the many branches of science and art which photography covers. I have tried to confine myself to some few advances that have been made in its theory and practice.

The discovery of the action of light on silver salts is one of the marvels of this century, and it is difficult to overrate the bearing it has had on the progress of science, more especially physical science. The discovery of telegraphy took place in the present reign, and two years later photography was practically introduced; and no two discoveries have had a more marked influence on mankind. Telegraphy, however, has had an advantage over photography in the scientific progress that it has made, in that electrical currents are subject to exact measurement, and that empiricism has no place with it. Photography, on the other hand, has laboured under the disadvantage that, though it is subject to measurement, the factors of exactitude have been hitherto absent. In photography we have to deal with molecules the equilibrium of whose components is more or less indifferent according to the process used; again, the light employed is such a varying factor that it is difficult to compare results. Perhaps, more than any other disadvantage, it labours under is that due to quackery of the worst description at the hands of some of its followers, who not only are self-asserting, but often ignorant of the very first principles of scientific investigation. Photography deserves to have followers of the highest scientific calibre; and if only some few more real physicists and chemists could be induced to unbend their minds and study the theory of an applied science which they often use for record or for pleasure, we might hope for some greater advance than has hitherto been possible.

Photography has been called the handmaid of Art; I venture to think it is even more so the handmaid of Science, and each step taken in perfecting it will render it more worthy of such a title.

CAPT. W. DE W. ABNEY, R.E., C.B., F.R.S.

CAPTAIN ABNEY, the president-elect of Section A, was born in 1844. He belongs to an old Derbyshire family, and is the elder son of the Rev. Canon E. H. Abney, of Measham Hall, in that county, and Catherine, daughter of J. Strutt, Esq., of Belper. He was educated at Rossall School, and also privately. He went to Woolwich in 1860, was commissioned in the Royal Engineers in the following year, and was made captain in 1873. In 1865 he married Agnes Matilda, daughter of E. W. Smith, Esq., of Tickton Hall, Beverley. In the same year he went to India, where he served till 1869. In 1870 he was appointed assistant instructor in electricity at the School of Military Engineering, Chatham, and in 1872 instructor in chemistry and photography. In 1876 he was appointed inspector in the Science and

Art department, and in 1884 assistant director for science, which post he now holds. Captain Abney commenced photographic studies in India in 1865, and in 1873 invented the system of photo-lithography called papyrotype, which is now used for military purposes. He superintended the photographic arrangements for the 1874 Transit of Venus, and was one of the observers at Thebes. In 1877 he was elected Fellow of the Royal Society, and in 1884 was awarded the Rumford Medal of the Royal Society for his researches, by means of a photographic process on the dark rays of the spectrum. In 1878 he received the progress medal of the Photographic Society for his researches in photography. He is the author of numerous papers on this subject, which have appeared in the proceedings of the Royal Society, the *Photographic Journal*, and other papers. Also with General Festing, F.R.S., he has contributed an important paper on the increase of radiation with the increase of electrical current through carbon filaments. In 1886, Abney and Festing had so far completed their researches on colour photometry, as to make it the subject of the Bakerian lecture of that year. By comparing the intensities of the several portions of the visible spectrum, using a modification of Rumford's method, they have drawn up a "luminosity curve." Their experiments with different individuals have given us additional insight into the nature of colour blindness. They have also investigated the atmospheric absorption of light. Captain Abney is the author of Thebes and its five greater temples; joint author of Pioneers of the Alps; author of various books on photography; and editor of the last edition of Schellen on the Spectroscope. He is a Fellow of the Chemical and Astronomical Societies, on the councils of which he has served, or is serving; and is a vice-president of the Photographic Society. He is one of the British delegates to the Electrical Standards conference, and to the Astro-photographic conference. He is a member of the Alpine Club; one of the executive committee of the present French International Exhibition; a member of the Kew Committee; and the inventor of the Abney level for survey purposes. In 1888 he was created a C.B. for his services to the War Office.—*Newcastle Daily Chronicle.*

PHOTOGRAPHY IN GERMANY.

BY HERMANN E. GUNTHER.

Hardening the Film of Gelatino-Chloride Prints—Eikonogen Developer—Electricity and Light—Literary Matters.

Hardening the Film of Gelatino-chloride Prints.—Those who work the gelatino-chloride printing-out paper, and who habitually pass the prints, either before or after toning, into an alum bath, will often have noticed that the prints after drying acquire a slight yellowish tint in what should be the white parts of the picture. This is due to the acidity of the alum solution, for if, instead of ordinary alum or chrome alum, acetate of aluminium be employed, this yellowish tint will become still more intense, which proves that the strongly acid reaction of this latter salt plays an important part in discolouring the whites of the picture. On the other hand, an alum bath is very desirable in the case of gelatino-chloride paper in order to harden the film, which otherwise will always remain somewhat stieky, so that the finished prints cannot be dried between blotting-paper, nor mounted wet, like albumen prints. It is for this reason that Dr. Stolze suggests the use of a neutralized chrome alum bath for gelatino-chloride paper. His method is the following:—A chrome alum solution 1 : 100 is made, and liquor ammonia gradually added to it as long as the resulting light green precipitate disappears on shaking the liquid. The latter becomes thereby intensely green. As soon as the point is reached where the solution remains cloudy, the bath is allowed to settle, or is cleared by filtering. The prints, after being thoroughly washed, should remain in the bath from one to three minutes, when they are once more rinsed with plenty of water. This done, they may be treated in quite the same manner as albumen prints, dried between blotting-paper, mounted wet, and so on. The whites of the picture are perfectly preserved in the bath, which may be kept for any length of time. Moreover, it has been observed that prints which are squeezed on glass or ebonite, after being hardened in the described manner, preserve their glossy appearance much better than prints not treated with the chrome alum bath. It must, however, be borne in mind that the hardened prints should not dry before being squeezed; that, on the contrary—at least, if a very high glass is desired—they should be squeezed directly after the last washing. Another advantage of the alum bath is this: that prints treated with it may be very readily touched up, provided that, as in the case of all gelatine films, only very little of the colour is taken up with the brush.

Lomberg's Eikonogen Developer.—Herr E. Lomberg, dry plate manufacturer, of Langenberg, strongly recommends the following developer, especially for his own plates; but I have used it also with excellent results with another brand of plates:—

Solution No. 1.

Sulphite of soda	10 grammes
Distilled water	1,000 c.c.

After solution, add—

Eikonogen	10 grammes

It dissolves quicker by heating the liquid a little.

Solution No. 2.

Carbonate of potassium—pure ...	150 grammes
Distilled water	1,000 c.c.
Hyposulphite of soda ...	0·5 to 1 gramme

The two solutions may be kept separately for any length of time. For use, equal parts of the two solutions are mixed. The addition of the hyposulphite of soda to solution No. 2 has for its purpose to shorten the time of exposure, and to render the negatives more uniform and harmonious. If solution No. 1 is used more concentrated—about 20 grammes of sulphite of soda and 20 grammes of eikonogen to 1,000 c.c. of water—the development proceeds much quicker; but the negatives are less harmonious, and are apt to give chalky prints. The plates should be thoroughly fixed, and then placed for a short time in a concentrated alum solution. The tone of the negatives will be much improved if they are exposed to the light after they have passed the alum bath.

Electricity and Light.—In the last volume of Prof. J. M. Eder's *Year-Book of Photography*, Dr. Moser draws attention to the following curious phenomena. The leaves of an electroscope are caused to diverge by charging with about 150 cells. On allowing a ray of direct sunlight to fall on the instrument the divergence is increased, and it returns to its original amount when the light is cut off. A common match—sulphur with phosphorus tip—will glow in the dark when brought close to a charged body, such as the cover of an electrophorus. The mercury in a capillary electrometer falls when a ray of sunshine falls on it, just as it does when connected to the zinc of a battery. The effect is distinctly electrical, not thermal, as it vanishes when the upper and lower mercury columns are short, circuited by a wire.

Literary Matters.—Finally, I have to note some changes in our photographic literary world. The Photographische Verein, the oldest photographic Society of Berlin, has, at its meeting of the 27th June, resolved to found its own photographic journal. The new periodical will bear the name *Photographische Nachrichten*, and its first number will be issued the 1st October. The editor of it is Dr. F. Stolze, formerly editor of the *Photographisches Wochenblatt*. This latter journal, which has been hitherto the organ of the Photographische Verein, will obtain a new—as yet unknown—editor.

An intimation to its members given by the committee of the Holborn Camera Club may be worth reproduction for the benefit of others. "Members are reminded that it is necessary to obtain permits to photograph in the Parks; write to H. M. Office of Works, S.W., and to the London County Council, Spring Gardens."

Notes.

YEAR-BOOK OF PHOTOGRAPHY, 1890.- May we remind contributors that we shall be glad to have their papers for the YEAR-BOOK at their earliest convenience? Owing to a letter—not issued from our office—lately circulated, and which may be misleading, we desire to state that all contributions should be addressed to the Editor of the PHOTOGRAPHIC NEWS, Furnival Street, London, E.C.

Science and Art is not in a state of extreme enthusiasm over the result of its last photographic competition, which chiefly appealed to students of the South Kensington Science and Art Schools. The photographs sent in were good, it remarks, but the number limited. It attributes the falling off to the competition taking place just at the time when the vacation was commencing. This may be so. We would suggest that our contemporary should fix its competition so as to obtain the advantage of the vacation. The amateur usually looks forward to his holiday as an opportunity for venturing with his camera into fresh woods and pastures new, and hence there would be a better chance of increasing the number of the competitors. It would seem, however, that there is not material enough in the classes for a good competition. A writer in the periodical we have mentioned puts the number at between fifty and sixty, and suggests that some sort of combination should be formed with the Photographic Club with a view to holding a small exhibition. We should fancy that the time was scarcely propitious for such an exhibition. The collection in Pall Mall will not only absorb attention, but the best pictures as well, and any subsidiary show, even though only of an informal and friendly character, would be necessarily incomplete.

Photographers who are fond of a *tour de force* had a good opportunity of indulging their ambition and dexterity a Sunday or two ago in Paris. The French are great pigeon fanciers, and they have brought the art of sending messages by pigeon post to great perfection. There was a flight on the day in question of no less than 100,000 birds, and the occasion was deemed so notable that M. Janssen, the well known scientific photographer, communicated the fact to the French Photographic Society, and invited those members who cared to do so to bring their cameras. It would be interesting to know what was the result of this photographic *battue*.

A weekly contemporary makes a serious charge against an artist whose sketches were, some little time ago, the talk of the town. It asserts that he is a skilful photographer, but that he has always concealed his accomplishment in this direction in order that his drawings and etchings might be wholly attributable to his pencil. The charge is that some years ago he passed some time in a foreign country, remaining there incognito with his camera. He then returned home and spent several months in London developing his negatives, and making his etchings from them. The etchings were exhibited, but not a word was said about photography. This is a very weighty statement to make, and is on all-fours with the one which involved certain persons in such trouble over the picture "La Sirene," which, it was asserted, M. Jan Van Beers had painted on a photographic foundation. Certainly, the English artist attacked should lose no time in replying to the charge, even though it appeared in what is, comparatively speaking, a paper of little influence.

The president of the Convention has suffered the usual penalty of greatness—he has been interviewed. The interviewer was the representative of a hybrid sort of publication rejoicing in the name of *Barker's Trade, Finance, and Recreation*. The interviewer seems to have trotted out Mr. Pringle pretty well, but we do not know that the latter had much that was new to say: how, indeed, could he, for all paths of photography have been trodden over and over again. It would, however, be interesting to know Mr. Pringle's grounds for believing that there is no jealousy between professional photographers and the increasing army of amateurs. We would like to believe so too, but we are afraid that if professional photographers are asked, the answer would be found contrary to Mr. Pringle's opinion that "the amateurs really don't interfere with the business of the professionals." It no doubt is true that, from a scientific standpoint, the amateur assists the professional; but from a commercial point of view the assistance is not quite so apparent.

The detective camera has been turned to black-mailing purposes in Berlin. An unscrupulous fellow has been in the habit of following couples whose demeanour towards each other appeared to be sufficiently affectionate for his purpose, and of photographing them when he observed any little act of endearment. He would then boldly accost them, announce the fact that he had in his possession a very compromising negative, and demand a substantial price for giving up the latter. The other day, however, he made a mistake. He demanded 1,000 marks from a lady who naturally objected to pay, as she was only kissing her brother. And not only did the lady refuse to part with any money, but gave the miscreant into custody in addition, and he is now undergoing the six months imprisonment which he richly deserved.

Mr. Patrick O'Brien, M.P. favours the Kodak. He it was, if we remember rightly, who secured a picture of the evicting ram. He has just retured to Ireland, and, armed with his faithful camera, intends to pursue his photographic studies, and secure photographic evidence of what he regards as Balfourian atrocities. It is said he has quite a collection of eviction scenes.

"*Apropos* of letting dark rooms to amateurs," writes a correspondent, "photographers ought to be careful how they word their advertisements. I saw one the other day which ran as follows: 'Amateurs can be accommodated with dark rooms at *sixpence per plate*.' The italics are of course mine. It is really a fact that hungry holiday makers have gone into the shop and asked for something to eat at the tariff announced, namely, sixpence per plate!"

PHOTOGRAPHIC OPTICS.

BY W. K. BURTON.

Chapter VII.—The Swing-Back Optically Considered.

There is probably no adjustment of the camera that affords to the beginner so endless a round of confusion as does the swiug-back. In fact, not only is the beginner confused by it, but the experienced photographer very often does not thoroughly understand the action. So badly are the functions of the swing-back uuderstood, that it would probably be better for ninety-nine per cent. of beginuers and about fifty per cent. of experienced photographers—amateur and profcssional—to work with cameras having no such adjustment.

The cause of this confusion lies in the fact that the swing-back may be used for either of two purposes, which are quite different, and in some respects contrary one to the other. The confusion is not lessened by the fact that in most descriptions of the use of the swing-back one or other of its uses is entirely ignored, and that, when they are both considered, they are inextricably mixed up together. Farther thau this, the use of the risiug-front is closely allied to that of the swing-back, and adds to the confusion in considering the latter.

The "swing-back," all readers are presumably aware, is a term indicating an arrangemeut whereby the part of the camera carrying the ground glass can be rotated through a small angle, being swung either backwards or forwards so as to be no longer at right angles to the axis of the lens. This is the vertical swing; it has the result of placing the top of the ground glass farther from the lens than the bottom, or *vice versa*. The side swing is a similar arrangement for putting one side or end of the ground glass nearer the lens than the other.

The rising-front is simply an adjustment whereby the lens may be raised or depressed without tilting the camera.

There are some cameras which have what is called a swing-front as well as a swing-back. This adjustment is very useful, but in reality it amounts in action merely to an extension of the rising-front principle. This will be explained a little farther on.

I shall now explain one of the actions of the swiug-back. Let us suppose that we desire to photograph any object which is so high that, keeping our camera horizontal, and the lens in the normal positiou, the top part of the object is not included on the ground glass, whilst the upper part of the ground glass is filled with foreground which it is not wished to represent.

As a mere matter of including the whole of the object, we have two courses open to us. We can tip up the camera, or we can raise the lens. Figure 36 shows the first

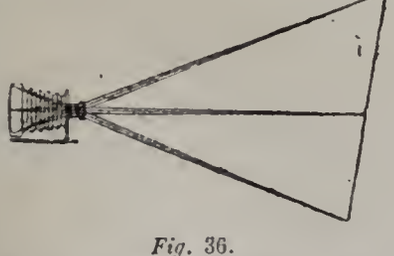


Fig. 36.

action. If the object have no straight lines in its composition—if it be a tree, for instance—the result may be satisfactory enough if the tipping is not excessive; but if the object be one in which there are vertical straight lines —if it be a house, for example—it will be found that these lines converge. This is duc to the fact that the plane of the plate is no longer vertical, and the following rule must be taken as quite without exception :—*If it be desired to render vertical lines in an object as parallel lines in a photograph, the plane of the sensitive surface must be kept vertical.*

We have now two courses open to us to securc this parallelism of the lines. We may swing the back till it is

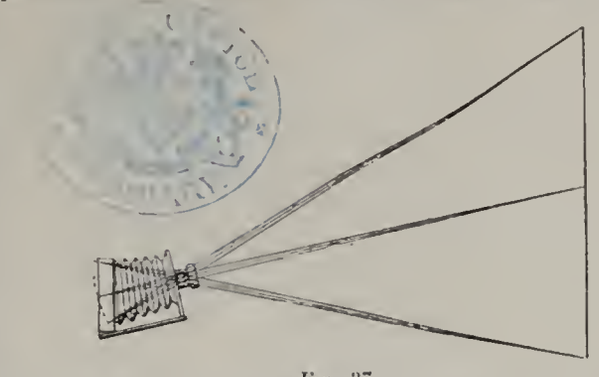


Fig. 37.

vertical, as shown in figure 37; or we may raise the front, as shown in figure 38. It will be seen that both courses result in a fulfilment of the conditions of the rule just given. It is worth while considering for a moment which it is best to adopt.

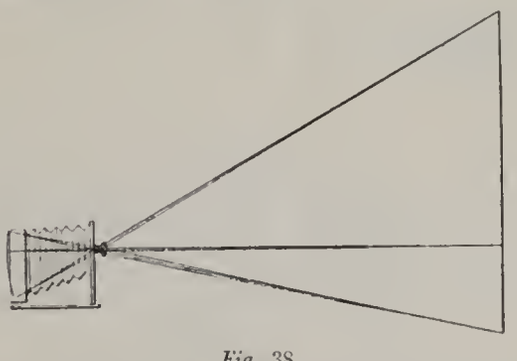


Fig. 38.

In all of the cuts, I have attempted to show approximately the amount of "straining" of the lens that will result from any adjustment of the camera. A dotted curved line shows approximately the field of sharpest focus. It will be understood that the farther this anywhere departs from the plane of the platc, the more will some parts of the subject be "out of focus," unless a very small stop be used. It will be seen that the curved line departs from the plane of the plate much more in figure 37 than in figure 38, and in fact when the back is swung on in figure 37, it is often very difficult to get all the subject in tolerable focus, using even a very small stop. We may, therefore, take it that where possible it is better to raise the lens than to tilt the camera and swing the back, aud so it is although the arrangemeut does give rise to a slightly greater falling off of light towards the corner of the plate representing the upper corners of the subject; but it will be seeu that the raising of the lens involves the use of an instrument that will much more than cover the plate when conditions are normal. This results frequently in the use of the swing back simply because, if the front be much raised, the lens will not cover the lower corners of the plate at all.

Again, it often comes to pass that subjects are so high that even when the front of the camera is raised to the utmost extent, the top of what is wanted is still not included. In such a casc it is necessary, besides raising the lens, to tip the camera and to swing the back.

If we look at figure 37, and suppose the camera fitted with an adjustment, so that the front can be swung forward till it is parallel with the back, it will be seen that the result would really be the same as in figure 38. This is why I said that the swing front came in practice to be merely an extension of the rising front principle. It is not the less useful on that account, however; it permits of a much greater rise than can be got without it.

We now come to the second use of the swing back, which, as we have said, is quite different from the first.

In fact, it is as a rule only advisable where there are no vertical lines in the subject, and where therefore it is most necessary to keep the plane of the plate vertical.

Of course the photographer is aware that when he photographs a landscape, he photographs a number of objects at different distances from the camera, and that he cannot in nine cases out of ten get all these quite sharp at the same time except by the use of a stop more or less small. He can by adjusting the distance between the lens and the ground glass make any one or several of the objects sharp that he likes, and were it possible, at the same time, to have different parts of the ground glass more or less near the lens as might be desired, all the image might be sharp at the same time. Now this is possible in the case of a form of subject by no means very uncommon, namely one in which the lower part of the subject is nearer the camera than the centre, the centre than the top. The most complete case of such a subject would

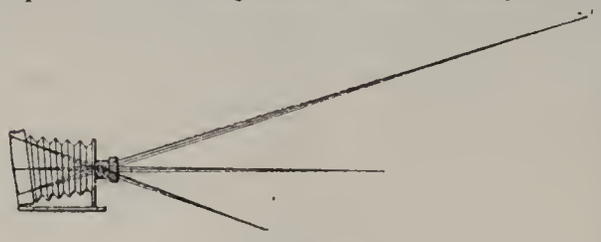


Fig. 39.

be a flight of steps straight opposite the camera. Of course such a subject is seldom or never photographed, but it generally happens that the foreground is the nearest object in a landscape, that the centre of the picture is considerably further away, and that the top is further away still—is perhaps, for example, the sky. Fig. 39 will show at once how by swinging the back so that the top is further from the lens than the bottom, the whole three parts are brought into focus at one time.

Another case in which the swing may be very useful is that of portraiture. In the case of a sitting figure, for example, the knees at the same time as the head may be brought into focus by the aid of the swing back.

The side swing is used when one *side* of the subject is much nearer the camera than the other. A typical example of such a case is that of a terrace of houses when it is desired to photograph these, looking along them from a spot nearly opposite the house at one end. The side swing is but little used compared with the vertical swing.

PHOTOCHROMOTYPE.—Photochromotypy is a process of producing impressions of leaves and plants, and is effected as follows. The plant is first dried and flattened by pressure between unsized paper, or it may be done rapidly with a hot iron. The surface to be copied is then brushed with a solution of aniline colour in alcohol and allowed to dry, which will take place very rapidly. If the impression is to be taken on paper, immerse the latter in water for a few seconds, and remove the excess by pressing between blotting-paper. Place it then on some non-absorbent surface, and apply the plant coloured side down; place over it a sheet of strong paper, and, while it is held securely in position, stamp the whole surface with a wad of cotton. A cold iron may be lightly passed over the surface instead of using cotton, and if a few sheets of tissue paper are interposed between the paper and the plant, its outlines and veins principally will be copied, while, without it, the whole surface may be impressed on the paper. If the paper which is to receive the impression is moistened with alcohol instead of water, the impression will be brighter, and the paper will retain its lustre or glaze better. If a very light coating of glycerine be spread upon the coloured plant, when perfectly dry, and the excess removed by unglazed paper, one or more prints may be immediately taken upon dry paper or other dry surface. If the print shows blots when a strong colour is used, pass over the surface with a pencil wet with a solution of saltpetre, which will moderate the impression. Different parts of the plant may be coloured differently to conform to nature or individual taste. Defects may be touched up with a pen dipped in the colour.—*The Picture and Art Trade.*

THROUGH JAPAN WITH A CAMERA.

BY W. K. BURTON.

CHAPTER XI.—NIKKO (*continued*)—THE JAPANESE LANGUAGE—JSUSENII—YOMOTO.

AT Nikko I was thrown on my own resources in the matter of language, and the Japanese language is a fearful one for foreigners. It is, in fact, a language that no foreigners really learn, except a few who make the learning of it their sole occupation for years, and even these get expert in it only if they are naturally good linguists.

There are two distinct languages, the written and the spoken, besides many variations of both of them. It is the latter that the foreigner generally tries to learn, and fails. Even it alone is probably about as great a task as to learn five or six European languages. One peculiarity of the language is the use of "honorifics." This means that every word, besides its own peculiar meaning, expresses the humility of the speaker or his respect for the person spoken to, or conveys an opposite meaning. Besides this honorific modification of ordinary words, there are special honorific words and particles, and when a Japanese wants to be remarkably polite he dilutes all his ideas with these honorifics.

To take an example of what I mean by words having, besides their own meaning, a honorific significance: there are no less than twelve Japanese words for our word "wife." These words are all different, and represent a graduated scale of politeness. Of the first, or least polite of all, the dictionary maker quaintly remarks that "A man may use it to his own wife, or to others to whom it is not necessary to be over polite."

The Japanese learn foreign languages with wonderful facility considering the difficulties that are in the way for them. The greatest of these is that they have to learn a number of new sounds. The Japanese language is syllabic; that is to say, it is made up of a number of syllables—about seventy—each consisting of an initial consonant and a vowel. There is only one final consonant, namely "u," and those who have not been specially trained in foreign languages cannot *pronounce any* word which is not made up of these syllables. The result is sometimes curious. Thus, the one English expression which is known almost all over the country, "Good-bye," is generally pronounced "gooroo-bye." Foreigners find it necessary as a rule to adopt modified names with the uneducated natives. I am tolerably fortunate, as they can come as near my name as Boorotou. An unhappy German, who has recently come to Yokohama, and bearing the unfortunate cognomen of Köchler, has had his name Japonified into "Kokirooroo!"

Sometimes English inscriptions are put over the shops in the larger towns. Some of these are curious, being evidently constructed with the aid of a dictionary. Thus, there are in Nikko two shops owned by the same individual. One has printed over it "Root Store," the other "Diverging Shop;" evidently intended for "chief store" and "branch establishment." Sometimes phrases which must have been picked up orally are used as *words* with very strange results. One such case I remember is so very remarkable that I may give it. I relate the incident precisely as it occurred, but lest some of the expressions be considered too strong for the British reader, I must ask the Editor carefully to read the tale, and, if he considers it necessary, to introduce a judicious blank or two, so that, leaving the meaning clear, the eye may yet not be offended.*

I was conversing with a Japanese lady—or it would be more correct to say I was attempting through the medium of my few miserable scraps of Japanese to hold converse with her. She had shown no symptom of knowing or imagining that she knew any word of English till reference was made to a certain man, when she made the following astonishing statement, all in Japanese excepting the astounding compound adjective, "Oh! I don't like him; he is a *God-damn-you-a-disgrace man!*"

One understands readily enough, it being predicated that "Shto" is the Japanese for man or men, how English sailors in Yokohama come to be designated "Damn-your-eye Shto," but as to how the wonderful phrase given above was incorporated in the vocabulary of the Japanese lady as an English adjective, affords much food for unsuccessful speculation.

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* It is surely a curious case of folly, this which permits the use of an "improper word" in print if part of it is represented by a blank, although the meaning remains as clear as if the word were written in full. I believe it has its origin with the sensitiveness of writers. They find it necessary occasionally to make use of such a word, but are in terror lest readers should suppose them so lost to all sense of decency as not to know that it is a bad word. They therefore adopt the use of a blank to indicate to these same readers that they (the writers), although they have to use a naughty word, are fully aware that it is such.

At Nikko is a very old bridge, three or four hundred years old, I was told, which is closed to the public. It is said that it is reserved for the use of the Mikado, and of certain other great personages. I consider it remarkable as exhibiting a peculiarity of Japanese structures. The upper part of the bridge is of wood; the supports are of stone. The Japanese are not a mechanical people. I don't mean to say they are not clever with their hands; they are exceedingly; but they are not a mechanically inventive people, and when, in their structures, they came to adopt stone in place of wood, they retained precisely the old shapes. Apparently they were ignorant of the principles of the arch until it was recently imported from the West.

The Torii was undoubtedly originally always made in wood, and it will be noticed that the form is one well adapted to a wooden structure. It is still most frequently made of wood, but is often made of stone and occasionally of bronze; but of whatever it is made, the form is kept precisely the same. This is not, I believe, because the precise form is one which has religious significance, but simply because the Japanese have not the mechanical instinct which induces Westerners to adopt a change in the form of a structure to suit any change in material which may be made.

From Nikko it is a glorious walk to a great lake called Jusenji, and further to a hot spring village named Yomoto. The walk is through a deep valley with a steep ascent from Nikko to Yomoto 3,000 feet or thereby, and there are in the valley some of the most glorious waterfalls that I have ever seen, a river at places leaping clear over a precipice of three or four hundred feet high into a deep and gloomy gorge below.

I did not photograph any of these. I saw many photographs of them in Nikko, many excellent, but none that conveyed any idea whatever of them to one who had not seen them, and to tell truth I believe that photography is not capable of giving an idea of them.

PHOTOGRAPHY AND ARCHÆOLOGY.

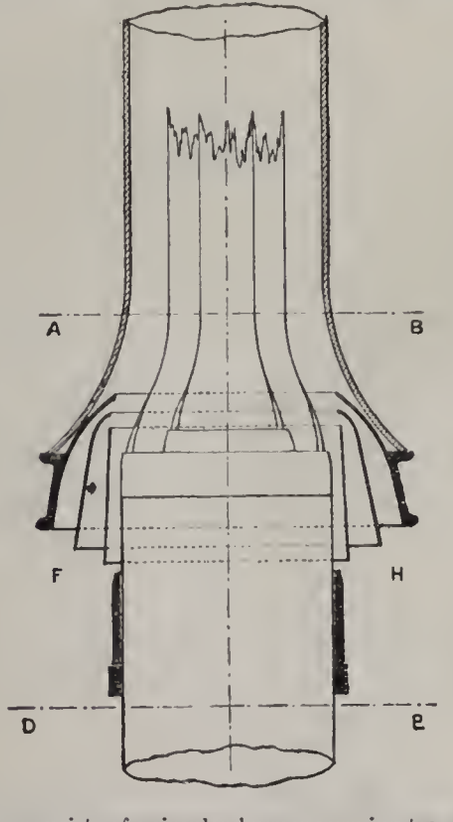
Much truth is contained in the appended remarks of the London correspondent of *Anthony's Photographic Bulletin*, as to the moral responsibility of the photographers of to-day to posterity. In addition to the archæological subjects, even more interesting historical pictures should be taken, namely, such as will hand down representations of the manners and customs of to-day. What would we not now give for a photograph of Sir Christopher Hatton, "who danced with grace," cutting his capers at a Court ball of Queen Elizabeth? What might not the public of three hundred years hence give for a group picture of imaginary photographers of to-day, who on bended knees, cap in hand, in suitable postures for the administration of kicks, humbly beg their superiors to patronise them? Perhaps, analogously, in the old Saxon times, Gurth, the serf, sometimes went voluntarily to his lord, and asked to have his left hand chopped off, that being then the mark of servitude.

"There is a growing desire among the English photographic societies to make themselves of real service to the community. One way of doing this is to obtain a complete photographic record of the district surrounding the society's headquarters. The government maps covering the area in question are purchased, and all the points of special interest are marked on each map in red ink. To do this properly, the aid of the other scientific societies of the district—those interested in archæology, geology, and so on—are enlisted, or specialists are appealed to. The photographers willing to take part in the work then group themselves in pairs—each selecting his bosom friend, of course—and to each pair one sheet of the map is allotted; and it becomes the duty of each couple to obtain two good negatives of each point marked on their map. The negatives are then all reproduced so as to be on one scale—whole-plate or 10 by 8, I recommend—and half a dozen platinotype prints and three lantern slides are made from each. Finally, the prints are made up into sets and pasted in albums, one set being retained by the Society, and the others placed in the public libraries and museums of the district. Just fancy the value and interest of such a photographic record in the future! What would we not give for 'sun-records' of New York in the days of Hudson, or of the Puritans when they landed from the 'Mayflower'? But the times in which we live will be 'ancient history' some day; and our descendants will blame us—and blame rightly—if we do not avail ourselves of the powers which we now possess to bequeath to them a record of such immense interest. There is no special need of any 'society' to do this work. Let every individual worker set his hand to the plough, and resolve to do his part in this great work."

A TRINITY HOUSE LIGHT FOR THE OPTICAL LANTERN.*

BY W. H. HARRISON.

When our respected President of the Convention invited me towards the close of last week to send in a paper, for a time I was at a loss for a subject, as the communication ought to contain something new, and the time was short. Afterwards it occurred to me that as the heavy responsibilities of Trinity House in the matter of adopting the most powerful possible lights to aid in protecting life, and—what some shipowners care more for—property at sea, had caused the Brethren to give special attention among other things to paraffin lamps, the suggestion might be made to the Convention to try such lamps in the optical lantern. I made this suggestion publicly some months ago, but last Monday called upon Sir James Douglass, the chief engineer to Trinity House, asking him to favour me with more exact figures and details about the lamps for the Convention. He promptly responded by furnishing the appended figures, the result of experiments made at Trinity House, and which have not hitherto been published anywhere. He also furnished me with the accompanying sectional diagram of the Trinity House two-ring or two-wick paraffin lamp.



This lamp consists of a circular burner carrying two concentric wicks. Air enters the lamp through three annular channels, and plays upon the flame just above the wick in order to compress the flame, the consequent condensation of which is just what is required in the optical lantern. The quantities and directions of the air currents thus admitted, depend upon the accurate construction of the three annular channels, which neither in dimensions nor in their curves are made in a haphazard way, but are the result of careful experiments. These

* Taken as read at the Photographic Convention.

channels are represented above F H in the diagram. The oil which feeds the wick is always at one level, D E, otherwise the light or its focal plane would vary. That focal plane is at A B. When the flashing point of the oil is 250° F., the burning level of the oil is close upon half an inch below the top of the burner. The oil is kept at this level by being supplied on the bird-fountain principle, from an inverted vessel into which air can enter only from below as the oil passes out.

The following are those of the measurements, and the results of experiments previously mentioned, which are likely to be of interest to lanternists, and "the Douglass burner, new pattern," is the one which forms the subject of the present memoir.

Sir James Douglass tells me that he has given up his interests in the form of patent rights in relation to these paraffin burners, and that it is open to anyone to manufacture them.

The 3-ring gas burner in the accompanying table seems promising for the lantern; it has, however, a flame very narrow in proportion to its length.

TRINITY HOUSE GAS AND OIL BURNERS.

NUMERICAL DATA.

	Oil Burners. Fresnel Pattern. Colza.			Trinity House, Douglass Old Pattern. Mineral Oil.			Trinity House, Douglass New Pattern. Mineral Oil.			Gas Burners. Trinity House, Douglass.		
	2-Ring.	3-Ring.	4-Ring	2-Ring	3-Ring	4-Ring	2-Ring.	3-Ring.	4-Ring.	2-Ring.	3-Ring.	4-Ring.
Diameter of Flame at Focal Plane in Inches	1·75	2·63	3·36	1·40	2·18	2·85	1·10	1·59	2·12	1·15	1·22	1·67
Height of Flame, Inches	2·50	2·90	3·60	2·63	3·50	4·0	2·10	3·25	3·50	2·75	3·30	5·30
Maximum Intensity of Flame in Candle Units	50	150	230	82	208	350	60	180	350	60	180	350
Intensity of Maximum Flame per square Inch of Sectional Area ..	14·30	22·50	23·60	25·50	36·10	37·40	26·08	39·56	54·43	18·58	42·15	37·63

EXPERIMENTS WITH DEVELOPERS.

BY DR. H. W. VOGEL.

THE new dry plate developer, eikonogen, raises a good deal of dust. The reports about its excellence do not seem to fully agree yet. Many have obtained good results; others, again, very unsatisfactory ones. Still, I have not the least doubt that for short exposures the developer surpasses all others. On one plate which I treated in vain for a long while with hydroquinone developer, after washing the same again, I obtained with eikonogen an excellent picture. Professor Rietschel reports, also, about very good results with the new eikonogen developer. The developer, according to his experience, works two to three times as quick as hydroquinone, and admits a considerably shorter time of exposure without hindrance to the fineness of details. An instantaneous view—about one-half second—at seven o'clock in the evening, with a Steinheil group, antiplanet—third last diaphragm—gave a picture full of contrast. Successful portraits were made on a roofed verandah situated on the north side, at one second exposure. For a satisfactory reproduction of an oil painting, with colour sensitive plate, in sunlight and by application of the smallest diaphragm, twelve seconds were sufficient. The preliminary bath recommended in the formula that comes with the developer, as well as the alum bath, do not seem to be necessary, at least, they were not employed during experiments with Sachs and Vogel-Obernetter colour sensitive plates. With regard to cheapness, according to Rietschel, hydroquinone seems to have the advantage, unless—as was also the case with the hydroquinone—a formula is discovered which will admit a smaller quantity of eikonogen for development than at present required In the following formula, discovered by my son, the quantity of eikonogen can be considerably reduced, so that the price will not be higher than that of pyrogallic acid or hydroquine.

The pyro developer has the disagreeable property of staining the fingers, and it oxidizes as soon as exposed to the air, and thus loses a considerable part of its effect. The hydroquinone developer, free from these defects, was therefore hailed with pleasure, and quickly made friends, particularly among amateurs. But it works much slower than the pyro developer, which, although of advantage under certain circumstances, will be detrimental and obstructive in cases, as for instance, in portraiture, when quick work is required. By addition of caustic potash the development may be accelerated, but unfortunately not all plates can endure this addition.

The eikonogen developer enjoys the advantage of the hydroquinone developer, not to oxidise quickly in the open air, and the development proceeds as quickly as with the pyro developer. The developing solutions mentioned in the prospectus of Dr. Kruger give good results; but they contain a great deal of eikonogen, whereby the price of the developer comes too high. But such a great quantity of eikonogen in the developer is by no means necessary, as proved by my son during his experiments. Equally good results as with the hydroquinone developer are obtained, if less eikonogen, but more alkali, is applied. If hydroquinone and eikonogen developer are made after the same formula, and two simultaneously—in the stereoscopic apparatus—exposed plates are treated with the same, it will be found that the plate developed with eikonogen has not such a strong appearance as the one developed with hydroquinone. But the same strength can be obtained as with the hydroquinone developer if more alkali is added to the developer. After many tests my son determined upon the following formula, which in its composition is very similar to that of the hydroquinone developer:—

Solution I.

Crystallised sulphite soda (or 20 grm. free from water)	40 grm.
Eikonogen	5 ,,
Distilled water	500 c.c.

Solution II.

Potass. carbonate (or an equal quantity of calcined soda)...	50 to 75grm.*
Distilled water	...500 c.c.

For use, equal volumes of Solutions I. and II. are mixed. The mixed developer keeps well in well-corked bottles for a good while, but not as long as hydroquinone developer. As with all developers, it is here also advisable to commence the development with old developer, or, if such is not on hand, a few drops of bromide of potassium, 1:10, may be added. It appears that eikonogen will stand a larger addition of bromide of potassium than the other developers.

For the development of instantaneous views of very short exposure, the developer as given in the prospectus about eikonogen—

Sulphite of soda	10 grm.
Eikonogen	5 ,,
Carbonate of potassium	5 ,,
Water	150 c.c.

* Harder working plates, to produce strong negatives, require less, softer ones more, carbonate of potassium.

can be used to advantage; but for other purposes the above formula, which, in consequence of the small quantity of eikonogen, is much cheaper, might be preferred.

The hydroquinone developer will at all events maintain its position for many purposes—for instance, for the development of landscapes, the slow development enabling one to exercise a better control and to develop several plates at the same time. It seems to admit also a larger limit in the time of exposure. But particularly the old hydroquinone developer has great advantages in comparison with the *old* eikonogen developer. The former developed a plate excellently during a test, but slow, while the latter under the same conditions gave a quickly appearing but much thinner and foggy picture. For all cases where quick work is required, instantaneous views, development of under-exposed plates, it will very likely be displaced by the eikonogen developer.

Several weeks ago I reported about two new developers which in mine as well as in other hands have given less favourable results, namely, pyrocatechin and paraphenylendiamin. They seem to be almost forgotten at the present time. Still, in honour of the truth, I have to state that such an excellent investigator as Professor Dr. Eder, in Vienna, obtained lately very good results with these developers. Whether the material was of better quality or a change in the formula, I cannot say. Eder says: I examined lately the pyrocatechin as developer. The pure pyrocatechin came from the chemical factory of Dr. Schuchardt, in Görlitz, and developed with potash the latent picture upon bromide of silver gelatine, quick and strong. The silver was reduced with a coffee-brown colour; the liquid assumed a brown colour pretty soon. The following formula acted well:

	A.	
Pyrocatechin	1	part
Sulphite of soda...	4	parts
Water	40	„
	B.	
Potash	4	parts
Water	40	„

One volume of A is mixed with two volumes of B. This developer keeps much clearer than without sulphite of soda; the development proceeds less quickly, but still much quicker than by application of an analogous composed hydroquinone developer. The pyrocatechin developer gives the same or a somewhat higher sensitiveness than hydroquinone developer, and the plates assume much quicker the necessary strength. Even if the quantity of the pyrocatechin is reduced to one-third, the developing strength is still great. This proves that the pyrocatechin is a magnificent developing substance, which deserves our fullest consideration alongside of the developers at present generally in use—pyro, hydroquinone, and oxalate of iron—and whose general application is only obstructed by the high price.

With regard to paraphenylendiamin, Eder says: After several preliminary tests, which I made in company with Mr. Von Reisinger, I find that the paraphenylendiamin, C_6H_4 (HN_2), which was obtained from the chemical factory of Dr. Schuchardt, in Görlitz, acted well as developer for bromide of silver gelatine plates. It gives about the same sensitiveness—as tested with a Warnerke sensitometer—as pyro or hydroquinone developer. One part of paraphenylendiamin was dissolved in 50 parts of water, and 1 volume of this solution was mixed with ½ volume of a potash solution, 1:10. The development took place regularly; the colour of the silver precipitate is grey, and the picture delicate and soft. Sulphite of soda keeps the solution colourless for a longer time, but retards the development to a very high degree.

Lately many complaints have been heard about frilling of plates in the hypo bath. These complaints are repeated every summer. The best known preventive is alum. Some apply it before, others after fixing; others again mix it with the fixing bath. That it decomposes the fixing bath in the latter case by separating sulphur, is known. According to Lainer this can be prevented as follows: If to a concentrated alum solution is added a saturated sulphite of soda solution, a precipitate will form, which dissolves again; by further addition a limit will be reached, where a solution of the precipitate will not take place any more; during the reaction a smell of sulphur dioxide can be observed. If such an alum bath is mixed with an equal volume of fixing bath, this will remain clear. Further tests showed that it is not necessary to go exactly to the above mentioned limit with the addition of the sulphite of soda solution to the alum bath. Lainer mixed 1,000 c.c. alum solution concentrated with 200 to 300 c.c. sulphite of soda concentrated, and added to this solution the equal volume, therefore about 1 litre of fixing bath. This mixed alum and fixing bath remained for fourteen days completely clear and undecomposed in open as well as in covered dishes. Lainer reduced the addition of sulphite of soda in the above formula to 100 c.c., and obtained still a clear alum and fixing bath, but of shorter durability. However, there is to be remarked that, according to the quality of the alum, the addition of sulphite has to be increased or reduced; in one case 40 c.c. sulphite of soda solution, 1·4, were sufficient for 1,000 c.c. alum solution, to prevent precipitation with the added fixing bath within eight days.

But besides alum there are other means to tan plates and prevent frilling, particularly as alum will oftentimes produce peculiar marbled figures, especially on the colour sensitive plates. For some time myself and son have applied tannin in the following solution:

Crystallized sulphite of soda (or 5 grm. free from water)	10	grm.
Tannin	1	„
Water	500	c.c.
Strong muriatic acid	5	„

Such a solution can be kept in stock for a long while, the sulphurous acid, freed from the sulphite of soda by the muriatic acid, acting as a preservative. The latter has, besides, the advantage that it will destroy any yellow colouration that might have originated during development. Plates which have a great tendency to frill I flow with this solution, without previous washing; with less frilling plates the developer may be washed off before the solution is put on. The action of the tanning is surprising, the gelatine film being already completely hardened after a few seconds, washing and fixing afterwards as usually. The tanning solution can also be applied with great advantage to the tanning of prints upon chloride of silver gelatine paper—aristo paper. Here it is best to do the tanning after fixing. Such chloride of silver pictures can be treated exactly like albumen prints, when mounting, without any fear of destroying the gelatine film.—*Anthony's Photographic Bulletin.*

AMERICAN PHOTOGRAPHIC DEVELOPERS.

The *Beacon* of July last gives the following proportions of the ingredients of developers as recommended by various leading American dry plate manufacturers:—

	Pyro-gallol.	Sodium Carbonate.	Sodium Sulphite.	Potassium Carbonate.
John Carbutt	3	6	18	3
D. H. Cross...	2	13	22	—
G. Cramer	3	8	30	—
The Eastman Company ...	5	20	30	—
do. do. for Kodak	2½	19	27½	—
Harvard Dry Plate Company	5	20	25	—
Ripley	5	10	26	—
M. A. Seed Company ...	3	12	18	—
Stanley	3	18	18	—

Photographic Society of Great Britain.—Monthly technical meeting on the third Tuesday, September 17th—the usual fourth Tuesday being required for the Exhibition—at 8 p.m. at the Gallery, 5A, Pall Mall East.

A NOTE ON BACKGROUNDS.

BY FRED. HART WILSON.

THE cut herewith presented is not from a photograph of the Russian giant, although it may seem so. It is merely an estimable young man of ordinary proportions, who has been put in peculiar relations with his surroundings. The only excuse we have for giving him this publicity is that he is such an excellent illustration of a fault in the management of back-



PICTORIAL EFFECT OF AN UNSUITABLE BACKGROUND.

grounds. As will be seen, the background is too high from the floor, and yet, at the same time, too low at the top. While the lower edge cuts across at the level of the knees, the head is above the mountain peaks of the supposed distance, and far up among the clouds. The result of this is to give him the appearance of gigantic height.

It is to be remembered that the eye, accumulating a certain experience, constructs out of this a natural standard, which it carries with it, and which it applies to pictures. Perspective and proportion are the bases of all the desirable deceptions of art. If we wish to give the impression of size, surrounding objects are diminished; of distance, objects receding grow smaller. To any one standing on his feet it would be utterly impossible for the head of the tallest man to appear against the sky above a line of mountains so distant as these.—*Wilson's Photographic Magazine.*

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.—The Hon. Sec. writes that the council, in response to several requests, have decided to extend the time for receipt of applications for space at the forthcoming exhibition from the 16th to the 30th of September.

ROYAL CORNWALL POLYTECHNIC EXHIBITION.—The following has been sent to us as the result of the awards made at the above:—In the Photographic Department—Professional Section—Messrs. W. J. Byrne and F. W. Edwards are awarded first silver medals; Messrs. W. W. Winter and H. P. Robinson, second silver medals; Mr. R. W. Robinson, special first, and Messrs. R. Keene and T. Protheroe, first, bronze medals; Mr. Alfred Treglitz and Messrs. Chenalls and Sons are highly commended. In the Amateur Section, first bronze medals are awarded to Messrs. A. K. Baruett, Henry Little, F. C. Cembrano, and M. E. Austin; to Mr. A. R. Dresser and Rev. H. B. Hare, second bronze medals; while Mr. E. Brightman, Miss E. L. Hare, and Mr. A. Stieglitz are highly commended. In the Photographic Appliances Department, Mr. F. W. Hart is awarded second silver modal, and Messrs. Cathcart and Peto are highly commended.

Patent Intelligence.

Applications for Letters Patent.

13,796. P. VON KNOBLOSH, 94, Wellington Street, Sheffield, "To Turn Light into an Electrical Current."—September 2nd.

13,837. J. H. SKINNER and E. J. LYTH, 54, Fleet Street, London, "Camera Slides."—September 2nd.

13,880. M. W. GRISWOLD and W. B. ATTERBURY, 45, Southampton Buildings, London, "Improvements in the Manufacture of Sheet or Window Glass."—September 3rd.

13,892. R. W. THOMAS, 121, Cheapside, London, "Dark Slides."—September 3rd.

13,969. J. VON CZERKASKA, 41, Reform Street, Dundee, "Portable Easel."—September 5th.

14,073. W. CLAYTON, 87, Birchanger Road, South Norwood, London, "Whistling Fireworks."—September 6th.

Specifications Published.

13,868.—*September 26th*, 1888. "Improvements in Cameras and in Tripod Stands for the same." JOHN WILLIAM RAMSDEN, Park Lane, Leeds, Photographer.

The inventor claims:—

1. A base or base-piece formed in two portions, the one sliding outside the other, and provided with slits or slots for facilitating the adjustment of the camera-back to focus.

2. The arrangement and use of a swing carrier for supporting the camera-back frame from the base or base-piece so as to be capable of adjustment.

3. The combination or arrangement of lens plate and pillar attached thereto, with slides or guides attached to the camera-box or bellows, the former capable of sliding in the latter so as to facilitate the closing or packing up of the camera.

4. The means herein set forth for adjusting the camera-back frame about an horizontal and an imaginary vertical axis with respect to the base.

5. A lens plate attached to one end of a flexible camera-box or bellows, and connected by a sliding connection to the base.

6. The combination of lens plate and pillar, with a socket in the base-piece for the purpose of adjusting the height of the lens above the base.

7. The arrangement of grooves in opposite sides of the dark slide, one of such grooves being provided with springs, all substantially as described and shown and for the purpose specified.

8. The means substantially as described and shown for securing the dark slide or focussing plate in the camera-back, consisting of hinged plates at the top corners, and a recess or projection in the bottom of the camera-back with corresponding grooves or slits in the corners, and a projection or recess on or in the sides of the dark slide or focussing plate.

9. A base or base piece formed in two portions, the outer portion, which slides over the inner, formed in two pieces connected together at one end by a broad flat plate, and at the other by a hinged cross-piece, substantially as described and shewn.

10. A tripod stand with the legs constructed in upper and lower halves, the one capable of sliding over the other or within it, both halves being split, the split portions of the lower halves being hinged together at their lower ends; and provided with hinged bars for tying across the split portions when these are opened out.

14,089.—*1st October*, 1888. "Apparatus for the Exhibition of Photographic Pictures, Advertisements, and the like." JOHN TAYLOR LEIGHTON, 18, Montgomery Street, Edinburgh.

My invention relates to improved means for the exhibition or display in succession of photographs, pictures, advertisements, and the like, which, being mounted upon suitable frames, are, by the rotation of a handle, brought successively into view.

The improved apparatus or appliance, according to my invention, comprises an enclosing box or frame, divided into three compartments or divisions, the central one of which is shallower than the others, but of sufficient depth to allow of the free passage of the frames. At the top and bottom of the enclosing box are fixed horizontally four grooved or slotted plates, two at the back and two at the front, within which grooves move horizontally and parallel to each other, four slides, each provided with a loose projecting clutch or pawl, which latter may, under some circumstances, be held in position by means of springs or equi-

valents. The two front and two back slides aforesaid are connected respectively to two vertical bars arranged within one of the lateral divisions or compartments above referred to. Said vertical bars have longitudinal slots formed therein, in which slots take the crank pins of two adjustable revolving arms, the rotation of which is effected by means of a knob or handle fitted upon the exterior of the enclosing case; thus, upon rotating said handle, a to and fro motion is imparted to the vertical bars and its attachments.

The frames above mentioned are formed of any suitable material, and provided on one or both sides, as may be desired, with clamps or grooves for holding the articles to be exhibited or exposed to view. In a convenient position on the top and bottom of the frame and front and back, are formed slots, perforations, or recesses with which engage the loose clutches or pawls fixed to the slides aforesaid. The vertical edges of said frames are bevelled in such a manner that in the forward movement of one frame, it may pass in front, or to the rear of the next succeeding frame.

The action of the improved apparatus according to my invention is as follows:—Upon rotating the knob or handle, the arms aforesaid on which are fitted the crank pins are rotated in unison therewith, by which means, as above described, the vertical bars and horizontal slides have a reciprocating motion imparted thereto. In the forward movement the loose clutches or pawls of the back slides engage with the perforations or recesses in the back plate of the frame, impelling it forward from the centre division into the outer or third lateral division or compartment. In its return the clutches aforesaid are capable of sliding over the perforations or recesses in the back of the frame, but the clutches on the front side now engage with the recesses in the front of the frames, and by means of the bevelled edges, withdrawing the frame to a rearward position in the central compartment or division.

In addition to the clamps or grooves in the frames, small springs may be employed to retain the articles to be exhibited in position, and prevent displacement during the to and fro motion above described.

The enclosing box may be of any suitable design, ornamental or otherwise, and may be provided with a magnifying lens inserted in a collar attached to the front of the box.

In cases in which the frames are intended to carry two photographs or other articles, the back of the enclosing box is provided with an opening similar to that in the front, and may similarly be provided with a magnifying lens, thus allowing double the number of articles to be exposed to view than when the front only is utilised.

Correspondence.

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.

Sir,—Kindly permit me to remind intending exhibitors that Wednesday next, September 18th, is the last day for receiving "packing cases" from the country by our agent, Mr. Bourlet, 17, Nassau Street, Middlesex Hospital; and also that the same day is the *only one* for receiving pictures and apparatus at the Gallery. Any further information may be obtained from me.

Edwin Cocking,
Assistant Secretary.

5A, *Pall Mall East, S.W.*

TESTING ORTHOCHROMATIC PLATES.

Sir,—In your leader of the 6th inst., you refer to the testing of the sensitiveness of orthochromatic plates to yellow rays, and you suggest that a standard yellow screen might be used with an ordinary sensitometer, and that the screen might take the form of a glass tank of definite dimensions, containing some definite saline solution.

Such a method I devised more than eighteen months ago, and have used constantly ever since. It was described in my Convention paper of last year, was referred to in my paper of this year, and was also described in the last volume of Eder's *Jahrbuch*.

An amyl-acetate lamp—or, better, the modification of it which I recently described in the Photographic News—is placed at a distance of one metre from a sensitometer screen, and immediately in front of the screen is placed a glass tank two centimetres across, containing a one per cent. aqueous solution of picric acid. The light which falls upon the plate under these conditions consists only of rays less refrangible than the Fraunhofer line *b*. The method is very convenient in practice.

C. H. Bothamley.

WOMEN AT PHOTOGRAPHIC MEETINGS.

Sir,—Being a member of the same Association as "Perplexed," who writes to canvass the opinion of those Photographic Societies only who admit lady members, I think it very bad taste on his part to drag this matter into public; I am sure the members have had enough of this in their own debates. Many of the oldest and most interested members of the Association referred to strongly object to this scheme being introduced, and yet its promoter has not the good sense to let the matter drop, but continues to bring it forward, which, I fear, will lead ultimately to the injury, if not dissolution, of the Association.

A Member.

Proceedings of Societies.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 5th inst, Mr. J. P. Everitt in the chair.

Mr. Friese Greene read a paper, in the course of which he said:—"Photography has so many attractive applications to one thing and the other at the present time, that it has too much the effect of distracting attention from some of the most important questions which it raises, such as the chemical and art knowledge which is in its power to revolutionize. Yes, we photographers can honestly say that now, especially to those who reproach photography as a mere mechanical operation, and say that we need not possess taste, imagination, or even a knowledge of the rudimentary elements of pictorial art. Some will say no mechanical process can long supersede the living agency of man's mind, and that photography is not and never can be anything more than a servant of servants; and they will use arguments neither novel nor ingenious to say that photography cannot maintain the position in which we admirers of the wonderful processes connected with our art are placing it. Now these remarks do not make the slightest impression on genuine practical workers; it's like water on a duck's back to me, and if I have anything to carry out, I generally put wool in my ears until it is finished, or at least until the difficult part is over. I admit we lose a lot of thoroughness, or what ought to be done thoroughly, through the excitement produced by the marvels of the science, such as the want of taste in the point of views selected to take a picture, and the noticing of curious phenomena which crop up during our laboratory experiments; but as long as the world lasts we shall always have that; but what I mean is, for us to look at the progress year by year photography is making into everything. Chemists taught us at first; it will be soon, if we work earnestly, the reverse. We shall teach the chemist, for the more I consider the chemical question in relation to photography, the more strongly it forces itself to my notice, and I look forward to our occupying much larger space in the domain of chemical inquiry than is the case at present. Look at the grand lenses made now, and the results we obtain through them; but we still want magnitude, and the beauties of perspective not diminished. There is a good field for lenses. We photographers should not be too frightened of getting the sun into our lens, and turn our back on our best friend, and lose all the cross shadows which give the stereoscopic effect to a picture. I have found the most pleasing effect produced where the sun is shining towards the lens. Now, as to novelties, I am going to show you a few to-night: firstly, my opal cards, which I will demonstrate; secondly, these few ivory pictures, upon which I should like to hear your candid opinion, therefore I will say nothing more about them, but pass them to you; thirdly, I have brought this scroll, as I am anxious to know if anyone can tell me how the ornamental border is done. It is not done in England; I have never seen anything so fine produced here. Still we are not beaten in everything, not even by our American cousins, for here is a camera with one movement constructed to take three or four pictures a second by simply turning a handle, a thing which has never been accomplished before."

Specimen photographs on thin sheets of white celluloid, with embossed designs, were shown; these had all the beauty and appearance of thin ivory sheets.

Mr. GREENE also exhibited his opal cards, upon which photographs can be printed by artificial light direct without mounting or toning. Several cards were exposed in a pressure frame, at periods ranging from two to five seconds, about twelve metres from an ordinary gas burner; they were then developed, fixed, washed, and, after a final bath of methylated spirit, dried over the gas, the whole of the operations occupying from ten to fifteen minutes. A brass model of the working parts of a detective camera was also shown by Mr. Greene. This he had designed specially for taking a rapid series of moving objects with one lens and camera, the number of pictures being limited only by the length of the film provided—as many as 300 might be taken with a single roll-holder at the rate of six in a second, simply by turning a handle.

Mr. A. HADDON asked if the cards shown by Mr. Greene were absolutely impervious to water and photographic chemicals.

Mr. GREENE said they were for the time required for development. Referring to the celluloid films, Mr. Greene said he had found great difficulty in coating them. After many experiments, he obviated this by first coating the films with wood spirit.

The CHAIRMAN referred to an experience in development that he considered worth relating. He developed a plate in the usual way with pyro; the image not being sufficiently dense, he decided to add more pyro, but by mistake added ferricyanide of potassium; the image immediately disappeared. The plate was now washed, and a fresh developer applied, resulting in a positive image.

Mr. WM. HASTINGS exhibited a Taylor and Hobson's No. 3 detective lens, six inch focus, working at f_{11}, and fitted with shutter and iris diaphragm.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

AT the meeting on Friday, September 6th, at 76, Peckham Rye, the President, Mr. F. W. EDWARDS, in the chair, seven candidates were elected members of the Society, and one proposed. Contributions of lantern slides were made by Messrs. Dowling, Gardner, and Kelly. Negatives taken on the excursion of August 17, to Richmond, were exhibited, also some negatives of holiday work by one of the members. A large number of prints of various subjects was on view.

The PRESIDENT showed a quantity of platinotype prints, among which were some excellently executed 24 by 18.

It was resolved that the last excursion this season be in the neighbourhood of Dulwich, and that the members assemble at the *old* College Gates at 6 p.m., on Saturday, September 21st.

At the meeting on October 4th the President will deliver a lecture on the "Properties of Lenses."

LEWES PHOTOGRAPHIC SOCIETY.

THE first annual meeting was held at the "George and Dragon" Coffee Tavern, High Street, on September 3rd, with the PRESIDENT in the chair. Mr. R. C. Bennett was elected a member of the Society.

The HON. SECRETARY then read the report of the Council for the past year. The Society at present numbers thirty-eight members.

All the retiring officers were re-elected with the exception of Mr. A. N. C. Corder, who had resigned the committee in consequence of business engagements. Mr. G. J. Wightman was elected to fill the vacancy.

Several slight alterations were made in the rules. An invitation from the Brighton Society to the Lewes Society to join them in an excursion to Shoreham on the 14th inst, was cordially accepted. An excursion to Groombridge was also arranged for the 28th inst.

CATALOGUE. — Mr. C. C. Vevers, of Leeds, sends us what he speaks of as a hastily compiled and, consequently, very incomplete price list; it is, nevertheless, a very well-arranged and comprehensive catalogue, on which he promises an improvement in the next edition.

PHOTOGRAPHIC CLUB.—The subject for discussion on Sept. 18 will be "Dark-room Illumination." Saturday outing at Greenwich.

Answers to Correspondents.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

L. E.—Even if we knew the composition of the powder developer, it would not be fair to the makers to publish the analysis. As a matter of fact, we have never examined it.

P. A.—Pure dextrine is itself a neutral body, but the generality of samples react acid to test paper. A trace of ammonia would no doubt correct it, but we never found any disadvantage from the presence of a trace of acid.

J. M.—The case is peculiar, and we should hardly know how to advise you. Much depends upon the legal interpretation of the clause in your agreement.

TYRO.—One pound of hypo dissolved in a quart of water is about the proper strength of fixing bath for dry-plate negatives. For local application in reducing over-intensity or halation, use a solution of potassium cyanide thickened with gum; apply this with a camel's hair pencil upon the plate when about half dry, and finish with a good washing.

B. S. E.—We have no knowledge of a manual of photographic colouring by the author named, nor can we learn anything about it on inquiring of the Autotypo Company. You have probably seen Mr. A. H. Bool's little shilling book, published by Messrs. Piper and Carter. You might also look up Mr. A. H. Wall's papers, which appeared some time ago in the NEWS.

LUX.—An instrument which fulfils your conditions is the Whipple-Casella Universal Sunshine Recorder. It is a glass sphere appropriately mounted, which scorches or burns a trail in a band of cardboard placed equatorially around it. In this way the amount and varying degrees of sunshine are registered daily, and the marks on a paper scale show both intensity and duration.

M. B.—The Key Camera was exhibited by Messrs. D. Noakes and Son, of Greenwich, during the Conference week at St. James's Hall. The arrangement for attaching the dark slide and feeding the camera is certainly ingenious, and the carriers very light.

PHOTO.—We have seen the article in *Harper's Monthly Magazine*, but of course, when the attempt is made to condense the account of "Fifty Years of Photography" into eight pages, the individual notices must necessarily be very brief; hence it happens that the record of our former editor, the late H. Baden Pritchard, is limited to a single achievement, and the item chosen is not one of his most important works. The portrait of Daguerre is excellently well reproduced, and the whole narrative well written.

NOT A MEMBER.—You cannot have seen the answer addressed to you a week ago. There is no time to be lost, Wednesday next being the last day for receiving pictures at the Gallery.

L. D.—We thank you for calling attention to the matter, and will not fail to make proper enquiry. The right in the negative was well considered, and reported upon at the Paris Congress. Eighteen by twenty-four centimetres is not whole-plate size, but exactly 9·45 by 7·09 inches. All changes are inconvenient for a time, and so with this until the French measures meet with general adoption.

J. P. S.—Use a more dilute developer, or increase the amount of restrainer. We did not succeed well without the bromide.

W. H. M.—There is no time to be lost, as the season is so far advanced. Push your enquiries, or advertise at once; the qualifications appear sufficient.

M. P. S.—The *Graphic* for August 24th is, indeed, a rich treat for those who take an interest in the sad fate of Messrs. Fox and Donkin. The account of "The Peaks and Glaciers of the Caucasus" given by Mr. Douglas Freshfield, so well illustrated, enables us to form some idea of the difficulties of the enterprise, and the character of the mountaineering expedition, upon which these intrepid explorers were engaged a year ago.

G.—The term "half-tone negative" in this connection would apply to a reproduction in which the lights and shades were broken up by reticulation or graining, such as might be obtained by copying the original subject with a fine wire gauze in contact.

F. McK.—The press or private view is usually held on the morning and afternoon of the date fixed for the opening soirée, which commonly falls on a Saturday.

ITINERANT.—If you want a photographic caravan cheap, you should make a bid to purchase the dilapidated omnibus fitted up with inner dark room, sliding front window and side benches, developing sink and over-head water cistern, now standing on the Gun Hill Cliff at Southwold. Some money would have to be spent on repairs, but here, at least, is a framework mounted apparently on good wheels.

SUBSCRIBER.—1. Under the circumstances you mention, it is usual to pay a premium, and receive a small salary from the commencement, or give services without remuneration for a stipulated time. 2. Not registered by our publishers.

MOTTLED.—If, as you say, the mottled appearance shows itself before toning, the defect is due either to the use of stale sensitized paper, or insufficient washing in the first instance.

Other correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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THE BRITISH ASSOCIATION AT NEWCASTLE.

THE meeting of the British Association at Newcastle came to an end yesterday, and all through it has been of a quiet nature, with no features of an exceptionally striking nature. Photographic papers have, perhaps, been in number above the average, and various memoirs, indirectly connected with photography, have not been without interest. The action of lead oxide upon glass at low temperatures was among the latter; the results exhibited were exceedingly curious in appearance, especially one in which a picture of a landscape had been etched by the oxide upon blue glass. The process is one which may come into use for producing ornamental borders upon glass plates intended to carry or cover positive photographs.

Last Sunday afternoon Mr. James Glaisher, Sir James Douglass, the Town Clerk of Tynemouth, the Engineer to the Tyne Improvement Commissioners, and others, visited the lighthouse and the old priory at Tynemouth. The light is a flashing red one; each flash is given by the flames of several single-ring paraffin Douglass lamps. The light is sent out as a parallel beam by means of silvered parabolic reflectors. Here it may be mentioned that the diagram of the two-ring Douglass paraffin lamp contained in our memoir contributed to the Photographic Convention, and published last week in these pages, represented chiefly the air-channels for compressing the flame, those being the chief feature of the invention. The diagram was not a section of the lamp as a whole, for the lamp is provided with channels, not represented in the cut, for supplying air to the centre of the inner flame and to the space between the two flames. An advantage of these lamps which lanternists will appreciate is, that the outer compressing currents of air tend to keep the chimney cool, and to reduce its liability to be cracked by heat when in use. Dr. Alder Wright visited Tynemouth fort earlier the same afternoon.

Captain Abney presided over Section A, and at times was relieved in his duties by Sir William Thomson, Lord Rayleigh, Mr. James Glaisher, and others; Mr. Glaisher presided at the reading of the meteorological papers, for in that subject he is an expert, as he had charge for many years of the Meteorological Department of Greenwich Observatory. Section A meets at eleven o'clock each morning, and its work may not be finished until four o'clock or later, consequently paying close attention from the chair to papers and discussions on widely differing subjects by some of the best men of science of the day, is no light task for a president; it involves considerable mental strain.

The photographic papers were read in three different sections, and occasionally two of them were being read at the same time in different buildings in Newcastle, to the inconvenience of those interested in such subjects. Perhaps the readers of photographic papers may gradually become numerous enough at the British Association to claim and obtain a department for themselves; that time might be brought closer by the Camera Club and other photographic organisations resolving to have a general gathering in the autumn, and to join the British Association for the purpose, rather than to start anything new, for the latter line of action might be supposed to be intended to compete with existing photographic institutions.

The hotels at Newcastle were so full on the night of the opening meeting that places several miles off accommodated surplus visitors; thus the hotels of the city of Durham, half an hour's journey by rail from Newcastle, contained a number of British Association people. In Newcastle high teetotalism and tall drinking seem to flourish side by side; in some streets of seven or eight houses, four of these houses are devoted to the sale of spirits; in others, handsome restaurants, in some cases externally resembling good foreign cafés, withhold from those who dine therein even such dangerous drinks as humble beer and *vin ordinaire*. Some of the permanent London officers of the British Association were "billeted" at the real foreign restaurant of Gustavo Barawitzka, near the Theatre Royal; they were greatly pleased with their quarters, and with the achievements of the French cook on the premises. Next year the Association meets at Leeds, and the year following at Cardiff; the powers of the latter town in the way of affording hotel accommodation to strangers are likely to be severely tested.

PROGRESS IN WOOD ENGRAVING.—After carefully examining the various contributions to the examples of wood-engraving and fine art printing which the present season has produced, it must be confessed that very considerable progress in the quality of the work is observable. The peculiar prettiness of the American engraving has been undoubtedly copied in more than one English book, a proceeding that was quite unnecessary, as the popularity of the mannerism of the transatlantic productions is already on the wane, and will never supersede the rich and artistic form of wood-engraving to which we have been accustomed from the best engravers of the English school. Wood-engraving in this country has long since emancipated itself from the slavish copying of the delicacy of copperplate effects, and has adopted in its place that boldness of style and wealth of colouring which are the peculiar characteristics of the wood-cut. The modern method of America is simply a reproduction of the desire to rival copper-plate work, and although it has and does still please by its minute detail in the matter of tint cutting, it will assuredly give place eventually to sounder and more legitimate work. Still, it must be confessed that this American revival has not been without its influence for good, and has stimulated English engravers to look to their laurels. Although there is no need to copy that which in the American work must be considered as artistically unsatisfactory, it has prevented the British vigor of design and execution descending into coarseness. Upon a future occasion something may be said upon the subject of the printing of wood-cuts, which is quite as important an item as engraving them.—*The Picture and Art Trade.*

ON EIKONOGEN, A NEW PHOTOGRAPHIC DEVELOPER.*

BY PROFESSOR G. D. LIVEING, F.R.S.

THIS substance is the sodium salt of amido-β-naphthol--sulphonic acid.

The acid with this long name, $C_{10}H_5.NH_2.OH.SO_3H$, was first described by Professor Meldola in 1881. He obtained it by the reduction of nitroso-β-naphthol-sulphonic acid (Ch. S. J. xxxix. 47.). It has since been obtained in much larger quantity by Witt, by reducing the orange colouring matter from diazo-benzene chloride and Schaeffer's β-naphthol sulphonic acid (Annalen Ch. ü. Ph. 152. 298.), and he described his process, and the characters of the product, in the "Proceedings" of the German Chem. Society, last December.

It is now produced on the manufacturing scale by the Actiengesellschaft für Anilinfabrikation at Berlin, and may be obtained in the market, and I think it may be of interest to chemists as well as photographers.

Eikonogen crystallises well from solution in water, and the crystals contain two molecules of water of crystallisation. It dissolves with tolerable facility in hot water, but is only sparingly soluble in cold water, and is insoluble in alcohol. The aqueous solution quickly turns yellow, and gradually brown. An alkaline solution turns brown immediately, from absorption of oxygen. To keep the aqueous solution for any time it is necessary to add sodium sulphite. Even with the addition of sodium sulphite I have found that it does not remain colourless very long.

I need not say that a great variety of reducing agents may be used as photographic developers, but the most essential quality to secure is that the reducing agent shall quickly reduce those portions of the silver compound which have been exposed to light, but shall have no effect, or no rapid effect, on the silver compound which has not first been acted on by light; in fact, that the reduction shall extend to the faintest lights, but shall never spread beyond the particles which have received the impulse of light. Of all substances tried, perhaps pyrogallol has held its own the longest, though some prefer ferrous oxalate, and of late hydroquinone has been a good deal used. The chemical action of hydroquinone is very similar to that of pyrogallol, and the fact that the former is paradi-hydroxybenzene, and pyrogallol is a tri-hydroxybenzene, led Dr. Andresen, of Berlin, to try the effect of other para-derivatives of benzene which, by oxidation, would easily give quinones or similar substances. Para-di-amido-benzene and para-amido-phenol were found to be well adapted for developing photographs. Subsequently Dr. Andresen turned his attention to the sulphonic acids, and the outcome has been that eikonogen appears to fulfil the requirements of a good developer, the best.

Dr. Andresen claims for it:—

1. That while eikonogen reduces the bromide of silver so far as it has been subject to the action of light, the bromide in dry gelatine plates which has not been exposed to light remains unaffected by it.

2. That concentrated solutions of eikonogen (1 : 20 to 1 : 50) produce even with instantaneously exposed plates minutely detailed negatives.

3. The minuteness of detail produced by eikonogen is supposed to be due to the fine grain of the silver precipitate.

4. The tone of the negatives given by eikonogen is well adapted for printing, and in this respect it excels pyrogallol.

5. The solutions of eikonogen containing sodium sulphite are durable even after the addition of carbonate of soda, and the same solution can be used for several pictures in succession.

6. Eikonogen is not poisonous, which cannot be said of pyrogallol or hydroquinone.

The specimens which I exhibit bear out, I think, the claims. The negatives are remarkably perfect in detail, the tone is excellent, blacker than is given by pyrogallol, more delicate than is given by ferrous oxalate, and the prints from them are very good. I need not say that they have been taken by an experienced photographer.

My own experience of eikonogen is, as yet, very limited, and my practice of photography is limited to spectroscopic photography and negatives. It is necessary for me to have a very sensitive developer, which will develop the faintest details and, at the same time, give all the shades of depth which correspond to variation in the brightness of the spectral lines. Hitherto I have not found anything do so well for my purpose as pyrogallol; but eikonogen seems as sensitive as pyrogallol, and, at the same time, to give me a picture in which the lines are blacker and more easily seen under a microscope. I cannot quite endorse Dr. Andresen's claim that solutions of eikonogen with sodium sulphite are very permanent. The same solution can, however, be used for several pictures in succession. For instantaneous photographs the solution has to be made alkaline with caustic alkali, and then the liquid becomes brown very quickly. For portraits, and such like pictures, an alkaline carbonate, such as sodium carbonate, may be used.

As regards the non-poisonous character of eikonogen, I suspect it can only be due to its sparing solubility, for so powerful a reducing agent can hardly fail to have a strong effect on the animal economy.

* Read before Section A of the British Association.

DISCOVERY OF A LODE OF URANIUM.

EXACTLY a century ago—namely, in 1789—Klaproth succeeded, says the *Times*, in isolating from a dark-coloured mineral known as pitchblende a yellow oxide, which, after carefully testing, he pronounced to be the oxide of a new metal. To this metallic substance he gave the name of uranium, so calling it after the planet Uranus, then recently discovered by Herschel, and it was at once classed among the rare metals and still remains so. Its rarity is indicated by its market price, which is about £2,400 per ton. There are several oxides of this metal; but the best known and most important is the sesquioxide, which forms a number of beautiful yellow salts. This oxide is largely employed for imparting delicate gold and greenish yellow tints to glass, while the protoxide is much used in producing the costly black porcelain. Uranium is also found to be useful in certain photographic processes as a substitute for the chloride of gold; but its rarity and consequent high price have hitherto caused its application to be very limited, although there are uses other than those already named to which it could be put if it were less scarce and less costly. It is found in Cornwall, Saxony, and Bohemia; but up to the present time it has only been met with in isolated pockets and patches. The centenary of its discovery by Klaproth has, however, been marked by the finding of a continuous lode at the Union Mine, Grampound Road, Cornwall, which is believed to be the only known lode in the world. This discovery is regarded as unique in the history of the metal, for the lode is what is known as a true fissure vein, and the ore is found to contain an average of 12 per cent. of the pure metal, the assays going up as high as 30 per cent. in some parts of the lode. Several tons of the ore have already been raised and sold, fetching high prices. The lode traverses the mine from north to south, and the uranium occurs in it chiefly as a sesquioxide. It is anticipated that the present discovery will enable two important applications of the metal to be followed up. The first is as a substitute for gold in electro-plated ware, inasmuch as with platinum and copper it forms two beautiful alloys, each having the appearance of gold, and the former also resisting the action of acids. The second application is in connection with electric installations, where its usefulness consists in its high electrical resistance. The mineral deposits generally at the Union Mine are of an exceptional character, comprising, in addition to uranium, magnetic iron, silver, lead, tin, copper, ochre, and umber.

THE French journals announce that the Paris Exhibition will not be kept open beyond the 31st October, and that the official list of awards will be published towards the end of the present month.

PINHOLE PHOTOGRAPHY.*

BY LORD RAYLEIGH, SECRETARY TO THE ROYAL SOCIETY.

IN the *Philosophical Magazine* for 1880 it was shown that a simple aperture is as effective as the best possible lens in forming an image, provided only that the focal length (f) is sufficiently great. Conversely, if f be given, the aperture ($2r$) may be made so small that the use of a lens would give no advantage. But if f be such as is usually afforded by a camera, the admissible aperture, being very much less than that of the pupil of the eye, is insufficient for reasonably good definition.

If λ be the wave length of light, the point at which a lens may be dispensed with is given by

$$f = \frac{2\,r^2}{\lambda} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1).$$

This is the condition that the relative retardation of the rays from the centre and from the margin of the aperture shall amount to $\frac{1}{4}\lambda$. If $2r$ is to be equal to the aperture of the pupil, f would have to be about 66 feet. At this focus and with this aperture, the image formed without a lens would be at the least as well defined as that received upon the retina.

In some recent experiments f was about 9 feet, and $2r$ about $\frac{1}{10}$ inch. The specimens exhibited were taken upon gelatine plates, and represent a weather-cock seen against the sky. The amount of detail is not materially less than that observed by direct vision in the case of ordinary eyes. Theoretically, it should correspond to that obtained when the eye is limited to an aperture of $\frac{1}{10}$ inch. If the pictures are held at the ordinary distance of, say, a foot from the eye, the object is seen under a magnification of nine times, and there is, of course, a corresponding loss of apparent sharpness.

As the focal length increases, the brightness B of the image in a properly proportioned pinhole camera diminishes—

$$B \propto \frac{r}{f^2} \propto \frac{r^2\,\lambda^2}{r^4} \propto \frac{\lambda^2}{r^2} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (2).$$

But modern plates are so sensitive that there would be no difficulty in working with an aperture equal to that of the pupil, other than that incurred in providing a focal length of 66 feet, with the necessary exclusion of foreign light.

NEW YORK SOCIETY OF AMATEUR PHOTOGRAPHERS.

DR. EDER, Mr. Carey Lea, M. Davanne, and M. Leon Vidal have been elected honorary members of the above Society, which has also received the following letters :—

Blackheath, London, S.E., March 27th, 1889.

MY DEAR SIR,—I beg to acknowledge the receipt of your kind note of the 2nd inst., informing me that the Society of Amateur Photographers of New York had done me the honour of electing me an honorary member. I beg you will convey to them my thanks for this favour, and with the sincere hope of a prosperous and progressive future, believe me, faithfully yours,

JAMES GLAISHER.

To the Secretary, Society of Amateur Photographers of New York.

He also has sent the following letter :—

1, *Dartmouth Place, Blackheath, London, S.E., March 27th*, 1889.

MY DEAR SIR,—Your letter dated February 22nd was read at a meeting of the Society held on the 12th inst. It has given us great pleasure to receive the congratulations of the Society of Amateur Photographers of New York. In acknowledging the receipt of your communication, I have the pleasure of expressing, on behalf of the Photographic Society of Great Britain, the hope that the second half-century of the history of our art-science may be as fruitful in progress and discovery as the first.—I have the honour to remain, dear sir, faithfully yours,

JAMES GLAISHER, *President*.

To the President, Society of Amateur Photographers of New York.

* Read before Section A of the British Association.

BLUE-PRINT PAPER MAKING.

BY JOSEPH P. BEACH.

FOUR or five years ago the writer began to make prints upon "Ferro prussiate paper," purchased from the photo dealers. When it was obtained fresh from reliable manufacturers the paper was of good quality, and for a few weeks it would give very satisfactory results ; then the prints lacked brilliancy, and soon the paper gave a dull, deep blue, of no value in pictures. This was because the paper, by age and dampness, had deteriorated. The only remedy was a new purchase of freshly-made paper. Frequent purchase of paper—only to throw nearly half of it into the waste-basket—was somewhat o a tax upon the purse, besides being very trying to the temper of the operator when his prints proved to be worthless. There was also the disadvantage of one who lived in the country, far from the source of supply, in procuring paper when most needed. There are a large number of amateurs who would, no doubt, be delighted to furnish each of their friends with a picture, if the thing could be done without much trouble, and at a minimum of expense.

This paper is therefore written for the purpose of informing those who are interested how they may proceed to make blue paper prints to *give away* or keep as they may see fit, without incurring much expense, or spending much time in the manipulation. The writer does not propose to detail his various experiments, but will give the best results finally reached after a series of trials, during which he used nearly every known formula on the subject, beginning with that of Professor Gowroskovitz, who pretentiously styles himself the "inventor," and dates his invention from 1870, while it is well known that, as early as 1840, Sir John Herschel experimented so exhaustively with the same ingredients as to reach results almost equal to those of the present day. The writer does not pretend to any invention, or to relate more than he has ascertained by his own manipulations, largely aided by ideas obtained from others, whose language he may unconsciously use in attempting to make the process of blue paper-making plain to the comprehension of the uninitiated.

Among the many formulæ the writer has tested was one that came from the Smithsonian Institute at Washington. It was a double, back action recipe, involving printing first and developing afterwards, but resulting, in the writer's hands, in no better prints than any other paper of a poor quality. It had the advantage only of keeping for a long time, and the greater disadvantage of the operator having to serve an apprenticeship in learning how to print before applying the chemical developer.

The blue paper will not take the place of silver prints, or recommend itself to everybody as a "thing of beauty," yet prints may be made on this paper that will, to many persons, be "a joy for ever," the chief advantage being the permanent character, and the ease with which they may be developed in a bowl of clean water. After printing, the positive is simply washed in a few changes of water, which completes the process. The chemicals required for blue-print paper are :—

1. Ferridcyanide or red prussiate of potassium.
2. Ammonio-citrate of iron.

Buy half a pound of the red prussiate and a half-pound bottle of the citrate of iron and ammonia. The ferridcyanide should be of a good quality ; it comes in hard lumps, which may, if necessary, be broken up with a hammer. The following formula will make enough to sufficiently cover six sheets of paper 17 by 23, or enough for four dozen pieces 5 by 8, and two dozen $3\frac{1}{4}$ by $4\frac{1}{4}$, which will be the quantity an ordinary amateur will use before it loses its good qualities. Into a small, wide-mouth bottle, having a good cork, put *sixty* grains of ferridcyanide of potassium ; upon this pour an ounce and a half of warm, boiled water. If the water is taken from a tea kettle, it is well to filter it. Buy a small glass funnel and some filtering cotton, a little of which goes a great way. After the cyanide has been completely dissolved by vigorously shaking up in the bottle, filter it into another small, wide-mouth bottle, which should be allowed to stand for an hour or two, well corked. This may be done in broad daylight. When ready for use, take *ninety* grains of citrate of iron and ammonia and add it to the ounce and a half of finid ferridcyanide. This should be done in the dark-room, or in a room where the daylight is excluded, and the light shaded on the operating side by a piece of yellow or red paper. Shake the bottle vigorously for a few minutes, and set the mixture away in a dark place.

The bottle may be put into a dark pasteboard box, or wrapped in a piece of red muslin. Let it stand an hour or two, longer or shorter if necessary. The citrate of iron and ammonia is very sensitive to humidity. It comes in little dark red scales, which stick to the fingers and everything else in damp weather, but if a dry spoon and a dry piece of paper be used it is readily handled. After using, the bottle of citrate should be corked and a piece of paper pasted over it to exclude air. Having procured some good linen and cotton paper—unsized Rives paper is best—proceed as follows:—Get a piece of thick pasteboard or a pine board, cut to the size of your sheet of paper. Tack the left-hand edge of the paper to one edge of the pasteboard with two or three draughtsman's tacks. Now, in a dry room, lighted as before described, pour your mixture into a white saucer; it will be of a dark, red-brown colour. A piece of clean coarse sponge, three inches square, is now dipped into the mixture, taking up as much as the bottom side of the sponge will absorb. A little downward pressure soon gathers enough of the liquid, which at first does not readily attach itself to the sponge. With this, sponge the paper from left to right with a light, even pressure, covering the whole sheet as speedily as possible to prevent curling at the edges, then move the sponge over the paper at right angles to the first direction, and so on alternately, until you perceive the whole sheet has an even light brown colour, very much resembling the colour of a cup of coffee with milk in it. The sponge may be laid upon a plate while the tacks are removed from the pasteboard, or board, if one is used. With a couple of pins, one in each corner, or in any other convenient way, hang up the coated paper to dry. When the paper is all hung up to dry, wash out the bottle and sponge, and clean up generally, although there is very little to clean beside the sponge. The entire operation occupies about half an hour. Cleanliness is essential, because wherever any article used in making blue paper gets into daylight it soon turns blue, and nothing but potash will bleach it white. Care should be taken to keep the hands and fingers, if greasy or damp, off the white paper, or the coated paper. In a couple of hours, in a warm, dry room, the paper will be dry enough to put away. The sheets should be placed in pairs, the coated sides towards each other, and at first loosely rolled into a roll about six inches in diameter, then this roll wrapped in several folds of wrapping paper, and all again wrapped in some red muslin, when it may be put away for the night, or until wanted for use.

Every amateur will know *when* he needs some paper, and just about *how much* he will want to use. He can then fold it, coated sides in, to the proper size, and with a case knife, or sharp paper cutter, cut it to suit. The cut up paper, coated sides towards each other, should be put in a light-tight box and carefully excluded from dampness. It will keep for from one to three months, if care is taken to prevent *light* or *dampness* from reaching it. The operation of cutting up paper should be done in a dark room, or one lighted as before described, and all unnecessary fingering of the coated or even the white side of the paper should be avoided at all times, especially while printing.

It will readily occur to the amateur who has had any experience in mixing chemicals, that the proportions here given may be halved, doubled, or quadrupled, according to the necessities of the case, but it should be remembered that a very great departure from these proportions will result in a change of quality in the prints, and in consequence one batch of paper will not be exactly as good as the one preceding, or *vice versa*. Experience has taught the writer; but if others wish to experiment they will the sooner arrive at conclusions which suit them best.

The paper made after this formula has worked better, in the writer's hands, than any other he has ever used, and he has used many different kinds, made after a dozen or more of formulæ, which gave as many different results as there were authors or inventors. One kind would print rapidly and remain blue in the whites; another would be very long in printing, and then the blue would be almost too pale to be of service. In the formula here given the printing of a good negative, under a bright sun, has a minimum of five minutes' exposure to a maximum of ten minutes; but all good negatives should be printed in from five to seven minutes. In a few days this paper turns to a light, faded green colour, and so long as this colour remains light green the paper is in good condition. If the paper begins to assume a dark green or blue it may as well be discarded, for the resulting prints will not be satisfactory. In this connection it will be well to observe that a *poor* negative will make a *poor* print, while a *good* negative will always give a *good* print.

Printing on blue paper should be done in bright sunlight, where no shadows fall on the glass, and if a negative is once timed, the same exposure, under similar conditions, will almost invariably produce an equally good print. In a very subdued light, or the dark corner of a room with closed blinds, is the proper place to handle blue paper, or to put it into the printing frame, or to examine the print before development.

A properly printed blue print will have a rusty blue tone, the whites remaining of a faded green colour. A little experience will teach an amateur all the mysteries of printing. When the print is taken from the frame it may be consigned to a light-tight box until as many prints as desired have been printed, when they may be developed by simply plunging them, one at a time, into a bath of clean cold water. Care should be taken to do this in a subdued light. Strong daylight should never be allowed to shine upon the print until after it has been under water, and the surplus chemicals floated off. At the first washing fine air-bubbles are likely to appear; a gentle movement under the water will soon remove these. It should, however, be done at once, or the print may be spotted. Iron or tin vessels should not be used, and only two or three prints washed in the first basin of water; then they should be removed into another water bath. After this let the prints soak in clean, clear, cold water until the whites appear bright, and the blue of a handsome colour.

The writer does not believe in soaking these prints as long as some experts recommend. The fibres of the paper will rebel against such treatment; therefore, as soon as the prints look satisfactory they should be removed from the water. If the washing is done where a strong light falls upon the print it is apt to set the blue colour remaining in the substance of the paper beneath the whites, and the resulting print will show signs thereof. In washing it is always better to keep the prints face down in the water for some time before turning them over, except to examine. Attention to these particulars will be rewarded by good, bright prints, while carelessness will meet with its usual penalty—a poor print.

A good blue print is seldom made under a dull exposure. The result is a dull green colour, and the printing on dark days is not advised unless the operator does it for an experiment, or on some occasion when he has no other alternative. On bright, sunny days in June, July, August, and September, blue prints may be made from nine a.m. to six p.m.; but after four o'clock the exposure must be from one-third more than to twice the time of a normal exposure.

In the last *International Annual* for 1889 will be found an article by C. B. Talbot, which the present writer recommends to the attention of amateurs who care to make their own paper. The formula is substantially the same as given in this article, with the addition of four drops of aqua ammonia. This may be an improvement, but its value is not apparent. Mr. Talbot has, no doubt, had a large experience, and his article treats the subject in a common-sense style; nevertheless, some of his statements may be open to criticism. He claims that the red prussiate of potash cannot be kept in solution. It can be kept a very long time if put up in a well stoppered bottle, and it is very doubtful whether even strong daylight would very much disturb its quality. The citrate of iron can also be kept a long time in solution, but this should be closely corked, and kept wrapped up in red muslin and put away from the light.

For the information and use of those who prefer to keep their blue-paper chemicals in a form easily accessible, ready for use in small or large quantities, without the trouble of frequently weighing out the ingredients and mixing, as herein described, the writer gives the following as the result of his own experience. 1. Mix 240 grains ferridcyanide of potassium—red prussiate—in four ounces of water, filtered—after being boiled in a copper tea-kettle—before using. When the red prussiate has been thoroughly dissolved, filter it into a six-ounce bottle, cork it tight; label it, with date of mixing, and put it away in your closet, or let it stand on a shelf with other bottles until required. This stock gives sixty grains of red prussiate to the fluid ounce. 2. Mix 360 grains citrate iron and ammonia in two ounces of filtered, boiled water; put in a three-ounce vial, shake it up well, then cork it tightly. Now wrap this bottle up in several folds of red flannel, and put it away in a dark place. This stock gives ninety grains to the half ounce. When it is required for use, take of No. 1 one fluid ounce, of No. 2 one fluid half-ounce;

put in a mixing bottle and shake vigorously a few minutes. This quantity ought to cover six sheets of paper, and if it does not it will be because the operator spreads the fluid too profusely. In sponging, the fluid should be absorbed by the paper as the sponge passes over it, and the sponge, sufficiently moistened, should pass over the paper often enough to cause every part to take its proportionate amount of fluid. When this has been done, and the paper, all over its surface, has an even light brown colour, the operation should cease and the paper be hung up to dry. There should be no rubbing *in* of the chemicals. Let the paper, as it were, take in the mixture. The mere weight of the fluid in the bottom of the sponge is almost pressure to use. In a few minutes the operator will discover how to do it, and he will do well to always avoid overdoing it.

A good quality of fine linen cloth can be manipulated in the same manner, but it takes longer to dry. The resulting prints, of course, will not be like paper ones, but if care is taken in the sponging not to let any fluid blotch the back of the linen, some very pretty handkerchief pictures can be made and presented to the amateurs' lady friends. White silk or satin of a good quality can also be sponged, and with careful manipulation will come out almost as clear in the whites as paper. White cotton cloth of a fine quality behaves well under this process. The sponge should not be gritty, and all foreign substances seen on the surface of the paper, while spouging, are best removed by using the edge of a scrap of paper rather than the fingers. The entire spouging may be, and should be done without soiling the fingers of the hand using the sponge. The part of the sponge used as a handle remains comparatively dry, and only the tips of the fingers need be soiled while hanging the paper up to dry. Even this can be avoided by not sponging two of the corners of the paper. Avoid, as much as possible, getting any of the mixture upon the back of the paper. It is easily done, and when one sheet has been hung up, see that none of the fluid is left upon the board, before laying down another sheet.

At some future time the writer may add some explanations to what is here written. This communication will doubtless be found enough to instruct any amateur with but a small amount of gumption, how to mix his chemicals and coat his own blue paper, thus enabling him to "give away" all the blue prints he wishes, at a very moderate cost of both money and labour.

It only remains to add up the cost of making, say, a dozen sheets 17 by 23 of a good quality of paper :—Chemicals, 10 cents; paper, 30 cents; sundries, 10 cents; total, 50 cents; for which trifling sum the blue paper maker will get eight dozen pieces of 5 by 8 and four dozen pieces $3\frac{1}{4}$ by $4\frac{1}{4}$, or nearly two hundred pieces of 4 by 5, which size is probably most serviceable to the amateur who will be likely to prepare his own ferro prussiate paper.—*The American Amateur Photographer.*

A SUCCESSFUL PHOTOGRAPHIC ARTIST.—At the National Eisteddfod, held at Brecon, Mr. John Owen, photographer, Broad Street, Newtown, was successful in carrying off the first prize of £25 in the photographing series of views in the county of Brecknock. In the absence of Mr. E. Seward, Mr. Whaite, Birkenhead, made the adjudication, which must be a matter for congratulation to Mr. Owen, when we consider that Messrs. Chapman and Goldie, of Swansea, two eminent photographers, were among the competitors. The adjudication, as follows, speak for itself :—"The best are those sent in by Mr. Owen, Newtown, whose work stands easily in front both for excellent workmanship and artistic taste, notwithstanding the gap between the scenes of the works of the other competitors." —*Shrewsbury Chronicle.*

EIKONOGEN.—Messrs. Marion and Co. forward us the following letter which they have received from Messrs. Fradelle and Young, and which may prove of interest to our readers :—"We have tried and are much pleased with the eikonogen developer, but think that the instructions sent out with it are unnecessarily complicated. We think you may possibly be interested in a slight modification of it which we use in our practice as follows : a ten per cent. solution of eikonogen—*i.e.*, 1 ounce eikonogen and 4 ounces sulphite of soda—made up to ten ounces with water. A developer can be made up from this stock as required in the proportion of 1 ounce of stock to 10 ounces of water. So powerful is this developer that we find an accelerator rarely necessary, though it can be used, apparently, to any extent, by adding as required from a ten per cent. solution of common washing soda, or the developer retarded by a ten per cent. solution of bromide. This arrangement will be found to be the essence of simplicity, and the results leave nothing to be desired."

ACTION OF LEAD OXIDE UPON GLASS.*

BY T. W. HOGG.

LEAD oxide in a state of fusion attacks silica with great readiness, and by merely exposing a mixture of these substances to a red heat for some time combination will take place without the mixture having been in a state of fusion; it is, therefore, not surprising to find that glass should be acted upon by lead oxide at a comparatively speaking low temperature.

If a polished plate of glass be coated with oxide of lead, and then heated up to a temperature of scarcely visible redness, or even slightly below this, it will be found after cooling and removing the surplus oxide that the surface has been distinctly corroded, owing to the oxide having entered into combination with the constituents of the glass. The corroded parts produced by conducting the operation at this temperature possess quite a smooth surface, but if the corrosion be allowed to take place at a decided red heat, the parts are rough, and not unlike the effect produced by dry hydrofluoric acid. By soaking these corroded plates in a solution of ammonium sulphide, the lead may be converted into sulphide of lead, and the corrosion may be so varied under different conditions that brilliant mirror-like films may be obtained of considerable durability, and of sufficient thickness to be quite opaque, or so thin that light of a brownish hue is transmitted.

Upon examining these corroded parts under the microscope, the limit of each mark is observed to possess a delicate fringe easily seen by very oblique light, and especially if the glass was observed from the reverse side, the appearance being similar to what might be produced by a slightly volatile substance. Whilst submitting this point to a more careful examination, it was found that if a plate of glass were written upon, using lead oxide as a pigment, and another plate, preferably of some dark blue or ruby tinted glass, placed immediately over it, but prevented from actual contact by suitable means, if these were then heated for about one hour to a temperature of scarcely visible redness, the upper glass always had its polish so altered that a distinct reverse of the writing appeared upon it, more or less sharp according to the distance between the two surfaces.

It was suspected at first that this result was produced by the mechanical transportation of particles of the oxide, as the expulsion of moisture from most substances is often accompanied by the expulsion of part of the substance itself; this suspicion, however, was easily disposed of by previously heating the oxide before placing the upper glass over it. The effects were just as easily obtained with this precaution, and quite a conclusive experiment consists in actually fusing the oxide upon a platinum support; if this is then covered by a plate of glass, and prevented from actual contact in the usual way, and exposing to the usual temperature, the polish of the glass will also be distinctly altered; the effects are also obtained if a little lead oxide be placed in a platinum crucible, and this covered by a piece of dark blue glass; in this case it requires exposure to the low temperature for two or three hours before the glass is tarnished. It is generally understood that lead oxide is not sensibly volatile below its fusing point, and so far as the indications of the balance are concerned, this may be quite true; it is therefore very interesting to know that by the experiments here described it can be shown that lead oxide volatilizes at a scarcely visible red heat in quantities that fail to be recognised by the most sensitive balance.

DR. A. SCHUSTER, who presided over Section A of the British Association during the reading of Mr. John Spiller's paper last Wednesday, said that Mr. Spiller's observations agreed with those of others to the effect that santonine did not produce ordinary colour-blindness. There was no discussion, time being short on the last day of the meetings.

* Read before Section A of the British Association.

AN EXPERIMENT IN COLOUR-BLINDNESS.*

BY JOHN SPILLER, F.I.C., F.C.S.

EXAMINATION of several colour-blind persons having convinced me of the practical value of a compound tassel of green and grey silk cords as a preliminary indicator of defective colour-vision; and, moreover, having studied Professor William Pole's interesting memoir—describing his own case—in the *Philosophical Transactions of the Royal Society*, April, 1859, which is illustrated by a diagram, showing bands of "neutral grey" appearing to him in the middle of the green and at the deepest red, or crimson, of Chevreul's coloured *cercle chromatique;* I felt very desirous of trying an experiment to see for myself whether it was possible by the administration of a small dose of santonine—which is said to cause temporary colour-blindness—to realize in my own case the imperfection of vision which seems common to most colour-blind patients.

Such an experiment I made on the 29th of August; but before proceeding to describe the result it should be mentioned that I have good proof of my being blessed with the possession of a normal sight; for in the course of a long experience with coal-tar colours, and having frequent occasion to compare observations in regard to slight differences of tint with my six colleagues, I have never perceptibly deviated from the concensus of the laboratory staff, and may fairly claim to be reliable on this score. On a fine day, provided with an ample selection of chemical specimens and coloured objects, and Ladd's direct vision spectroscope ready to hand, I took, fasting, a small dose of santonine, a grain and a-half dissolved in a small quantity of alcohol and diluted with water. In less than five minutes the drug had taken effect; the white table cloth appeared of a delicate bluish-green colour—pale turquoise, exactly like the covers of the *Nineteenth Century Magazine*, and all objects were seen as through spectacles of that precise tint. A rapid survey was made of my varied collection of objects, and I went into the garden to use my spectroscope. I could see all the solar colours in unbroken series with scarcely perceptible variation; the Fraunhöfer lines were there as usual (not thickened), the violet extending up to the usual limit, and so with the red end, with slightly diminished brilliancy, but hardly appreciable absorption; there was *no neutral grey band in the green*, but this portion of the spectrum appeared quite normal and splendidly brilliant. The observation was repeated a few minutes later with the same results.

Turning to my coloured specimens. Nickel, copper, and iron sulphates, iodide and chromate of lead, ultramarine and ammonio-sulphate of copper, were quite normal; oxalate of cobalt had not lost its delicate pink colour, nor nitrate of uranium its well-known shade. On the other hand, scarlet iodide of mercury was decidedly dulled, and a fine sample of carmine appeared more like crimson. By running my eyes along the book-shelves in my library, I soon noticed that Gmelin's Chemistry—Cavendish Society series—and other old-fashioned green bindings assumed a kind of slaty appearance, crimson backs appeared as maroon, dark brown was converted to chocolate, but I could see violet quite well, bright green pretty much as usual, the *Chemical News* bound in scarlet appeared red, and neutral grey bindings looked only darker in colour. I could see quite distinctly the difference between light-green and slate-grey silk tassels, so that my condition was not so abnormal as many of my colour-blind friends, who fail to see any radical tint-distinction between these two dissimilar colours.

Now for a word of caution. I had taken only what might be described as a quarter-dose—"2 to 6 grains" is the stated quantity in Martindale's Extra Pharmacopœia; other authorities say more—but at the end of fifteen or twenty minutes, the tension upon my nervous system proved so serious that I feared the worst consequences. I felt so giddy and depressed, with a kind of mild tetanus, that I was obliged to resort to an emetic—mustard and warm water—which soon gave me relief. I would earnestly warn my hearers of the danger of repeating this experiment; and now, on fuller enquiry, I learn that santonine is a drug reported to be "sometimes uncertain in its action," and occasionally developing "poisonous symptoms from its depressing effects on the nervous system." I had read of Dr. W. G. Smith taking a 5-grain dose to induce colour-blindness—Cooley's Cyclopædia of Practical Receipts, page 1460—without dangerous consequences, and resolved to take a very much smaller quantity, 1½ grain, in the first instance, well knowing that more than this had often been given to children. Perhaps taking it in the state of solution, and before breakfast, or a wrong dose, made all the difference. However that may be, I shall never again try ophthalmic experiments with santonine, and would warn others against doing so without proper medical advice.

My object is accomplished: I wanted to search for Professor Pole's neutral grey bands in the solar spectrum, as he sees them in Chevreul's famous '*cercle chromatique*' diagram, but did not find them. Nor, it may be added, do any of my colour-blind friends see any break in the solar spectrum, although we know that the heavy green pigments are by them so often mistaken for grey. Furthermore, it does not appear that santonine gives the *same kind* of colour-blindness as commonly presented by the natural defect, or my colour test of green and grey would at once have indicated it.

* Read at the British Association, Section A.

LANTERN SLIDE MAKING.*

BY E. H. JAQUES.

LET us consider the requisites of a good lantern picture. First, of course, comes artistic composition, the arranging of the subject in such a manner that, as the eye wanders over it its beauties continue to grow, and the imagination receives an unalloyed feast of satisfaction and pleasure. To some extent I think it possible to teach the art of composition—at all events, so far that its simplest canons may escape violation—but the capacity of rendering true art is a gift of nature. Secondly, the technical excellence of the picture, its mechanical production.

The wet process, properly understood, I believe it is generally admitted, yields the best results in many cases. That it is at times a somewhat troublesome process I frankly admit; still, with care and observation, its difficulties can be overcome. I shall treat of the collodion process only, leaving that of albumen for a future paper. Collodion—that is, pyroxyline dissolved in ether and alcohol—forms the vehicle to receive the sensitive salts, and a collodion that has been iodised some time is necessary, otherwise the high lights of the pictures will suffer. Thin glass cut to the standard size is taken, and after standing some time in sulphuric acid and water it is carefully dried with a cloth free from soap or other grease. One side of the glass is then coated with the following solution, which must first be filtered through filter paper:—

White of one egg, well beaten	
Ammonia liquor ·880	1 ounce
Water, according to quantity of albumen	15 to 20 oz.

The coating is performed by pouring a small pool in the centre of the plate, then gently inclining it so that it runs to each corner; the excess may be thrown away. So soon as the plates are dry they are ready for use. With a soft brush carefully dust the prepared surface, flooding it with collodion in a similar manner, but returning the excess to the stock bottle. This is to avoid dust, a serious enemy. During the draining the corner should be kept in contact with the bottle, and the plate gently rocked to avoid a streakiness or uneven setting of the collodion. Directly it is sufficiently set—the best test for which is trying the upper corner with the finger—it is steadily and evenly lowered into the sensitizing bath by means of a dipper.

A good bath for lantern slides is made as follows:—

Pure nitrate silver recrystallised	40 grains
Water distilled	1 ounce

* Abstract of a Paper read before the Birmingham Photographic Society.

rendered slightly acid with C.P. nitric acid, one or two drops of which will be sufficient for 12 ounces of solution.

When the bath is mixed, for each twelve ounces add half an ounce of the iodised collodion, and shake very thoroughly ; let stand a couple of hours, then filter. The bath should now be quite clear and in good working order, but may occasionally be placed in the sun for a few hours, and afterwards filtered, when it will work cleanly until the silver is exhausted. When the plate has been in the solution about two minutes it should be slightly moved to help the escape of the solvents, and in about four minutes may be examined by yellow light. If the surface is free from greasy lines it is ready for exposure in the camera.

A good negative is necessary for a successful slide. It should be "plucky," so as to admit of a fair exposure.

A good developer is made as follows :—

Protosulphate iron	½ ounce
Acetic acid	2 ounces
Honey...	1 ounce
Alcohol	½ ,,
Water	16 ounces

Use plenty of developer, and cover the plate in one even wave ; never mind spilling a little, though practice will enable you to avoid this. As soon as all detail is well up, thoroughly wash and intensify with—

Pyrogallic acid	24 grains
Citric acid	24 ,,
Acetic acid	¼ ounce
Water	24 ounces

Enough to cover the plate is taken, to which, immediately before use, a few drops of the silver bath are added.

Do not over-intensify, as the picture does not lose much in fixing, for which operation hyposulphite of soda may be used on the ground of safety, but cyanide of potassium acts more quickly, and perhaps more cleanly. Slides by this process are a good colour, and do not need toning. A coat of clear varnish improves the transparency of the shadows.

Whether printing in contact, or by means of the camera, I strongly recommend a full exposure. Gelatine plates are sure to show fog if forced, and however slight that may be, it should ensure their immediate rejection. Indeed, it is well to select a really good slide as a standard both as to density, tone, and clearness in the high lights, and those that do not come up to it should not be kept.

For dry plates I prefer a soft negative full of detail. If the skies are not sufficiently opaque they must be stopped out.

The solutions required are ten per cent. ones of the following : Pyrogollol, bromide of potassium, ammonia, carbonate of ammonia, and carbonate of potash. The pyro is mixed as follows :—Four ounces of sulphite of soda are dissolved in boiling water and rendered acid with citric acid. The pyro is then added, and the whole made up to ten ounces with water. The other chemicals are simply mixed with water, and all will keep well. A developer giving a beautiful purple tone with Mawson's and Thomas's plates is—

Pyro solution	30 minims
Bromide	30 ,,
Ammonia	30 ,,
Carbonate ammonia	30 ,,
Water to make up to...	1 ounce

The same colour can be obtained with Fry's plates by slightly increasing the exposure and bromide, while a fine engraving black is got by shortening the exposure, increasing the ammonia, and leaving out the carbonate of ammonia. Sepia is obtained by full exposure and using carbonate of potash or soda in place of ammonia ; but some makes of plate will not yield the sepia tone.

While the plates are developing keep them in motion ; it adds to their vigour, and prevents flatness, and also deposit settling upon them. After fixing and moderately washing they may be cleared in

Alum	2 ounces
Citric acid	½ ounce
Water	10 ounces

The addition of two ounces of protosulphate of iron and a quarter of an ounce more of citric acid will considerably moderate the tone, and by slightly reducing the slide increases the clearness of the high lights. If any deposit appears upon the surface, rub gently with the finger or a tuft of cotton-wool. The slide is now well washed, allowed to dry slowly away from dust, and then varnished.

REACTION OF BENZOQUINONE WITH POTASSIUM CYANIDE.*

BY S. A. SWORN, B.A.

Hydrocyanic acid does not form a compound with benzoquinone. The latter body, however, readily combines with potassium cyanide to form a dark green body, which is obtainable only in aqueous solution. One molecule of the quinone combines with one of the cyanide. Anthraquinone does not form such a compound. Hydrocyanic acid (but no quinone) is given off when the solution is boiled, and quinone is liberated by the addition of silver nitrate solution.

THE UNITED STATES ECLIPSE EXPEDITION.

The Navy Department in Washington is now fitting out an expedition to Angola, on the West Coast of Africa, to observe the total eclipse of the sun, which will be visible there on the afternoon of December 22nd next. Professor Todd, of Amherst College, has been appointed chief of the party, a position similar to that which he held two years ago in conducting the Eclipse Expedition to Japan.

The party, which will be a large one, will leave New York about October 1st, in a Government cruiser. The natural history department of the Expedition will be under the charge of Dr. Wm. J. Holland, of Pittsburg, who will make large collections and extensive investigations, especially in entomology, which is his special department. He filled a similar position in the Expedition to Japan in 1887. Work will be done in many directions, and even if the weather or any accident should render a successful observation of the eclipse impossible, the Expedition will have a great amount of valuable information and collections when it returns.

After landing at St. Paul de Loanda, 250 miles south of the mouth of the Congo, the Expedition will go about one hundred miles into the interior, in order to be on higher land, and out of the fever belt on the coast. The eclipse, which will occur on December 22nd, 1889, at about 3 p.m., will be total for a little over three minutes at the station south-east of Loanda. The whole length of the eclipse will be between two and three hours. In photographing its different phases, if the sky is clear it is hoped that about 150 photographs will be taken with the largest telescope ever used for photographing an eclipse. This will give an image of the sun about 4½ inches in diameter. Owing to the number of fine instruments which have to be carefully transported and adjusted, about two months will be spent at the observation station, and the party will be absent about five or six months altogether. The particular point where it is hoped a settlement may be made is Muxima, on the Quanza River. In reply to a question as to the instruments he would take with him, Professor Todd is reported to have said :—

"Some of them will be the same as I had in Japan, especially the great telescope, forty feet long, to get pictures of the different stages of the eclipse. It is the same sort of telescope that I used in photographing the transit of Venus in 1882 at the Lick Observatory. But photographing the corona is not the main thing nowadays in eclipses. All that has gone by. There are other questions of much more importance than merely to find out how the corona looks. It is a very complex phenomenon. The sources of its light are not known, and the streamers of light are in parts superposed or overlapping. The most important thing to do is to take photographs in such a way that the intensity of the light in every part can be accurately measured, and to photograph the spectrum of as many separate portions of the coronal light as possible. We are making much progress in this direction, but the old methods of eclipse photography in use ten or fifteen years ago yielded very insufficient results, and there is relatively little use in following them up if the more advanced and specialized work is not undertaken. Of course they are good as far as they go. Then I shall have several new devices, of which my previous experience, particularly in Japan, has led to the invention. Among other things, I have devised a revolving plate-holder which will enable us to get the largest possible number of pictures at the critical moments."

Photographic Club.—The subject for discussion on Sept. 25 will be "Bromide Paper Printing." Saturday outing at Earlsfield.

* Read at the British Association, Section B.

Notes.

A Society journal has gone into ecstacies over a photograph taken of the finish of the Searle and O'Connor sculling match. It speaks of it as "a fine instantaneous picture about eighteen inches by twelve," and goes on to say that "considering the short time which was taken in developing (*sic*) it, the photograph is a capital one." Our contemporary is apparently ignorant of the fact that the shorter the exposure the longer is the development, but this does not matter very much, as probably the journal in question means exposure, and not development. By the way, a picture measuring eighteen inches by twelve is rather a tall thing in instantaneous photography, but here again our contemporary may refer to an enlargement. The paper we have quoted from is not worse in its utter ignorance of the principles of photography than the dailies, but this is not saying very much in its favour.

In speaking of the feats of memory performed by Mr. Blackburne, the blindfolded chess player, the *Daily News* cites, as though it were a very remarkable thing, the likeness of Fielding forming the frontispiece to Murphy's edition of Fielding's novels, which was drawn by Hogarth from memory after the novelist's death. There is nothing at all extraordinary in this. Memory portraits are constantly being drawn by artists attached to illustrated papers, as it frequently happens they are placed in situations where to use a pencil would be extremely embarrassing. But, to be successful, the features should be very marked. In the portrait of Fielding referred to, the view is a profile, and the outline of the nose and chin exceedingly bold. It could not have given an artist of Hogarth's power of observation the slightest difficulty. One version of the origin of this portrait robs Hogarth even of the credit of memory. It is said that some little time after Fielding's death, Garrick and Hogarth were sitting together and lamenting that no portrait of the novelist existed. "I think I could make his face," said the actor, and forthwith his features were twisted into a semblance of Fielding's. Immediately Hogarth made a sketch, and out of it grew the well-known portrait.

We believe that the photographer is kept constantly at work at South Kensington Museum, but it is not quite so certain as to what is the outcome of his labours. It is, therefore, gratifying to learn that in one direction, at least, a practical result has followed. Mr. Arthur Silver, a well-known art designer, has selected the most suitable objects in the museum for reproduction in modern commerce, and from these he has produced by the aid of photography full-sized working designs made to the exact sizes commercially required by the exigencies of rooms and stocks. These practical designs are to be sold to manufacturers, who can then reproduce the original work as accurately as if they had the original sample before them. This is all very well, but what we would like to know is, who pays for the expense of photographing the originals? Does Mr Silver bear the cost, or is the work done by the photographic staff attached to the museum?

The *Globe* makes merry over the "dark-room," which it says is not uncommon to see advertised as among the attractions of country inns. After speculating whether these "dark-rooms" are intended to attract Blue Beards, or members of the Psychological Society, it condescends to explain to the unsophisticated reader that the sole purpose of the dark-room is to administer to the requirements of the travelling photographer, especially the amateur.

There is nothing here which can be called news to a photographic public. What, however, will surprise them, is the statement that "it shows how widely extended this form of enjoyment—*i.e.*, photography—has become, that almost every rural inn of any pretensions now boasts its "dark-room." It is very pleasing to know this, and coming from so respectable an authority as the *Globe*, one would be tempted to believe it, were it not that our contemporary goes on immediately to express the hope that there is no truth in the ugly rumour that bath-rooms are being surreptitiously converted to the use of the photographer! It is, after all, a pity to be obliged to think the *Globe* is only poking its fun, because the whole army of amateurs would rejoice if they knew almost every rural inn of any pretensions had its "dark-room."

Some experiments have been made as to the effect which the light of the dark-room has upon the eye. The result is, the experimenters recommend that when at work the actual rays of coloured light from a window or lamp should never be allowed to fall on the eyes, and when passing out of the dark-room into the brilliant light of the studio they should be exposed for the first moment or two to as little glare as possible. These precautions are, of course, very commendable, so far as positive danger from the colour of the light and the effect of sudden transition from gloom to brilliancy are concerned, but they do not take into consideration what may be a most important factor, namely, the straining of the eyes in watching the development. The fact also must not be lost sight of that the development of dry plates is a longer process than it used to be in the collodion days, and hence must be more trying to the eyes. It is worth enquiry whether working in too dim a light is not productive of more injury to the eyesight than is the colour of the illumination.

The interference of the amateur with the professional is, perhaps, not very serious as regards regular studio portrait work, but it comes in in other directions. There are few cricketing, football, rowing, or bicycle clubs which do not number amateurs of fair skill in their ranks. Amateur photographers turn up at bazaars, they accompany excursions, they are to be found at beanfeasts; thus the competition filters down to the lowest stratum. The trade of the peripatetic photographers is in some cases almost gone. A good many of these now complain bitterly that their receipts from the photographing of pleasure parties have dwindled down seriously, simply because so many are accompanied by an amateur photographer.

TWO LIGHTNING PHOTOGRAPHS.*

BY PROFESSOR LEONHARD WEBER.

Two lightning flashes were photographed with a camera held in the hand, and so oscillated—with a period of $\frac{1}{3}$ second—that the axis of the lens traced ont an elliptic cone ; thus the image of a point that was luminous for $\frac{1}{3}$ second at least, would be an ellipse.

Flash No. 1 ran horizontally, and was rose-coloured ; in the picture it appeared as a broad, luminous band, with sharply defined parallel edges, which represent the serpentine path of the flash. The edges are bright compared with the neighbonring parts within the band, as they correspond to the turning points of the camera's motion. *Superposed* on the band are fine, uniformly bright, elliptical lines, which are not due to parts of the flash being brighter than the others, but to a foreshortening effect : these lines start *above* the band, make one complete turn so as to form a 6, and end in the upper third of the band. The picture leads to the following conclusions :—

1. The flash light lasted abont $\frac{1}{2}$ second.
2. There is no discontinuity in intensity along the whole length of the flash or at its ends.
3. The foreshortening of the flash increases its apparent brightness.
4. This continuously luminous flash consisted very probably of a single continuons one-directioned electric current.

Flash No. 2 was also rose-coloured, but ran almost vertically instead of between two clouds, its lower end being the roof of a distant house ; 6-shaped lines here also indicate a duration of about $\frac{1}{2}$ second, but the change in luminosity with the time is very different from that in No. 1. The bright zig-zag line in the upper third of the band first occurs, and corresponds to a duration of $\frac{1}{100}$ second at most ; then at intervals of some hundredths of a second follow two more bright lines which are perceptibly broader, and correspond to discharges that have lasted for periods measurable in hundredths of a second ; finally, after another interval, comes a flash that gradually fades away, but lasts for $\frac{1}{3}$ second. That this is the actual order of occurrence of the phenomena appears from the picture, the camera having been rotated left-handedly. In this picture

(*a*) If the three bright lines correspond to alternate discharges, the subsequent occurrence of a comparatively long continuous current, which can scarcely be taken as simple phosphorescence, is very remarkable.

(*b*) If the three bright lines, and the subsequent band, correspond to discharges in the same direction, we must conclude that the side-flow of electricity, which increases the luminosity of a zig-zag flash that lasts for a big fraction of a second, do not occur simultaneously with the beginning of the discharge, and that therefore the luminosity of the chief branch of the flash is liable to sudden variations corrresponding to the influence of a strong side-flash.

A SPECTROSCOPE WITHOUT A LENS.†

BY PHILIP BRAHAM, F.C.S.

The instrument consists of a taper tube with an adjustable slit $2\frac{1}{2}$ inches long, similar to a parallel rule at one end, and a prism at the other. The length of the tube should allow the slit to be at the distance of distinct vision. Although the spectroscope is without a lens, the eye acts the part, and produces the image on the retina, which image is dispersed by the interposed prism.

Comparison prisms or mirrors can be easily placed before the slit, and the instrument can be easily made by anyone with ordinary constructive ability at a small cost, enabling those whose means are limited to experiment, verify facts, and penetrate the charmed circle of brass and glass to the popularization and advancement of science.

* Read at the British Association, Section A. † Read at the British Association, Section B.

ROYAL CORNWALL POLYTECHNIC EXHIBITION, 1889.

JUDGES' REPORT.

The Judges have great pleasure in recording the continued success of the photographic department. They have noticed a slight falling-off in the professional section this year, and great increase in the exhibits of the amateur section, the latter showing a marked improvement in several of the classes. They also notice the names of several new exhibitors in all sections of the departments, and many of the old exhibitors still keep to the front ; especially noticeable is the name of Mr. H. P. Robinson, of Tunbridge Wells, whose productions have adorned the walls of the exhibition for over a quarter of a century, and are always worth careful study. Mr. R. W. Robinson, his son, follows in his father's footsteps this year with a collection of "Artists at Home," being most of the Royal Academicians taken at home in their own studios, which make an interesting series, about twenty-four in number. Mr. W. J. Byrne, of Richmond, whose works are hung this year on the platform in the great hall, are perfect as specimens of the art. Mr. W. W. Winter is also to the front again with some of his very fine work. The portrait studies of Mr. Protheroe, of Bristol, printed in platinum, are also fine specimens. Mr. F. W. Edwards takes the first award for landscape work. In the amateur section Mr. Cembrano is represented by some exceedingly fine interiors in the Alhambra. Mr. A. K. Barnett, of Penzance, shows some very careful work, for which he receives a medal.

For lantern slides, Mr. Henry Little received an award, also Mr. Dresser for some very clever instantaneous pictures.

In the photographic appliance department, Mr. F. W. Hart takes the only award in the section, for his patent magnesium flash lamps, the very best of their kind, as his specimens will show. The different exhibitors are dealt with as they appear in the catalogue.

Professional Section.—Mr. H. P. Robinson sends two composition pictures, viz., "Fisher Maidens" and "Lobster Boats" ; to the latter has been awarded a second silver medal ; it is rather smaller than some of this artist's works, but, in treatment, it is very realistic. Mr. J. Milman Brown contributes four studies, the best of which is No. 753, "Declining Day." Mr. J. P. Gibson is represented this year by several careful studies ; "Weary" is a very artistic conception, and admirably treated. Mr. F. W. Dew sends several pictures, and the judges are of opinion they have seen some better work of his in former years. P. M. Law and Son show two pictures ; "What is it ?" shows considerable artistic taste. Mr. W. Winter, of Derby, takes an award of a second silver medal for his charming portrait group, very tenderly and delicately treated, printed in sepia platinum. Mr. R. H. Lord shows two pictures, "Neddy's New Shoes" and "Try again," both genre pictures ; the latter is by far the best. Mr. R. W. Robinson has apparently set himself a very difficult task, viz., photographing the principal of the Royal Academicians at home at work in their own studios, of which he sends about two dozen examples, and has been awarded a *special* first bronze medal. He also contributes some clever sketches well worthy of notice. Mr. Frank Hopps contribntes some very good frost studies. Mr. R. Keene takes the award for his collection of interiors, viz., a first bronze medal. Mr. W. M. Harrison's chief exhibits are enlargements of local people, and instantaneous groups of Mr. Gladstone's visit to Falmouth. Messrs. Werner and Son have two large portrait studies taken direct, printed in platinum. Mr. T. Protheroe, of Bristol, has been awarded a first bronze medal, for the best six pictures by the platinum process—portrait studies which are very soft and brilliant. Mr. W. Scorer shows a number of pictures, one or two showing a certain amount of artistic merit, and others not so good as they might have been if they

had been more carefully printed. Mr. F. Whaley's best exhibit is "Sunset on the Downs," being well and carefully treated. Mr. Frank Sutcliffe, of Whitby, contributes a subject well chosen, "Dinner Time." Mr. W. J. Anckorn sends six pictures of the genre order, which have been carefully worked out, and are humorous in style. Messrs. Riley Bros., of Bradford, show a frame of lantern slides, which would look far better if they were of a warmer tone. Mr. J. M. Pike sends two pictures, interiors. Mr. F. W. Edwards takes the first silver medal for the best landscape in the exhibition, which is of large dimensions printed in platinum; it is a marvellous production. There are several others of different style, and all of a very high order. Mr. J. W. Byrne, as usual, is well to the front with his well known portrait studies, and takes a first award, viz., a first silver medal, for a large direct portrait of Mr. W. Backshell, being one of the most perfect pictures of its kind; there are several other pictures by the same artist of almost equal merit. A hunting group by Messrs. Chenall and Sons is highly commended, and must have been a rather difficult subject to treat.

Amateur Section.—Mr. W. H. Kitchen exhibits several pictures of animals of the Zoo. order, which show careful manipulation. Home portraiture by flash-light is well represented by Mr. W. Taverner. Mr. A. Dresser sends for exhibition a goodly number of works, especially in the instantaneous class, some very clever work of a dog jumping; to No. 911 has been awarded a second bronze medal. The same gentleman also contributes a collection of lantern slides of animals in the Zoo., and a great deal of beauty is lost by their being printed too black. There are several other admirable pictures by the same gentleman, "On Duty, our Coastguard," being the best. Mr. A. K. Barnett, of Penzance, shows a varied collection, and takes the medal for the best landscape in the section, viz., a first bronze medal for No. 861. Mr. Roscoe shows a frame of very artistic studies. Mr. Brewer contributes some very creditable work. The Rev. H. B. Hare has been awarded a second bronze medal for No. 924, being a very artistic production; there are several others showing very great taste and skill. "An Old Salt," by Mr. J. E. Brightman, is highly commended for good manipulation; other work by the same gentleman shows great taste. The Rev. F. C. Lambert, S. Holgrove, and Mr. McCulack, contribute. Mr. Henry Little sends a frame of lantern slides, instantaneous subjects, horses, steeplechasing, swans, being the most perfect of their kind, and are of good tone; a first bronze medal has been awarded. Mr. F. C. Cembrano sends a very fine collection of interiors of the Alhambra, printed in platinum, being soft, delicate, and brilliant, and as near perfection as possible; to these have been awarded a first bronze medal. Messrs. R. Murray, F. W. Lomer, and Arthur Camell exhibit some fairly good productions. Mr. M. E. Austin forwards some very clever and artistic genre pictures; to No. 972, "Anyone at Home?" has been awarded a first bronze medal, the difficulty being to decide as to which was the best picture of this gentleman's work, all being so exceedingly fine. Mr. W. H. Hooton's works show careful study. Miss E. L. Hare is highly commended for a frame of lantern slides, and would have done more justice to the negatives had they not been printed so black and hard. Mr. C. S. Roe sends two pictures. Mr. Frank Howard contributes some very soft and delicate studies full of atmosphere. Mr. Ernest Beringer contributes one picture, "A Cool Retreat." Mr. E. Brigleman sends a frame of lantern slides, printed evidently by a mechanical process, of various tones, which are very effective and fanciful. A set of lantern slides by Mr. J. M. Harding, which are too heavily printed to give the best results on the screen. Mr. H. P. Tagliaferro sends a photograph of a print, "A Favourite Spring." Mr. Alfred Strielitz, of Berlin, contributes a portfolio of prints, portrait and landscape, which the judges highly commend. Major J. D. Lysaght is represented by a frame of small sketches in Cork and Queenstown, which are little gems in their way.

Photographic Appliances.—Mr. F. W. Hart, of Kingsland, London, shows several forms of his patent magnesium flash lamps, also a good collection of pictures taken by their aid of a very high order, some being 12 by 10 fully exposed, and well merit the award the judges have given them, viz, a second silver medal. The same exhibtor also shows some very good racks for washing and draining plates. Mr. W. Scorer, of Havant, sends two cameras, one a parallel bellows body, and the other conical in form. They are rather of a complicated order, which, in the opinion of the judges, is rather against them than otherwise. A photographic electric dark room lamp by Messrs. Cathcart and Pets, of London, is an exceedingly portable and useful arrangement, which the judges highly commend.

ATTEMPT TO REPRESENT THE CHEMICAL ELEMENTS BY PHYSICAL FORMS.*

THE author, DR. Isaac Ashe, pointed out that when the combining weight of an element was divided by the number representing its combining power, or valency, as compared in both cases with hydrogen, the quotient in many cases presented the fraction one-half, instead of an integer number; and that in many other cases, particularly in the triad series, an integer quotient with unity for a remainder was to be obtained by doubling the combining weight before dividing.

Hence he inferred that an element having half the weight of hydrogen would be found to be the primordial element out of which the other elements were constructed. This hypothetic element he proposed to call "Dimidium." The number of atoms of dimidium which would go to form any given element would be double the number representing the combining weight of that element as compared with hydrogen. Dimidium itself might probably consist of a number of vortex rings—according to Sir W. Thomson's theory—placed one on the top of another, thus forming an elongated circular bar; a limit would be placed to the length of the bar so compacted, in consequence of a point being reached on each side of the centre, in a lengthwise direction, where the forces of attraction and repulsion between the rings balanced each other. Possibly the hollow tube thus formed might itself be filled with some still lower form of matter, out of which the vortex rings themselves might have been made, perhaps perfect spheres, to which Mr. Crookes's term "protyle" might be applied.

Assuming, then, the existence of this primordial linear element, and representing its atoms by small metallic bars of brass wire, the author showed that—taking in each case the number of bars indicated as above, by doubling the combining weight of each element—he had been able to construct a series of models of the chemical elements, in which their combining power, their positive or negative condition, and their modes of combination, were all expressed, as well as their combining weight. He further showed that the forms brought out in these models corresponded with the crystalline forms known to belong to certain of these elements; and how the phenomenon of the expansion of water when freezing might be explained by reference to the form employed for the melecule of that compound, which was hexagonal in its general outline.

The forms adopted for the elements in these models were also shown to correspond with the arrangement of the elements in series by Newlands and Mendeljeeff, elements belonging to the same series having corresponding forms.

The author suggested that simple geometrical forms—that is to say, the equilateral triangle and the square—were the combinations into which the primordial element would first have entered, and all the models were accordingly constructed out of these forms, along with the simple bar. Thus the atom of hydrogen was constructed of two single bars placed side by side, and the molecule of four, and he suggested that these were probably separated in the gaseous condition so as to form a hollow cube. There were other secondary forms constructed out of the triangles and squares, and the models of many of the elements were then constructed out of these secondary forms.

* Abstract of a paper read at the British Association, Section B.

DARK-BLUE-PRINTS.*

BY CHARLES J. BATES.

IT must be said that to obtain any fine result some drudgery is inevitable. The hunter who depends on the game he kills or the fish he catches for his living, kills and catches in the best or easiest way he may, cleans and packs the results, considering that as part of the work in preparation for the market, where he gets his profits. But the true sportsman has a feeling of satisfaction in having made a good shot on the wing, or skilfully tired out an obstreperous fish, and derives an additional pleasure in the contemplation of a fine buck or a fish that will suggest a story bigger than itself; but this same sportsman will frequently rather give away his game than even take the trouble to carry it home. It is a trite simile to compare a photographer to a sportsman, for that has often been done; but in the home work of the photographer there is much that has no parallel to the efforts of the sportsman, except may be in the feeling of satisfaction over the results. Many persons carry their cameras far to get a picture. Having "pressed the button," they take no further interest in the matter until the finished print is placed in their hands. I have known others "stalk" a picture, study this view and that view, and if the case is difficult, with irregular or uncertain lighting, they will study the development with a care almost inconceivable, and having finally secured a good negative, it is a matter of entire indifferenuce whether they ever make a print. The majority of persons, however, who take an intelligent interest in photography, like to see the positive that may be compared to the original. This has led the writer to try to find some way to secure a print that will be pleasing in tone and simple in manipulation. From some hints derived from an old book the "blue-print" was tried nearly thirty years ago, but was discarded for reasons now well known. Many other experiments were tried, the latest being the following, the results, however, not being eminently satisfactory. But the writer is cheerfully willing to give his game away rather than to carry it home. Some experiments, as well as the known fact, proved the hopelessness of any attempts to change the blue colour of the blue-print except by operations making the result more trouble than it is worth, or at least to entirely destroy the simplicity sought for.

TABLE OF PARTS OF SOLUTIONS USED FOR EXPERIMENTS.

	Numbers of Experiments.																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
a. Saturated solution potash bichromate (fluid drams)..	1	1	2	2	2	2	2	2	4	4	3	4	6	6	4	2	4	3	3	2	2	3	3	2	2	2	2
b. Water (fluid drams)	0	2	2	3	3	4	4	4	4	4	2	2	2	2	6	0	0	0	0	0	0	0	0	0	0	0	0
c. Solution red prussiate potash, 1 in 10 (fluid drams)..	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	6	4	4	4	4	4	4	4	6
d. Citrate iron and ammonia (grains)	40	40	40	40	30	30	20	10	10	16	20	20	20	40	10	12	12	12	12	0	4	2	4	2	6	8	4

It took little observation to discover that the blue colour was transparent, so it occurred to the writer that the blue could be combined with another colour that would result in a more satisfactory tone. The nature of the solar spectrum at first suggested using orange (orange being complementary to blue); so by making blue-prints on orange coloured paper a very good tone was secured, but with the very serious objection that the high lights retained the orange colour. Other papers were tried; but the best results came from a grey paper, which gave a very good blue-gray tone, with the same objection, however, that was found to the colour of the high lights, though not so seriously as in the case of the orange. It then occurred to the writer to ask, could not some substance sensitive to light be used that would give a colour where colour was wanted, and on washing would leave the lights white or nearly so. The only substance at present known to the writer is bichromate of potash. This is nearly as sensitive to light as the blue-print, and as it was a hopeless or at least difficult task to make a bichromate print first and then a blue-print correctly over it, a series of experiments were tried by mixing the bichromate with the blue-print solutions in various proportions, as shown in the table.

It being known that a saturated solution of bichromate of potash spread on paper would make a clear print of a strong yellowish brown tone, Solution 1 was tried. The resulting paper proved very insensitive to light, due, no doubt, to the failure of the solutions to soak well into the paper. The outer surface was affected by the light, and protected the substrata, so that unless exposed for a long time the picture all washed off. This was largely obviated by adding water as shown in Solution 2. The resulting tone here being too blue, the amount of bichromate was increased as shown in No. 3, but with the same objections that were found to No. 1, so further dilution was resorted to, as shown in No. 4; but the colour being still too blue, and having learned a lesson from No. 3, a reduction of the ammonia citrate of iron was tried, as shown in No. 5. The above general principle was carried on as shown variously in the succeeding solutions. Want of time has prevented further experiment; but the writer thinks that by using a stronger solution of the red prussiate, and proportions like those in the latter part of the above table, good results might follow.

Large numbers of prints were shown as examples of the results of the different experiments.

* From the *Proceedings* of the Society of Photographic Amateurs of New York.

SOME EXPERIMENTS WITH CAMPHOR.

THE introduction of flexible films, and the possibly important part which celluloid may play in the photography of the future, have raised the question of the possible effects of camphor on the sensitive film. Celluloid contains camphor, and some have thought that the dark spots sometimes noticed in flexible films were due to the camphor contained in the celluloid support. We have recently finished a series of experiments, begun some weeks ago, with a view to determine what, if any, effects camphor exerts on a sensitive emulsion. A number of plates were subjected to three tests. Two were placed in the bottom of an empty plate box and covered with powdered camphor. At the end of one week one of the plates was removed from the box and exposed under a negative. Development showed the plate to have been over-exposed, but there were no signs of anything abnormal; none of the dark spots complained of appeared, and we concluded that a week's contact with camphor had no injurious effect on a dry plate. At the end of two weeks the second plate was removed from its box and treated like the first, giving less exposure; the result was a good transpareney, with no indications of spots or other imperfections which could be ascribed to the presence of camphor. Dry camphor we conclude, therefore, has no injurious effect on a coated plate. Possibly camphor in solution might. A plate was therefore immersed for five minutes in an alcoholic solution of the gum and then developed; still no signs of fog. In order to test the matter still further we allowed a plate to remain in the solution for three days; again no spots. Our final test was to expose a plate to camphor fumes for two hours, with the same negative results. These experiments we take to be conclusive proof that camphor has no injurious effects upon a coated plate, and that therefore the cause of the spots complained of must be sought in some other direction, possibly in the temperature of the emulsion when the films were coated. Heat is a powerful factor in chemical processes, and it is possible, but hardly probable, we think, that a warm emulsion might be injured by contact with a substance containing camphor. We have had no opportunity to test this, and we leave it for some of our experiment-loving readers.—*American Amateur Photographer.*

ROYAL CORNWALL POLYTECHNIC ART UNION.—The drawing for the prizes took place in the Polytechnic Hall on the evening of Friday, September 13th, with the following result.—Oscar Guttman (279), £7; Right Hon. Lord A. Levanthorp (677), £5; Mrs. Sharpe (5), and Robert Fox (539), £3 each; Miss Stevens (264), John Borlase (150), A. Latchmore (281), £2 each; Right Hon. Leonard Courtney, M.P. (626), Robert Fox (531), J. Hayes (218), E. Kitto (451), N. Lanyon (664), £1 each; W. Norton (48), Mrs. Wilson (749), 10s. each. The winners are allowed to select a picture to the amount of the prize, in the professional Fine Art Section, and also in the professional Photographic Section.

ACTION OF MAGNETISM ON PHOTOGRAPHIC PLATES.*

BY PHILIP BRAHAM, F.C.S.

DURING some investigations I was pursuing concerning magnetism, I surmised that photographic plates could be acted on by that force, but not having sufficient electrical energy at command to render the result clearly apparent, I waited until an opportunity occurred.

A friend placed at my disposal a battery of sufficient power, and plates of great sensitiveness, with the following results :—

By placing photographic plates between the poles of a powerful electro-magnet and intermitting the current, an action similar to that of light is produced, which on development shows a nebulous appearance in the part directly between the poles, and an intense spot at some distance from them.

The magnet used was formed of a ring of soft iron with two solenoids within the diameter ; the poles of the solenoids were within fifteen millimetres of each other. The plates first used are known as "Lumière."

RATIONAL DEVELOPMENT.

BY W. H. RAU.

ALTHOUGH the work made by the average photographer has improved since dry plates have been introduced, yet a vast amount of bad work is yet to be seen, much of it made by men who were leaders in the wet plate days. Yet it must be admitted that pictures are now made that could not be equalled with wet plates. I attribute the success and failure in dry plate work to the knowledge of one class and the ignorance of the other concerning development and the use of developers. Not half of the photographers and operators know the use of the various ingredients used in making a developer. This assertion has been repeatedly made by men who come in contact with the fraternity all over the country. As a rule, it is safe to follow the instructions given with whichever plates are used, although it is not absolutely necessary to stick to this as an iron-clad rule. The soda formulæ just now are in the majority, and seem to give more general satisfaction than any other.

The tendency just now seems to be to secure a developer that will develop an image on a dry plate in the same time that was necessary with a wet plate. This has brought out the process vendor, who reaps many a fifty-dollar lump for his hydroquinone formula that will do this. The work done by such a rapid developer is, as a rule, hard and blocky, and does not possess the delicate shadings, gradations, and half-tones that are obtained by use of a mild, gentle developer. I think this intensely rapid development a mistake, and only fit to be used on black-and-white subjects, that need contrasts and density. I admit it was some time before I became convinced of the merits of very slow development with a fresh weak solution ; but I have seen such fine results in other processes as well as in gelatine plates, that I am now convinced that for fine, delicate work, in which there is half-tone detail in the shadows as well as in the high lights, without flatness, a mild developer will always give the best results, unless poor plates are used. My favourite formula is :— Make a solution of sulphite of soda to test 60 by the hydrometer, and a solution of sal-soda to test 22. Take—

For Alkaline Stock.

Sulphite	4 ounces
Sal-soda	4 „

For Pyro Stock.

Pyro	1 ounce
Water	12 ounces
Oxalic acid	10 grains

For Development.

Alkaline solution	8 ounces
Pyro	8 drams

This starts the image within thirty seconds when exposure has been right, and keeps adding to the density so gradually that any changes deemed necessary in the pyro, acid, or alkali can readily be made without fear of the plate being lost.

I believe that by following a slow method of development fewer plates are wasted and a better quality is secured, and the work of an establishment becomes more regular. I do not rely much on formulæ, believing that, unless the proportions are badly exaggerated, good results will follow, and that the operator should study the action of the developer just as he did his collodion and bath, and not rely too closely on the formula, but more on observation, study, and experience. There is a tendency to expect everything from the plates. Of course, all plates are not good ; some, according to their manner of making, act entirely different from those of a previous batch. As a rule, the plates on the market now show a very high quality and give fine results. Bad plates are the exception, and I can safely say that I have not had two dozen in my hands during the past year. I think it will pay the operator to take a little more time and get the best results. The employment of a mild developer is especially recommended in using a slower brand of plate, such as Carbutt's A and B, as density can readily be obtained in either of these, and pyro should be sparingly used. For copying line work and drawings, and for general landscape, they hold a place entirely their own.—*American Journal of Photography.*

* Read at the British Association, Section A.

DEVELOPING FORMULÆ.

THE following are official formulæ of negative developers in general use by members of the Society of Amateur Photographers of New York ; they are all calculated on the basis of 437 grains to the ounce :—

BEACH'S DEVELOPER.

Pyro Solution No. 1.

Sulphite soda, c. p. crystals—437 grains to ounce	4 ounces
Warm distilled water	4 „
When cooled to 70° F. add	
Sulphurous acid water	3½ „
And finally	
Pyrogallol	437 grains

This solution contains 48 grains of pyro to 1 fluid ounce, or 6 grains to 1 fluid dram.

For normal developer, add 1 dram to 2 ounces of water. If intensity in negative appears too weak, increase from 1½ to 2 drams. If there is too much intensity, use from ½ to ¾ of a dram to 2 ounces of water.

Potash Solution No. 2.

A.—Sulphite soda, c. p. (crystals)	2 ounces
Water	4 „
B.—Carbonate potash, c. p.	3 „
Water	4 „

When all dissolved, mix A and B.

One of the above drams contains 20 grains of carbonate of potash and 14 grains of sulphite of soda. If a plate is supposed to be greatly over-exposed, add 10 minims of this solution to 2 ounces of water. After two minutes' action, if no image appears, add 10 minims more, and so on at intervals, until it is noticed that development has started. Usually, for ordinary exposures, ½ a dram to 2 ounces is the proper amount to commence with, adding ½ a dram at a time at intervals up to a total of 2½ drams, until the development is complete. Pursue the same course for an under-timed plate. The pyro and potash solutions will keep for any length of time, and may always be relied upon.

ANOTHER FORMULA.

Beach's No. 1 solution	20 minims
Alkali solution	1 dram
Water	7 drams

The above alkali solution is made in the following proportions :

Sodium sulphite	1 ounce
Sodium carbonate	1 „
Potassium carbonate	1 „
Water	11 ounces

By adding half the additional amount of water to above developer, lantern slides may be developed.

ANOTHER FORMULA.

Mix up an alkali solution as follows :—

Sodium sulphite	½ ounce
Sodium carbonate	½ „
Potassium carbonate	½ „
Water	32 ounces

Developer is made as follows :—

Beach's No. 1 solution	1 dram
Alkali solution as above	2 ounces

Pyro stains may be removed from the fingers by dipping them occasionally in a very strong cleansing solution, made as follows:—

Alum	2 ounces
Citric acid	1 ounce
Water	10 ounces

Hydroquinone Developer for Lantern Slides.

Sodium sulphite	40 grains
Hydroquinone	15 „
Water...	1 ounce

To develop a lantern slide, add to 1 ounce of the above ½ to 1 dram of the Beach's potash solution, or about 15 grains of carbonate of potash. Preserve solution after use, for further use. If the slide is too dense, add 1 ounce of water.

Ferrous-Oxalate Developer.

No. 1.

Make a saturated solution of neutral oxalate of potash with hot distilled water.

No. 2.

Make a saturated solution of protosulphate of iron with hot distilled water; add about 5 drops of sulphuric acid to the pint of solution.

Allow both solutions to cool and clear before using.

The oxalate of potash must be neutral—that is, neither change blue or red litmus paper. To use:—

No. 1 solution	6 ounces

Commence with small quantity of No. 2, say from ½ to ¼ ounce, till image begins to appear; when detail is all out add enough iron to make entire quantity added 1½ ounces, when image will gain in density.

Pyro and Hydroxylamine Developer, suitable for Negatives and Positives.

No. 1.

		French weights
Pyrogallol	437 grams	50 grams
Hydroxylamine chloride	60 „	6¼ „
Water	12 ounces	500 c.c.

No. 2.

Sodium sulphite (crystals) ...	2 ounces	100 grams
Sodium carbonate (crystals) ...	4 „	200 „
Water	12 „	500 c.c.

To develop, one dram of each of Nos. 1 and 2, and 2 ounces of water; or 4 c.c. of 1 and 2, and 60 c.c. of water. If image hangs back, add a dram or two at a time of No. 2. If more density is wanted, a dram of No. 1.

PHOTOGRAPHY BY FLASH LIGHT.

On Wednesday, September 11th, at the Cornwall Polytechnic, Mr. F. W. Hart, F.C.S., delivered a lecture, with experiments, on "Magnesium and its Uses"; the Right Hon. Leonard Courtney, M.P., occupied the chair.

The lecturer remarked that eighty-one years ago Sir Humphry Davy was investigating the action of electric force, and succeeded by its aid in releasing magnesium from that old familiar medicine Epsom salts. Bunsen in our own times was the first to improve on the electric decomposition of alkalies and earths, but his process was not a commercial success. Many minds were set to work to solve the problem how to obtain the earth metals economically, the two most important being aluminium and magnesium, each profusely abundant in the crust of the earth. The clay under our feet points to the probability that aluminium takes precedence of all other metals for quantity. It is about five times lighter than brass, and less than double the weight of water; when untarnished it is beautifully white, almost rivalling silver, and upon being burnt gives a brilliant and smokeless flame.

Some years ago Roscoe and Bunsen found that whilst the sun was about 525 times more brilliant than ignited magnesium, its power for producing photographic effects was only about 36 times as great; so that it was only necessary to increase the volume of light 36 times to rival the sun in the rapidity with which photographic results can be obtained; and Mr. Hart showed that this was not at all difficult by his cleverly devised lamps. Photographs of children at play were shown produced at night in one-thirtieth of a second at eight feet distance from the source of light. By still farther increasing the volume of light by more lamps, Mr. Hart felt fully assured that there would be no difficulty in getting full exposures in one-hundredth of a second.

In photographing with the magnesium light, the principal object should be to produce breadth of lighting, so as to obtain as nearly as possible the effect of the parallel rays of daylight. This is accomplished by Mr. Hart's system of distribution and simultaneous flashing of any number of lamps. The actual force of magnesium is 120 times as great as the electric arc light, and whilst the cost of the former is only 30s., that of the latter is £300; and one is so portable that the plant can be packed in a hand-bag, whereas the other includes an engine of two or three horse power. In chemical analysis, magnesium is a most valuable adjunct in the detection of poisons. For military and naval signalling, Mr. Hart has invented an apparatus, easily carried in a knapsack, by which a soldier can communicate, by using the Morse system of long and short flashes, either direct, or, if a hill intervenes, by reflections in the sky. Magnesium is also largely used in pyrotechnic displays.

In conclusion, Mr. Hart called attention to a series of home photographs produced by means of the flash light, life-like and pleasantly free from that stiffness inseparable from having your likeness taken.

Mr. Lanyon suggested that by means of a flash light photographs of workings in mines and of the interiors of the pyramids could be obtained; and he mentioned that in America it was now used in detecting crime. A policeman entering an illegal drink shop took an instantaneous flash light photograph of the scene, and it was produced in evidence.—*Communicated.*

ARAGO ON THE DISCOVERY OF PHOTOGRAPHY.*

To copy the millions and millions of hieroglyphics which entirely cover to the very exterior the great monuments at Thebes, Memphis, and Carnac, would require scores of years and legions of artists. With the Daguerreotype a single man would suffice to bring to a happy conclusion this vast labour. Arm the Egyptian Institute with two or three of Daguerre's instruments, and on several of the large engravings in that celebrated work, the fruit of our immortal expedition, vast assemblages of real hieroglyphics would replace fictitious or purely conventional characters. At the same time, these designs shall incomparably surpass in fidelity, in truth of local colour, the work of the ablest artists. Again, these photographic delineations having been subjected during their formation to the rules of geometry, shall enable us, with the aid of a few simple data, to ascertain the exact dimensions of the most elevated parts, and of the most inaccessible edifices.

These reminiscences, in which, if I am not strangely mistaken, neither the philosophers nor the artists, so zealous and so celebrated, who were attached to the army of the East, can detect the shadow of blame, will doubtless recall the thoughts to those labours now carrying on in our own land under the superintendence of the Commission of Ancient Monuments. At a glance, each of you, gentlemen, will perceive the important part which these photographic processes are destined hereafter to assume in this great national enterprise. Each will comprehend, also, that the new method will be distinguished by economy—a species of merit, be it observed, rarely combined in the arts with perfection of result.

If, finally, it be asked, can art viewed in its own interest be expected to derive advancement from the examination from the study of those forms designed by the most subtle, the most refined agency in nature—the rays of light? M. Paul Delaroche shall reply to the question.

In a letter written at our request, this celebrated painter declares that the processes of M. Daguerre "carry to such perfection certain of the essential principles of art, that they must become subjects of study and observation, even to most accomplished artists." What strikes him in the photographic designs is, that the finish "of inconceivable minuteness disturbs in no respect the repose of the masses, nor impairs in any manner the general effect." "The correctness of the lines," remarks M. Delaroche, in another place, "the precision of the forms in the designs

* Continued from page 589.

of M. Daguerre are as perfect as it is possible they can be; and yet, at the same time, we discover in them a broad and energetic manner, and a whole equally rich in tone as in effect. The painter will obtain by this process a quick method of making collections of studies which he could not otherwise procure without much time and labour, and in a style very far inferior, whatever might be his talents in other respects." After combating by excellent arguments the opinions of those who have imagined that photography will be injurious to our artists, and especially to our able engravers, M. Delaroche finishes his letter with this reflection: "In conclusion, the admirable discovery of M. Daguerre is an immense service already rendered to art." We shall not commit the unpardonable fault of adding anything to such a testimony.

It will doubtless be remembered that among the inquiries proposed in the commencement of this report was the question: "Are the photographic methods likely to become generally applicable?"

Without divulging what is and what ought to remain a secret until the passing of the Bill, we may state that the tablets upon which the light delineates the admirable designs of M. Daguerre are plated surfaces—that is to say, sheets of copper covered with a thin coating of silver. It had unquestionably been preferable for the convenience of travellers, and also on the score of economy, could paper have been employed. Paper impregnated with a solution of chloride or nitrate of silver was, in fact, the substance first selected by M. Daguerre. The want of sensibility, however, in this preparation, the confusion of images it produced, the uncertainty of the results, and the accidents which often marred the operation of transforming the lights into shadows, and the shadows into lights, could not fail to discourage so able an artist. Had he persisted in this first intention, his photographic designs might perhaps have figured in collections as the productions of a curious philosophical experiment; but assuredly they never would have occupied the attention of this House. Besides, if three or four francs, the price of a single plate such as M. Daguerre employs, appears too much, it is but just to add that the same plate is capable of receiving in succession a hundred different designs.

The remarkable success of M. Daguerre's actual method depends in part on the fact that he operates upon a coating of matter of extreme tenuity—on a veritable pellicle. It needs not, then, that we waste time upon the price of the ingredients of which the surface is composed. The price, from its smallness, would in reality be unassignable.

A single member only of the commission has seen the artist operate, and has operated himself; it will, then, be upon the personal responsibility of this deputy that we can occupy the attention of the House with details of the Daguerreotype, viewed in reference to its simplicity of application.

The Daguerreotype, then, does not demand a single manipulation which is not perfectly easy to every person. It requires no knowledge of drawing, and does not depend on any manual dexterity. By observing a few simple directions, anyone may succeed with the same certainty, and perform as well as the author of the invention. The promptitude of the method is, perhaps, that which has most astonished the public. In reality, ten or twelve minutes in the dull weather of winter are amply sufficient for taking a view of a monument, a section of a town, or a landscape. In summer this time may be reduced one-half. Under the skies of the south not more than two or three minutes will be necessary. But it is of importance to remark that these ten or twelve minutes in winter, these five or six minutes in summer, these two or three minutes in southern regions, express merely the time during which the plate of metal is exposed to the lenticular image. To this space must be added the time of unpacking and adjusting the camera, the time spent in preparing the plate, and the few minutes necessary for the final operation of rendering the picture thus obtained insensible to the future action of light. Added together, all these different stages of the process may extend the whole period employed to thirty minutes, or three-quarters of an hour. Those persons are deceived, then, who suppose that during a journey they may avail themselves of brief intervals, while the carriage slowly mounts the hill, to take views of a country. They also are not less mistaken who, struck by the curious results sometimes produced by the adhesion of the pages, or the pressure upon the engravings in very old books, have cherished dreams of reproducing and multiplying photographic designs by lithographic impressions. It is not in the moral world alone that the very perfection of certain qualities tends to defects; the maxim often finds its application in the world of art. To the perfect polish, the incalculable tenuity of the coating upon which M. Daguerre operates, are to be ascribed the finish, the grace, the harmony of these photographic designs; and to rub, to finger such designs, to subject them to the action of the press or roller, would cause their irreparable destruction. But who ever thought of forcibly pulling a ribbon of lace, or brushing the wing of a butterfly?

(*To be continued.*)

Patent Intelligence.

Applications for Letters Patent.

14,220. FRANK BISHOP, of the firm of Marion and Co., London, "Photographic Focussing Maguifiers."—September 9th.

14,270. H. TRUNBERRY, 52, Chancery Lane, London, "Photographic Shutter."—September 10th.

Specifications Published.

12,307.—*August 27th*, 1888. "Photo-lithographic Printing and Transfers." HENRY RYDER and WILLIAM HENRY RYDER, 38, Vicar Lane, Bradford, Yorkshire, Printers and Lithographers.

Half-tone process by two separate negatives from photograph or from picture. Our claim is using two separate negatives from photograph or picture, printed in two separate printings from stone or block.

First a screen—or negative—is got from a lined or stippled plate, after a perfect negative has been secured; then a photo or wash drawing is adjusted and focussed to the size required in the camera; then a wet plate is prepared and placed in dark-slide with screen before it, then exposed in camera; the plate being then developed. The first negative is over-exposed, giving details in darker parts of the object; the second negative is under-exposed, only bearing the lighter parts of the photograph.

Points are then taken from the negatives on prepared photo-litho-transfer paper, and inked and developed ready for transferring to stone or zinc, or printed direct to zinc in bitumen or albumen, and etched on zinc for letter press printing as well as for lithographic printing.

What we claim is, two separate negatives combined in the production of our picture, by two separate and distinct printings from stone or from block prepared for letter press printing.

SECTION A of the British Association is devoted to physical science, and Section B to chemistry.

THE ETHICS OF PHOTOGRAPHY.—Some one has said that photography is a moral agent in the improvement of man, inasmuch as it tends to inculcate the principles of honesty by teaching the importance of just weights and balances; but be this as it may, we are inclined to think that the adoption of a code of ethics by the detective photographers would tend to prevent some of the abuses of photography. It is true there can be no humour without a belittling of somebody or something. There is a victim always implied, a taking down of some one's importance, or a depreciation at the expense of somebody's dignity. Nevertheless, we believe that the photographer in search of the ridiculous should never so far forget the need of his own self-respect as to literally stoop to point his camera at scenes of privacy, or to take advantage of the unintentional positions of people of respectability.—*American Journal of Photography.*

Correspondence.

WOMEN AT PHOTOGRAPHIC MEETINGS.

SIR,—My attention has been called to a letter in your impression of the 6th of September, making reference to a Society's discussion as to the advisability or otherwise of admitting ladies as members. In an editorial note the non-contents were described as akin to savages. Now you shall judge of the justice of this remark, and of the good taste of your correspondent in writing to your journal a violently partisan letter describing a by no means despicable minority as "ungallant and illiberal."

Our place of meeting is a room at the top of five or six flights of stairs, the staircase being badly lighted. The dark-room is contained within this larger room. We have no care-taker; therefore, a lady would have to let herself in by means of a latch-key. It was felt by the gentlemen who opposed this proposed new rule, that if any lady could conquer her scruples to the possession of a latch-key under such circumstances, the male members would feel diffident about entering the dark-room where a lady or ladies were engaged developing their plates. It was felt that the social position of a lady would be injured by the knowledge that she carried a latch-key under such circumstances.

It does not require much acumen to perceive that under our peculiar conditions, the admission of ladies would have led to ceaseless complications which would have threatened the very existence of our Society.

Finally, I hold that a body of gentlemen associated for any purpose whatever have a perfect right to decline to admit ladies without being morally compelled to give any reason for such declension at all. It is absurd to suppose the contrary. The "ungallant and illiberal" Society in question gives, all through the winter season, lantern entertainments to which ladies are specially invited. But we have no convenience for receiving them as members, and at a general meeting it has been decided by a large majority to refuse.

NEMO.

Proceedings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

AT the technical meeting of this Society, held September 17th, Mr. FRIESE GREENE occupied the chair.

Photographs printed by development upon ornamental sheets of white celluloid, resembling opal glass, were shown by the CHAIRMAN, with a view to eliciting opinions as to the origin of certain irregularities that appeared in some of them. In the course of the discussion, it was suggested that the unequal patches were due to the wood spirit, that had been used for preparing the celluloid to receive the emulsion, having dissolved some of the camphor from the celluloid, and left it in patches; and to prevent this it was recommended that the spirit should be rubbed on and off with a tuft, instead of being flowed over the surface.

A photograph of a building with converging uprights was shown by Mr. J. A. HARRISON, also a bromide print from the same negative, in which, by tilting both the plate and the paper in opposite directions, the defect had been remedied.

Mr. W. ENGLAND described the automatic portrait photographic apparatus at the Paris exhibition, and a question was raised as to whether a better method of obtaining direct positives than that of employing the collodion and bath process was not available. A member said that an article had appeared in the PHOTOGRAPHIC NEWS about three years since detailing some experiments made in Vienna with emulsion for the purpose of making direct pictures.

A specimen of collotype printing contained in a Swiss photographic publication was much admired, and a question was raised as to the kind of negative most suitable for reproduction by collotype.

Mr. T. BOLAS said that the negative should be somewhat thin, showing tone throughout, and that an intense negative was very bad for the purpose.

On the question of printing in platinum by the hot or cold development method, preference was generally expressed for the cold plan.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on the 13th inst.; Mr. E CLIFTON occupied the chair. A question from the box was read:—"What is the best length of focus for a quarter-plate detective lens?"

Mr. T. KERR preferred a lens of about six inches focus, which he had found to work well.

Mr. A. COWAN said a longer focus lens was desirable if circumstances permitted its use.

The CHAIRMAN said the chief difficulty lay in judging distance; this could only be overcome by some amount of practice.

The subject of hydrokinone as a developing agent was discussed; several members spoke in its favour.

Mr. A. MACKIE said he had found it a very unequal developer.

The CHAIRMAN considered it behaved at times very erratically.

Another question in the box asked, "Does ferridcyanide of potassium keep in solution if exposed to light?" The general opinion was that it did not.

Mr. C. H. COOKE said that in using a clearing solution, he attempted to rub the image with his finger, which caused a black mark.

Mr. W. E. DEBENHAM thought Mr. Cooke must have had some pyro on his fingers at the time; he suggested removing the stain from the negative with any vegetable acid.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

A TECHNICAL meeting was held on Sept. 9th, with Mr. SAVILLE in the chair.

The subject for discussion was the toning of prints, of which Mr. BECKETT gave an exemplification, using the ordinary acetate toning bath, and one made with borax; the latter was found to be decidedly the quicker of the two, although the resulting tones when finished were found to be equal.

Some spoilt prints exhibited by Mr. CHERRY caused considerable discussion as to the reason of the defects. It was ultimately decided that the spots apparent in them were due to toning in a papier-maché dish which had been used for fixing.

Mr. A. L. Vierge was elected a member.

On Sept. 14th the members visited Battersea Park, meeting at Temple Pier at 1.45, and enjoying a splendid afternoon.

Subject for next meeting, Sept. 23rd, "Transferrotype Demonstration," by Mr. Bishop. Visitors are invited to attend.

BRIGHTON PHOTOGRAPHIC SOCIETY.

AT the meeting held on September 10th, the PRESIDENT in the chair, Mr. W. Duddell was elected a member.

Mr. G. EVES read a paper on "Development," in which he advocated the use of separate solutions of pyro, bromide, and ammonia or soda, and handed round several negatives and some very fine prints to support his statements.

On Saturday, September 14th, the Society had an excursion to Shoreham; the Lewes Society was invited to join. Nineteen took part, and some good work was done, the weather being most favourable for photographing. Several groups of the members were taken.

At the next meeting, on October 8th, the "Illustrated Boston" series of slides will be exhibited.

The Society now numbers sixty members.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

THE last of the out-door meetings for the present season took place on the 13th inst., when seventeen members and friends left for Matlock, where they soon began operations. Having ferried over the river, the charming scenery of the Lover's Walk engaged the attention of the tourists, the wooded river banks lending themselves readily in assisting picturesque composition. After dinner, a drive along the beautiful lane brought the party to the gates of "Willersley," the romantic seat of Mr. F. Arkwright, who had permitted the Society to photograph in his grounds, a privilege readily taken advantage of by the members, who were here joined by a small but prominent deputation from the Derby Photographic Society. The party then drove to the famous "High Tor," and having duly paid homage to the historic old pile, packed up for return. Forty-six plates were exposed by the members, and an excellent average of good negatives is confidently expected.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

A MEETING was held in the Club Rooms, Colmore Row, on the 12th inst., Mr. W. J. HARRISON in the chair, when Mr. W. L. Hipwell was nominated for election as member.

A letter was read from Mr. W. F. Kimberley offering his dark room for the convenience of members at the excursion to Kenilworth on the 21st inst.

The HON. SECRETARY, as the leader of the excursion to Dovedale, reported that fourteen cameras were carried, and one hundred and fifty-nine exposures were made; and gave notice that the pictures for competition must be sent him not later than Sept. 27th for transmission to the judge appointed to make the award.

The CHAIRMAN, in calling upon Mr. E. H. Jaques to give his paper on "Lantern Slide Making," remarked: "Our optical lantern dates back to the early part of this century, when Lieutenant Drummond used a lime-ball made incandescent for the purpose of signalling by night across distances exceeding fifty miles. The first transparent photographic positives on glass—lantern slides—were probably made by Langenheim, in the United States, about 1851, and soon afterwards what we may term the first really successful displays with the lantern on a large scale were shown at Manchester and Liverpool by Dancer." He had great pleasure in calling on Mr. Jaques, who they all knew had great experience in this branch of photography (see page 614).

The LECTURER commenced by giving practical demonstrations in every detail of both wet collodion and dry plate, exposing and developing, and then showing same on a large screen, using his own powerful lanterns. He then proceeded to the colouring, or rather tinting, of the slides, and finished by showing a number of slides taken on different makes of plates, explaining how he obtained almost any tone at will by various developers. The dry plates used for the slides were Fry's, Mawson and Swan's, and Thomas's; the negatives were made on Ilford, Paget, and Edwards's plates; the latter were orthochromatic.

DERBY PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting was held on Tuesday evening, September 10th, in the Society's Rooms.

The HON. SECRETARY showed some bronze medals sent by Mr. Restall, of Birmingham, which were excellent in design and finish.

Mr. SCOTTON handed round a number of silver prints from negatives taken during the Convention, which were much admired.

A discussion was then raised by Mr. CHADWICK on "Halation," which was warmly entered into, and many unique suggestions were thrown out as probable preventitives.

MESSRS. HOLMES, SADLER, AND HOLMES, have just issued a trade catalogue that ought to be cyclopædic with respect to apparatus and material, for it runs into nearly 300 pages. The arrangement and illustrations are good.

A SCEPTIC.—The American *Lithographer and Printer* quotes an article by M. Leon Vidal about the machine at the Paris Exhibition for taking photographs automatically, but the editor does not appear to believe it, for he adds:—"The above article in the *Photographisches Archiv* reminds the writer of an article that some ten years ago was running through a couple of hundred papers in Germany, which gave a very humorous explanation of how they made sausages in Chicago, Ill., alleging that a machine was used, into which the hogs were put one after the other at the front, and continued on a steady movement until finally they came out at the rear from the machine ready-made sausages by thousands."

ORNAMENTAL MATT BORDERS ON PRINTS.—M. Leon Vidal suggests a very clever device for obtaining a plain, smooth surface bordered by a matt surface, around the same print. This is secured by using heavy glass plates, ground to any desired width around the borders, the centres remaining smooth. The wet print is squeegeed down to the glass in the usual way, and allowed to dry. Any desired ornament, either in relief or depression, could be engraved around the margin of the glass plate, and, of course, would be produced upon the print. This suggestion might be made use of for introducing a novel style of work to the public, who are constantly looking for something new in photography. The process, of course, is intended for plain paper prints. If it is desired to so treat albumen prints, it would be advisable to employ some medium to prevent adherence to the glass.—*American Journal of Photography.*

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper and Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

T. L.—1. The use of sulphite would appear to be necessary, both as a mild alkaline preservative, and on account of its promoting the solubility of the eikonogen developer. The further addition of a strong alkali—potassium or sodium carbonate—mixed just before use, undoubtedly tends to stimulate the reducing properties of the naphthol compound. 2. Paraphenylene-diamine has been tried years ago by ourselves and others as a developer, and found to answer, but it is a rather difficult substance to prepare and purify, and exceedingly unstable when finally procured. Its tendency to turn black by atmospheric oxidation, and to stain a film or glass surfaces in contact with it, seemed to militate against its general adoption, but these defects might possibly be remedied if there were any very striking advantages in favour of its use. Dr. Eder condemns the employment of sodium sulphite in association with it, finding that this salt greatly hinders the development.

LUX.—In our description of the Whipple-Casella Universal Sunshine Recorder in last week's NEWS, the word "masks" got into print instead of "marks." With this correction, the account ought to be sufficiently intelligible:—"The glass globe acts as a burning glass, blackening or scorching the paper scale—making a mark—wherever the full influence of the sunshine happens to fall during the day. As a check for exact time it is recommended to mark off with a pencil line once or twice daily, noting the hour of so doing."

A. B.—Whether bromide or iodide, or any mixture, the chemical action would be the same, the haloid being absorbed by the gelatine or albumen.

LOWESTOFT.—The letters M. P. S. were very probably intended to give the stamp of competency, and to convey the impression that the itinerant operator was indeed a member of the Photographic Society, which is not the case. By the most cursory inspection of his specimens the public were in a position to judge of the character of his work, and no one with any artistic knowledge would be satisfied to accept bilious looking prints as evidence of moderate skill and care on the part of the camera proprietor.

WALBERSWICK.—The old term "salt officer" was applied to the official who collected the taxes upon salt in the latter half of the last century. He was a landsman, not an "old salt."

H. G.—Letter duly received; your request is being attended to by our representative at Newcastle.

A. G. F.—The print is fairly good, but what possessed you to take a point blank front view of a white house, when by moving the camera a little way off to the right, a much more picturesque effect would have been obtained? And again, with the figures standing in the porch, it would have been better to pose them so that the shadow of the trellis work fell clear of the old man's face. Anyhow, you would not have made much of such a very ordinary subject.

W. S. P.—To find lead in the presence of silver, you should add hydrochloric acid in excess, boil up the precipitate with a large bulk of water, and filter. Then on cooling, the needle-shaped crystals of chloride of lead would come down. As a confirmatory test, add potassium bichromate to the solution of the white crystals, and so get the characteristic yellow chromate of lead.

M. D.—In order to make good your claim to wall space at the forthcoming exhibition, the annual subscription for the current year must have been paid, or now forwarded with your intended contributions, to the Assistant Secretary, Mr. Edwin Cocking, at the Gallery, 5A, Pall Mall East.

IN A FIX.—We should hardly think it possible to find much sulphate of soda in a commercial sample of hypo in the present day. This impurity was sometimes met with formerly, but now the suspected weakness of your fixing bath could hardly be attributed to this cause. Either use a little more hypo, or add a small proportion of carbonate of ammonia, to fortify the bath. Too much ammonia is apt to loosen the albumen on the prints.

J. S. T.—Since writing to you, events have occurred which amply justify the line of policy indicated in our letter.

W. F.—The yellowish tinge of your platinotypes should easily be removed by treatment with hydrochloric acid and thorough washing with water. There is every reason to believe they are permanent.

L. A.—Borax is always alkaline to test paper, however many times it may have been recrystallized. On this account borax is sometimes used in the preparation of an alkaline gold toning bath.

T. F., Rev. H. G., X. Y. Z., H. A., J. A. C., and other correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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FOCUSSING GLASSES.

A PARAGRAPH published in these pages last week, to the effect that Mr. Frank Bishop has applied for a patent for "photographic focussing magnifiers," is a reminder that these instruments are in vast need of improvement. What Mr. Bishop's invention may be we know not, but the most crying want existing in the matter, especially for out-door work, is a large and serviceable eye-cup for focussing glasses, preferably with a soft projecting edge of thin india-rubber, to shut out all extraneous light. Focussing cloths, especially when small cameras are used, will then be unnecessary, the comfort of the worker will be increased, and the caricaturist will be deprived of the power of representing the photographer in the most undignified position he is now obliged to assume more or less in public. The next thing wanted is the power of clamping the instrument, permanently if necessary, in that position in which it brings the ground surface of the camera screen into true focus, so that the operator has not to adjust the observing instrument every time he brings it into play. The third necessary improvement is that the lenses of the focussing glass shall be of longer focal length than usual at present, so that the photographer may not in certain cases have to rub his nose against any part of the camera; this latter improvement will be all the more necessary when detective cameras are more generally made for mounting, when desired, upon the top of a stand, for the ground glass screen is then likely, in most cases, to be a little way inside a box. About six inches in length, with such cameras, might be a convenient length for the mount of a focussing glass, but then the instrument would, if permanently clamped, be too bulky to be pleasing to carry out-of-doors; this implies the advantage of sliding tubes with some device whereby the owner can, by a first adjustment, limit the particular length to which it is possible to draw it out, and that limit shall be one to always suit his eyesight. Under present circumstances there are usually two adjustments in focussing, one of the instrument now under criticism, and the other of the distance of the lens from the ground glass, and all scientific men know that the use of two adjustments to obtain one result is a fault which should be avoided when possible in instruments of precision. The photographer has a third difficulty added when he has, at the same time, to keep a focussing cloth suitably over his head upon a windy day.

SIR FREDERICK ABEL, of Woolwich Arsenal, will be the president of the British Association next year at Leeds. Some time ago he interested a Royal Institution auditory by placing a compressed cake of gun-cotton, weighing perhaps a pound, upon the lecture table, and igniting it by means of a red hot poker. Will he improve upon this at Leeds by similarly igniting a barrel thereof during his presidential address? He is a scientific chemist, and a leading authority on explosives.

THE CONFUSED PHOTOGRAPHERS OF LIMOGES.

THE editor of the *Progrès Photographique* is highly pleased with the narrative which appeared in these pages on the 30th of August last, entitled "The Unhappy Photographers of Limoges." In the last number of his periodical he says that under this title "a well-known English journal, the PHOTOGRAPHIC NEWS, reproduced an article from the *Progrès* of July, concerning the Limoges Society, with comments of a humouristic character, which completely supported our view of the true function of a photographic society." This statement is a complete mistake, for no opinion was expressed by this journal about the matter in dispute, of which we have as yet heard but one side, and it would never do to base opinions upon *ex parte* statements. One or two American and colonial photographic journals sometimes give most untrustworthy information to their readers about events in England, because they do not follow this rule; they may resemble the wise judge, who said that he preferred not to hear both sides of a case, because that course always puzzled him so completely. If the Limoges photographers think that this journal "took sides" in the case in dispute, they have fallen into a state of mental confusion.

The editor of the *Progrès* adds:—"The approbation of a journal so universally esteemed, of which the high competence in photographic matters has never been contested, is very flattering to the *Progrès*, and cannot but encourage it to persevere in its resolution to combat unceasingly the sad tendencies of certain groups of amateurs." As a matter of fact our position is perfectly neutral, one side of the case only having been heard.

In all matters of contention, heavy responsibility rests upon the head of the aggressor, because without his initial action there would have been no disturbance of the public peace; an unfounded attack is a moral offence against society in general, and the recipients of the onslaught in particular. The harmony of photographic and all other society would be improved, if the public would always at once bring severe criticism to bear upon aggressors, and make their road hard for them if they cannot fully justify their position.

Who was the aggressor in the Limoges case, and whether his line of action was justified or otherwise, is not yet apparent on this side of the Channel. Perhaps the *Progrès Photographique* assumes the anecdote told us by the late Mr. Grossmith to have been published to support its contention, but it was given merely as being parallel to the *ex parte* statement of the case which that journal had issued to the world.

MONDAY, the 7th October, has been appointed for the reception of Works of Art intended for the Autumn Exhibition of the 19th Century Art Society, at the Conduit Street Galleries.

PHOTOGRAPHIC OPTICS.

BY W. K. BURTON.

CHAPTER VIII.—OPTICAL PRINCIPLES INVOLVED IN ENLARGING.

THE optics of photographic enlarging will be very readily understood if what has already been written has been understood.

It has, of course, been observed by the photographer that, as he approaches an object to be photographed, he gets a larger image of it on the ground glass, and that he has at the same time to rack the lens out, or increase the distance between it and the ground glass. Now if we have a camera which will extend sufficiently, this process need by no means stop at that point where the size of the image is equal to that of the object, but may continue till the image is very much larger than the object, the lens being always brought a little nearer to the latter. In photographic enlarging the object consists of the negative from which the enlargement is to be made, and the image is received either on a sensitive surface, such as gelatino-bromide paper for direct enlargement, or on a plate for the purpose of producing an enlarged positive, from which an enlarged negative may be made by contact. Some prefer to make a transparency by contact the size of the negative first, and to make this the object, producing an enlarged image in the camera. It is to be observed that when lenses that are not symmetrical—which consist of two combinations different from each other—are used for enlarging, as, for example, the portrait lens, it is well to reverse the objective when the image becomes larger than the object, turning that end of the lens which is normally towards the object, towards the sensitive film.

This is really the whole of the optics of enlargement; further complications—which are sometimes considerable—all have for their object merely the illuminating of the negative. It will of course be understood that the more light passes through the negative into the lens the shorter need be the exposure. With modern films for enlarging, such as gelatino-bromide, it is unnecessary, in the case of daylight, to use any special means of concentrating the light. If behind the negative there be the sky or any evenly illuminated white object, as a board with a sheet of white paper stretched on it, the light will be sufficient. When, however, enlargements have to be made direct on, for example, such comparatively insensitive films as platino-type paper, albumenised paper, or carbon tissue, or in any case by artificial light—gas or oil—it is necessary to use an arrangement for concentrating the light. This is known as a condenser.

The condenser is nothing more nor less than a large lens or combination of lenses, one larger than the whole of the negative to be enlarged from. This lens *condenses* parallel or divergent rays, which pass through the negative and cause such as would otherwise fall outside the objective to pass into it.

We illustrate this here. A is, in this case, the source of

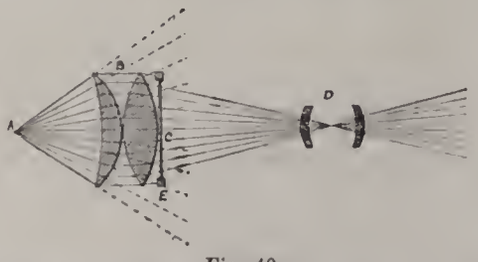


Fig. 40.

light, B is the condenser—a compound lens—C is the negative, held in a wooden frame E, and D is the objective or photographic lens. The relative distances of A, B, and D must be kept such, to get the best advantage of the condenser, that B brings the light to a focus within D.

In fig. 41 is shown, to a smaller scale, the whole arrangement, including the screen on which the enlarged image is thrown, and the path of the rays of light. The form of condenser is an inferior, but much more commonly used one, than that shown in fig. 40. The nearer to a point is the source of light A, the more easily can the whole of the light be thrown into the lens D, even if it be of smaller size; hence it results that with a light approaching a point in form, such as a lime light, and a well-formed condenser, it is of no consequence as regards length of exposure

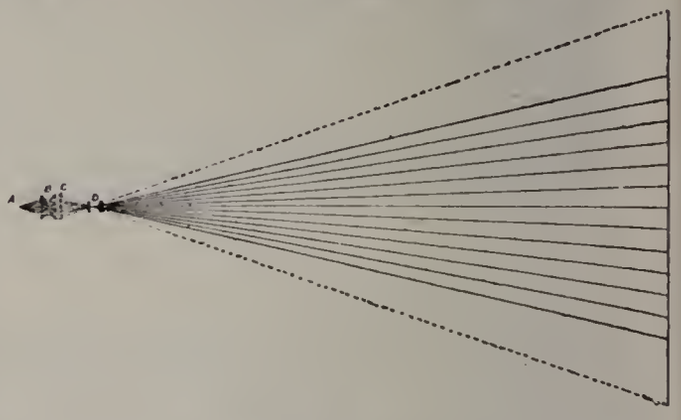


Fig. 41.

whether the lens D be of small or of large diameter, or slow-acting or quick-acting; and indeed, were it possible to have an absolute point as a source of light, and to have a condenser quite devoid of spherical and chromatic aberration, we might dispense with the objective D, altogether.

When the sun forms the source of illumination, a condenser of longer focus may be used than with artificial light, as the rays are parallel to begin with, not divergent. It is necessary, of course, to have the sunlight always passing directly into the condenser. This is commonly provided for by having the enlarging camera so arranged that it may be turned in any direction.

From the PHOTOGRAPHIC NEWS of December 23rd, 1870, we take an illustration showing the action of a solar camera.

Here B is the condenser, N is the negative, O is the objective or photographic lens adjustable by the pinion H, and R is the board for pinning the sensitive paper to, adjustable by the pinion *t*.

S is a vignetter which may be used if it be desired to produce vignettes. The shape is shown in the fig. 36.

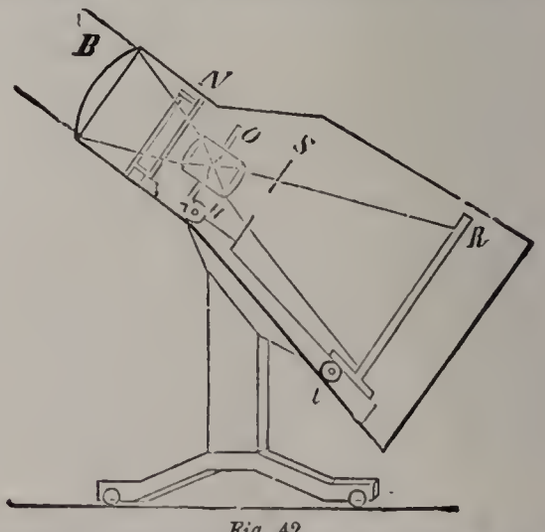


Fig. 42.

It is to be observed that when a condenser is used, especially with the sun as an illuminant, it is difficult to vignette with a simple oval opening, as in the case of direct enlarging, and that this difficulty is greater, the more optically perfect is the condenser. This is why it is *necessary* to serrate the edges of the vignettes.

Diagram 42 shows the external view of the solar camera with the sub-doors, which can be opened for inserting negative, sensitive paper, &c., and for observing progress when the image is visible, as in the case of albuminized paper.

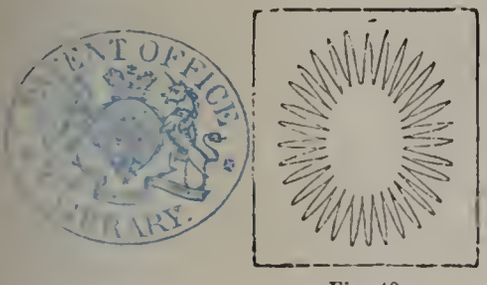


Fig. 43.

It has often been observed that whereas, when diffused light is used in enlarging, the quality of negative which is suitable for contact printing gives excellent enlargements, that when a condenser is used, and especially when the sun is the source of light, such negatives generally give very hard pictures, and that, for such enlarging, the most suitable negative is one with very clear shadows and *very* thin high-lights.

These facts have often been observed, but I am not aware of having, as yet, seen any explanation of them. The cause of the harshness of result, when a condenser is used with a negative of ordinary quality, is as follows.

The shadows we shall suppose to be clear glass. This being "structureless" in the sense of showing no visible grain, the light passes straight through it, and, having been given that direction by the condenser, *all* passes into and through the objective. Of course we leave out of consideration, in the meantime, the small amount lost by reflection from the surfaces of the lenses and the glass of the negative, and absorption by the substance of these.

The high lights, however, are not structureless. The deposit forming them is not of the nature of a stain, but is more or less granular—consists, in fact, of palpable particles. Such a deposit, then, acts as a *diffuser* of light, causing a certain amount of it to spread in all directions. For this reason it is, of course, not all thrown into the objective. We have then this state of affairs: all the light passing through the shadows is thrown into the objective; only a portion of that passing through the high lights is so thrown, so that the amount of contrast between the two is increased.

It is of course true that, with diffused light to begin with, the high lights farther diffuse or scatter light reaching them; but, in this case, there being, so to speak, an infinite number of sources of illumination (every point of the first diffusing surface being a source of illumination), the loss of light at any point of the negative, by rays from one point of illumination diffused *away* from the objective by the film, is exactly made up by rays from other points of illumination diffused by the film *towards* and into the objective, so that the amount of contrast between high-lights and shadows is, in this case, the same for enlarging as for contact printing.

SUGGESTIVENESS IN A PHOTOGRAPH.—Although the exercise of the imagination, the creative power of the painter and poet, is far beyond the highest aspiration of the photographer, yet the quality of suggestiveness may be found in a simple camera picture as the chief element of its attractiveness. Photography, despite its intense realism, may tell a story in the drama of every-day life in such a way as to excite interest or sympathy. By a proper selection and combination of actual facts, perhaps individually dull and prosaic enough, a mere photograph can give the mind material for the construction of a picture rich in thought and full of feeling. When photography thus brings together objects stimulating the association of ideas and creating a mental picture, thereby producing the feeling of surprise, novelty, or unexpectedness, it surely deserves to be admitted to the rank of a work of art.—*American Journal of Photography.*

BERLIN JUBILEE PHOTOGRAPHIC EXHIBITION.

[FROM OUR CORRESPONDENT.]

THE Exhibition was closed on Sunday, the 15th Sept. The contents will be conveyed from Berlin to Koenigsberg, in order to be shown there for about three weeks by the Polytechnic Society; thence they will be transferred for the same purpose to Breslau. The jury for the Exhibition consisted of four divisions. In division 1—portraits, landscape and architecture—the jurors were Prof. Encke; H. Graf, photographer to the Court; E. Körner, painter; Fr. Kühn, H. Hartmann, E. Milster, Lahde, painters; and Prof. Jacobsthal. The winners of the first prize—*Silver Medal*—are: A. Halwas, Th. Fechner, Loescher and Petsch, of Berlin; E. van Delden, Breslau; Carlos Relvas, Gollega; Loredana, Contessa da Porta Bonin, Vivenza; W. J. Byrne, Richmond, for excellent direct portraits, life-size; Ottomar Anschütz; Col. Hedinger, Berlin; A. Lunden, Deurne; H. P. Robinson, Tunbridge Wells, for excellent genre pictures; W. W. Winter, Derby, for platinum prints; Frank M. Sutcliffe, Whitby, for excellent instantaneous pictures; Dr. P. Güssfeld, Berlin; J. P. Gibson, Hexham, for beautiful landscapes; F. P. Cembrano, Jun., Richmond Hill, for platinum prints; H. H. Jackson, Denver; Paul Lange, Liverpool, for beautiful forest scenes; L. Minzloff, Koenigsberg; Ed. Sacré, Ghent; Anselm Schmitz, Cologne; Silesian Society of Amateur Photographers, Breslau; Association Belge, Brusselles; Salzmann, marine painter, Berlin; Prof. Max Müller, Braunschweig; Dr. R. Neuhaus, Berlin; Schultz-Hencke, Charlottenburg.

Second Prize, Bronze Medals: L. Cohen, Furlohn; Selle and Kuntze, Potsdam; Otto Lindner, Berlin; Mr. and Mrs. Anckorn, Arbroath, for picturesque groups; F. Pietzner, Teplitz; Fr. George Young Woodthorpe, London, for indoor portrait studies; Böhmer, Lichterfelde; Chamberlain, Dresden; E. Sack, Munich; Fr. Goebel, Witten; von Bethmann-Hollireg, Perry Falls, County, Texas; Miss Flor. A. Harvey, Slongh, for animal studies; Rich. Keene, Derby, for good landscapes; Hugo Kirckhoff, Berlin; Dr. J. Obermeyer, Berlin; R. Scholz, Gorlitz; F. von Staudenheim, Feldkirchen; Schirmer, Calcutta; J. O. Trene, Berlin; E. Bieber, Hamburg; P. S. Emerson, London, for landscapes; Graebner, Berlin; Knetsch, Bielefeld; Buhler, Mannheim. *Certificate*: Ralph W. Robinson, Linkfield Corner, Redhill.

Division 2. *Reproductions.* Jurors; Prof. Jacoby, E. Milster, Prof. Roese, Fr. Schroeder.—*Silver Medals*: Dr. E. Albert, Munich; J. Schober, Karlsruhe; F. Hanfstaengl, Munich; Autotype Company, Munich; Angerer and Goschl, Vienna; H. Riffarth, Berlin; J. B. Obernetter, Munich; Boussod, Valadon, & Co., Berlin; Alb. Frisch, Berlin. *Bronze Medals*:—Edw. Gaillard, Berlin; Wainwurm and Hofner, Stuttgart; Paul Stahl, Berlin.

Division 3: *Scientific Photography.* Jurors: Dr. Jeserich, Dr. Lummer, Dr. Miethe. Dr. Sieben, Dr. Pfeiffer, Prof. Tobold, Dr. Zenker, Prof. H. W. Vogel. *Silver Medals*:—Astrophysical Observatory, Potsdam; E. von Gothard, Hereny; Profs. Pickering, Brothers, Cambridge; Siemens and Halske, Berlin; Prof. Kayser, Hanover; Prof. Henry A. Rowland, Baltimore. *Bronze Medals*:—Prof. Cohn, Breslau; Rud. Spitaler, Vienna; Hoefller, Baker, and Jesse, Berlin; Alfredo Truan y Luard, Gijon; Prof. Tschirch, Berlin; Lieut. von Hagen, Berlin; Dr. Wollheim, Berlin; Farsari, Yokohama; Royal Technical University, Charlottenburg.

Third Voigtlander Prize: Dr. Witt, Charlottenburg.

Division 4. *Apparatus and Chemicals*:—Eleven silver medals, twelve bronze medals.

Special Division. Jurors: H. Hartmann, painter; E. Milster, painter; Prof. H. W. Vogel; Schultz-Hencke:—*Silver Medals*:—Dr. Jeserich; Aug, Lenz; Standigl; Dr. Miethe; A. Leisner; E. Vogel, jun. *Bronze Medals*:—

Prof. Dietrich ; Rich. Falk ; C. Fischer ; J. Gaedicke ; Rehbock ; Bruno Meyer.

Steinheil Prize:—Alfr. Stieglitz, Berlin.

First Voigtlander Prize:—Goemann, Berlin ; *Second Voigtlander Prize*:—Dr. Sattler.

Honorary Present of H.R.H. the Hereditary Princess of Saxony Meiningen:—Prof. Dr. H. W. Vogel, Berlin.

THROUGH JAPAN WITH A CAMERA.

BY W. K. BURTON.

CHAPTER XII.—CONCLUSION—A WORD ON JAPANESE ART.

I WOULD like to say a great deal about Japanese art, or rather I wish that I were qualified to do so, because I have been deeply impressed by it. One thing that what I have seen in this country has convinced me of is, that at home there is an utterly erroneous idea of what art is at all ; the idea—held by the vulgar multitude, at any rate, of whom I count myself one—that it consists in picture making, and statue making, and analogous performances, appears to me now to be very absurd.

I conceive that art which is confined to one class of a people, and extends to only one class of subject, is no true art, and that art in a whole people, if it is to be in the least true, must be spontaneous and unconscious, and that it must penetrate into all the works, of even the meanest, of the people. This is greatly the case in Japan.

The commonest thing that is made or used has a grace and beauty about it that is quite wanting in things for common use at home. I am struck with this much more in the case of quite cheap things for everyday use than in that of the more elaborate articles that commonly find their way to England. Amongst a set of common Japanese cups, saucers, and teapots—the whole lot costing, perhaps, a shilling—a piece of English earthenware looks positively barbarous ; but a single Japanese cup will not look other than beautiful beside anything ; and the same may be said of all the commonest things. A Saké bottle—the analogue of our decauter—which costs a penny or twopence, would be an ornament anywhere. In the poorest houses, things that we could never dream of using—common rough bits of wood and of stone—are used, and are disposed in such a manner that shows a true feeling for what is beautiful. The drawing of the Japanese is notoriously lacking in perspective, and I must admit that I do not vastly admire the more ambitious attempts ; but I think the very common drawing that is used for decorating even the poorer houses is often perfect. A few strokes—made with a brush and black colour—indicate a flower or a gracefully bending plant, and one could not conceive that a line could be altered by the distance of a hair's breadth and show any improvement. These things are done not by professed artists, but merely by handicraftsmen.

I believe that all this results greatly from the absence of anything corresponding to the system of wholesale manufacture that we have. The Japanese are not, as I have already said, a mechanical people, and have naturally no idea of all the methods that we have, by division of labour, the use of machinery, and so forth, of turning out vast numbers of articles. Every little thing is made, from beginning to end, by one workman, and, as a consequence, it contains, to a certain degree, a reflection of the individuality of the maker, without some of which, I imagine, no beauty is possible. In a certain sense every workman becomes an artist, and the thing must act and react. He is an artist in the sense of creating something that has some beauty in it; he becomes an artist in unconsciously learning to love that which is beautiful, and to hate that which is ugly.

It would almost seem as if unconsciousness were an essential part of such a feeling, for when a Japanese wakes up to the idea that he wishes to be decorative, he very frequently goes wofully astray, adopting, for example, the most wonderfully incongruous mixture of European ornaments—of a coarser and often more gaudy type—with rather debased Japanese art ; but I feel that I have got on a subject that I have really no right to talk upon, and that silence is the thing for the present.

"ONE MAN" PHOTOGRAPHIC EXHIBITIONS.—The fourth of the series will be opened at the Camera Club on October 4th, and will consist of pictures by Mr. H. P. Robinson. The pictures, which will be on view for about two months, are open to inspection by visitors interested, on presentation of their card.

ARTISTS' COLOURS.*

BY A. P. LAURIE, M.A.

AT the suggestion of Mr. Holman Hunt I have begun an enquiry into the important question of the permanency of painting. It is a very complex one, and cannot be regarded as solved by the experiments on the fading of colours by Captain Abney and others, valuable though these be. In considering this question, we have, first, to examine into the preparation of the colour used ; and second, to examine into the way in which the artist uses the colour after he has bought it. We have also got to take into account the oil and varnishes used with the colour, the preparation of the canvas surface, and of the canvas itself.

Confining myself in the first place to the colours themselves, and disregarding in the meantime the use or abuse of them by the artist, the enquiry divides into three heads :—

1. The permanency of the colour.
2. The purity of the colour from adulteration.
3. The purity of the colour from traces of injurious chemicals used in its preparation.

In order to decide on the permanency of a given colour, we cannot do better than make use of the experiments of some hundreds of years' standing, collected in the National Gallery. We have there examples of the most triumphant use of colours, and we have only to turn to the manuscripts written at this period to find a vast amount of information on the preparation and mode of using colours at that time. The main authorities are Eastlake's "History of Oil Painting," Mrs. Merrifield's translation of the 15th and 16th century Italian manuscripts, the translation of Onnino Onnini, the translation of Theophilus, &c. In these works we find a bewildering collection of colour receipts, methods of painting, and so on. They form a guide, though a most confusing one, to the best pigments, and the best methods of preparing these pigments.

The second point referred to above is the purity of colours from adulteration.

The third is their purity from injurious chemicals. In order to investigate this matter, it is necessary not only to carefully examine examples of colours, but to discover as much as possible about the actual processes used in their preparation. This I need not tell the Association is a matter of considerable difficulty.

With a view to completely mastering the problem, it seemed further necessary to devote some time to the actual preparation of colours fit for use by the artist, thus testing published receipts, and collecting much useful information.

After what I have stated above, the Society will recognize the enormous difficulty and complexity of the subject, and will, I hope, excuse me when I say that I have to bring before them some very disjointed notes on the subject of some interest, but far from a complete investigation. In excuse for the disconnected nature of these notes, I would like to point out that I have followed any clue which offered itself, without attempting to make the enquiry systematic. Enough has been found out, however, to show how misleading any such enquiry must be which does not trace a pigment to its source, and find out how it has been prepared.

I do not propose to trouble the meeting with an elaborate statement of what is to be found in the MSS. referred to above, but would like to mention in passing that the lists of colours mentioned are very large, and that a large number of them are vegetable colours. Among the reds, those most often referred to are the various red ochres, vermilion and madder, and Kermes lake. The vermilion is always prepared by the *dry* method—that is, heating sulphur and mercury in a covered crucible and collecting the sublimate. The Kermes referred to is a Persian dye, an insect similar to the cochineal insect, but giving a permanent red. I have not been able to obtain it

* Read at the British Association, Section B.

through the drysalters, but Mr. W. Morris has introduced it for dyeing his tapestries, and I have obtained some from him. The old masters do not seem to have used the Kermes direct as the source of colour, but to have extracted it from cloth already dyed with it. The processes mentioned for preparing these lakes are very simple, urine, or alkali, and alum being used, and the lake dried on a tile.

The blue most frequently referred to is ultramarine, and the most elaborate directions are given for its preparation; but copper blues and greens are frequently mentioned. Mr. Holman Hunt is of opinion that Prussian blue has been used in Rubens' pictures, though no record of its preparation remains, apparently.

Of yellows, Naples yellow, the yellow ochres, and various vegetable yellows, are repeatedly referred to.

It may well be asked, how did these artists succeed in using vegetable yellows and red so largely when they are looked on with so much suspicion by modern artists? The method used seems to have been a process of working up the colour in varnish. Being a lake, and therefore a transparent colour, it was apparently glazed on over a coat of varnish, and then a second coat placed over it. In this way it was hermetically sealed.

Unfortunately, this process would not, I fear, suit modern conditions of painting, and therefore we cannot recommend the revival of these vegetable colours, except in those cases when they seem to be permanent in themselves. I take it that among the reds we may place as permanent the madder and Kermes lakes, so well known as durable dyes, and among the yellows, gamboge is apparently permanent if properly used. I have consequently devoted special attention to the preparation of these lakes.

The experiments on Kermes have not as yet been very successful, the lake being of rather a dull violet colour. It has been prepared according to a receipt in the Bolognese manuscript, the only difference being that I have started directly from the Kermes. I think I can, however, recognise this lake in some of the pictures in the National Gallery. Whether it is also possible to obtain a bright red from it I cannot yet say.

With the madder lake I have been more successful, fortunately obtaining a trade receipt for its preparation. The process is of more interest, as it is based on the principle of Turkey red dyeing.

Starting with alizarine, the dye is heated with Turkey red oil, and a little tannic acid along with well-washed alumina; the alumina now drying a brilliant red. The shade of this can doubtless be varied by varying the quality of the alizarine. The colour so produced corresponds very closely to Newman's "permanent crimson," and is much richer than the ordinary madder lakes.

In the case of vermilion I have already stated that the practice seems to have been to prepare it by the dry method.

The first suggestion of a wet method for preparing it seems to have come from China, the Chinese vermilion being prepared, it is believed, in that way. The wet method now in use seems to be to grind together sulphur and mercury till they combine to form the black sulphide, and then heat them together with strong caustic potash until the change of colour appears. Great skill is necessary to stop this heating process just at the right moment when the vermilion has reached the finest colour. The process is, however, not otherwise very difficult, with this proviso: that the temperature necessary is stated in the books on colour manufacture too low. I have prepared some quite presentable vermilion in this way. It is, however, obvious that we here run considerable risk of leaving in the colour traces of alkali, which must ultimately be injurious, and that therefore the dry method, though not giving so fine a colour, is probably much safer.

The Chinese method of manufacture* does not seem to have been fully explained. I have a very fine sample of genuine Chinese vermilion, and there is no doubt that the best English vermilion cannot compare with it for fineness of colour, or fineness of grinding. If a few grammes of the Chinese vermilion are sublimed, a very minute trace of ash is left, which is apparently merely oxide of iron. In the case of English samples, more ash is left; and in some cases the ash is distinctly alkaline, dissolves partly in water, and shows traces of sulphide of potassium. I should imagine, however, that by long soaking in weak acid it would be made safe for use as a pigment.

With reference to the yellows, it is of importance to obtain the iron yellows in a precipitated condition if possible, and of as many shades of colour. I have found that by varying the methods of precipitation two colours can be obtained.

To obtain raw sienna shade, ferrous sulphate is mixed with bichromate of potassium until a precipitate begins to be formed, and it is then largely diluted with water, a rich raw sienna coming down. To prepare a bright yellow, ferrous sulphate is precipitated along with aluminium sulphate by potassium carbonate, and the precipitate oxidised in the air. Naples yellow seems to have been one of the most valuable pigments of the ancients, but I doubt if it is now prepared the right way. One sample of so-called Naples yellow seemed to be merely litharge, and I believe it is usually now a mixture of one or two yellows. Receipts based on the analysis of the colour are given, but they do not give a receipt in the old manuscripts. I have prepared some fairly good yellow by one of these receipts. It was of course a mixture of oxide of lead and antimony.

The only blue I have investigated so far is Prussian blue. Though the use of this by the ancients is very doubtful, yet it has been long enough in use to make us regard it as a fairly safe pigment. The result of my enquiries has been that Prussian blue is prepared by mixing a cold solution of ferrous sulphate with a cold solution of potassium ferrocyanide; the white precipitate formed is then oxidized, either by air, or by nitrohydrochloric acid, or by sulphuric acid and bichromate of potassium. These different methods produce different shades of colour known by different names in the trade. Other blues, again, are produced by precipitating alumina, or some white substance, with the Prussian blue. Now it is obviously of considerable importance to know by which of these methods a particular sample of Prussian blue has been prepared.

I have examined several samples from good firms, and while in some cases the blue seems quite pure, in other cases, by boiling with water and filtering, sufficient free sulphuric acid was obtained to reddeu litmus and give a copious precipitate with barium chloride; the actual amount of free acid in 30 grammes of one sample being ·032 grammes. We have here a very curious source of error in experiments as to the safety of Prussian blue as a pigment. I have prepared Prussian blue both by air oxidation and by nitrohydrochloric acid, and that produced by air oxidation is much the darker, approaching indigo in shade.

I have begun an enquiry into the preparation and properties of the oils and varnishes, but do not propose taking up the time of the Association with the results of these experiments at present.

To sum up the results of our experiments at present, we have succeeded in preparing the following list of colours very successfully:—Madder lake, Indian and Venetian red, Prussian blue—two shades—raw sienna, Mar's yellow, Naples yellow. We have made some progress in the preparation of vermilion and Kermes lake. Examination of present methods of manufacture shows that Prussian blue is made in two or three different ways, and sometimes contains free sulphuric acid; vermilion, if made by the English wet method, sometimes contains potassium sulphide; that Chinese vermilion is free from such impurities; that a sample of Naples yellow was merely

* For account of manufacture, see *Chem. News*, Aug., '84.

litharge; that chromate of lead always contains large quantities of lead sulphate. This is not adulteration, however, as the colour is believed to be more permanent if so made.

I think these results are sufficient to show the importance of not merely experimenting on the permanency of pigments as sold by various firms, but also tracing back the pigment to its source, finding out as far as possible the method used to prepare it, and practising its preparation by different methods. Enough has been also indicated to show the importance of studying the fifteenth and sixteenth century manuscripts, and digesting, if possible, the hotch-potch of information therein collected.

Though I have not attempted to put all our information before you—as it would occupy too much time to do so—I hope ultimately to have so completely mastered the preparation and properties of safe pigments, as to be able to lay before the artists a proposal that we should start their manufacture so as to be able to guarantee their durability.

At the same time I may point out that I have said nothing on another branch of this subject to which I referred at the beginning, and to which I have devoted some study: the use or abuse of the pigment when made. It is unnecessary to state to chemists the absurdity of the remark made to me by an artist the other day: "I want a box of colours of every variety, which I can mix any way I like, or all together, without stopping to think about it." I am afraid that all the resources of modern science cannot supply such a box of colours, and until the artists are prepared to do their part of the work properly, no amount of care in the preparation of pigments will save their canvases from destruction.

DAGUERRE AS AN ARTIST.

BY C. E. FEARCE.

M. BALAGNY has communicated to the French Photographic Society a most interesting reminiscence of Daguerre, a reminiscence which furnishes a proof, if proof were wanting, of the inventive skill of the discoverer of the beautiful process which bears his name. Daguerre died at Bry-sur-Marne (Seine), and it was to this place that M. Balaguy made a pilgrimage, and found what he calls the last relics of the artist-photographer.

Daguerre had made his reputation as a painter of panoramas, and was well-known in connection with his efforts to improve dioramic effects long before he announced his discovery of the Daguerreotypic process. Among his panoramic pictures, which attracted much attention at the time of their exhibition, were "The Midnight Mars," "Landslip in the Valley of Goldaw," "The Temple of Solomon," and "The Cathedral of Sainte Marie de Montreal." In these the alternate effects of night and day and storm and sunshine were beautifully produced. To these effects of light were added others from the decomposition of form by means of which, for example, in "The Midnight Mars," figures appeared where the spectators had just beheld seats, altars, &c., and again, as in "The Valley of Goldaw," in which rocks, tumbling from the mountains, replaced the prospect of a smiling valley. The methods adopted in these pictures were published at the same time with the process of the Daguerreotype, and indeed, it is said that Daguerre was led to experiment in chemical changes by solar radiations in the hope of being able to apply the phenomena to the production of effects in his dioramic paintings.

M. Balagny tells us that at Bry he paid a visit to the church, which he found to be a small edifice measuring about thirty metres broad by thirty-five metres long. At the end of the choir is an altar occupying a space measuring two metres and-a-half from the foot of the steps to the wall. In relation to the width and height the effect was that in length the church terminated too abruptly, and Daguerre, by a happy inspiration, conceived the idea how to lengthen it, if not actually, at least in appearance. The two sides of the church should of course have united, as it were, in the semi-circle behind the altar, but instead of so doing, by some eccentricity of the architect, they stopped short, leaving a flat space of about two and a-quarter metres long by three metres high. Daguerre at once saw how this space could be turned to account, and he conceived the ingenious idea of painting upon the wall the representation of the nave of a church. This nave is in the pointed style of the Renaissance; the perspective is admirably arranged, and the whole effect is to make the spectator believe, not only that the altar is naturally in the middle of the church, but that behind it commences a new church of finer proportions than the modest one of Bry.

How Daguerre effected this illusion M. Balagny describes very clearly. To make the necessary junction between the real and ideal church Daguerre first painted on either side of the wall behind the altar a column of white stone. Upon one of these columns he painted a gilt picture frame containing no picture, and upon the other a frame enclosing a picture of the Virgin seated on a chair. These latter were painted in very high relief, so as to assist the illusion. Upon each pillar, as if attached by some pious hand, he drew a bouquet of roses, whilst, from an arch above, depends a crucifix. Behind all this, which M. Balagny calls the first plan, Daguerre painted his imaginary church. Daguerre, it is said, was scrupulously particular during the progress of the work, retiring after almost every stroke of the brush to judge of the effect from all points. The result is, says M. Balagny, that the illusion is absolute, and if the altar were not there to bar the passage, visitors would seek to penetrate beyond.

The church is not the only relic which Daguerre has left at Bry. He was very intimate with the Baron Levis, a landed proprietor in the neighbourhood, who knew his ambitions and appreciated his genius. For the Baron Levis Daguerre constructed a grotto, and across the stream which meandered within he built a little bridge. Not far from the grotto was the country house of Daguerre himself. Here he seems to have revelled in problems of perspective, not problems on paper, but problems in which natural objects were the factors. By making use of dioramic principles he deceived the eye, and made what was really a small place assume apparently the dimensions of a park. This it is well known is the secret of landscape gardening, an art in which the French have always excelled, but no one has reached the pitch of perfection to which Daguerre attained. This property, M. Balagny tells us, is extremely difficult to see, as it was sold to the ladies of Sainte Clothilde, a religious body. I suppose it is useless to suggest to these ladies that in this, Daguerre's jubilee year, the grounds might be open to accredited visitors. Possibly the latter would be disappointed, as it is only in the nature of things that alterations would be made, and it is highly probable that all Daguerre's ingenious artifices of perspective, including a wondrous avenue of trees which, but few yards long, was made to look of interminable length, have disappeared. It is very clear that perspective gardening requires the constant attention of the master hand.

Daguerre's house was pulled down in 1870, and there now only remains the entrance to the property built by himself. This M. Balagny photographed, and a copy accompanied his communication to the Society. Daguerre lies buried in the cemetery of Bry, and the Société Libre de Beaux Arts erected a monument over his grave in 1852.

THE International Photographic Congress at Paris is regarded by the *American Lithographer and Printer* as having been more scientific than practical. It says:—"The nominal work of the International Congress of Photographers, held in Paris last month, is over, and a general complaint is made that not only was the attendance of foreign delegates not up to the expected size, but that the more scientific solutions took the precedence of practical matters, and many of the discussions were more fitted to the Academy of Science than a strictly Photographic Congress."

PHOTOGRAPHY IN GERMANY.

BY HERMANN E. GUNTHER.

DEEP BLUISH BLACK TONES WITH GELATINO-CHLORIDE PAPER—RELIEFS PRODUCED BY PHOTOGRAPHY.

Deep Bluish-Black Velvet Tones with Gelatino-Chloride Printing-out Paper.—In W. Cronenberg's establishment at Grönenbach, where plenty of aristo paper is worked, the following gold bath is used for this paper, with most excellent results :—

Solution No. 1.

Dist. water...	600 c.c.
Sulphocyanide of ammonium ...	27·5 grammes
Phosphate of soda	30 grammes

The solution should be allowed to stand for at least one day and a half.

Solution No. 2.

Chloride of gold (best)...	1 part
Dist. water	100 parts

This solution also should be kept one day and a half. Before use, to 15 c.c. of solution No. 2 100 c.c. of solution No. 1 are added, not *vice versa* ; the mixture is allowed to stand for two hours, when it is used for toning the previously thoroughly washed prints. Ten or more prints may be placed together in the bath, as the toning process proceeds rather slowly. The prints become at first intensely yellow, then gradually turn to blue and bluish-black. The tone acquired does not alter in the fixing bath. The latter consists of a solution of 12 parts of hypo in 100 parts of water, and should be used only twice. If the prints become reddish-yellow in the toning bath it indicates that the bath is too weak in gold. In this case more of solution No. 2 must be added to the bath, and then the latter allowed to stand again for about half-an-hour.

Reliefs Produced by Means of Photography. — The method of making photographic relief pictures by means of bichromatised gelatine is known to all ; the height of these reliefs, which depends on different circumstances, does not exceed, generally, a tenth of an inch. This is quite sufficient for the purposes of the Woodburytype and other phototographic methods ; but for ornament or decoration a much higher relief is desirable, to be reproduced in plaster of Paris, metal, or india-rubber. A process which yields excellent results has lately been invented, and in this country patented, by Herr Ferr.

The subject may be photographed either on a collodion plate or on a gelatine plate, but, at all events, the plates must be uniform in strength. If the subject be a drawing, with white lines on a dark ground, a diapositive is to be made after the negative ; if, however, the ground be white and the lines black, an ordinary negative is sufficient. In cases where photographs of human beings are used, in which the hair, the flesh, and the drapery are to be taken into consideration, the following method is employed. A diapositive is made after the original negative ; the drapery and the hair are scraped off, and on these parts is placed the negative ; the two plates are lightly pasted together. From these combined plates a diapositive is made once more. The operation described is necessary in order to impart to the hair, to the flesh, and to the drapery equal strength in the copy. The plates are printed on gelatine plates consisting of equal parts of gelatine and tragacanth—sixty grammes dissolved in 500 c.c. of water. This mixture is poured up to $\frac{3}{4}$ of an inch thick on plate glasses, from which the film, after setting, is stripped off, turned over, and transferred to another plate, with the smooth surface upwards, and allowed to dry perfectly. For further use the gelatine plates have poured over them a mixture of—

Bichromate of potassium	3 grammes
Dextrine	5 „
Gelatine	1 gramme
Water (cold)	500 c.c.

and are dried as quickly as possible in the dark room. The film must, after drying, show a matt surface. Care should be taken that in making up the mixture it does not contain foreign bodies, and in dissolving the tragacanth to avoid air-bubbles, which are very difficult to be removed. The time of exposure with these plates depends on the strength of the negative, but it will generally take one half to two hours. The development of the relief is done in a bath of clean water, in which the plate remains until the greasiness of its surface has disappeared, and the gelatine film begins to soften. As soon as this point is reached, 15 grammes of glacial acetic acid are added to the water, in which the plate is then allowed to remain for two or three hours. During this time the bichromatised gelatine film redissolves by influence of the direct sunlight, and the relief proceeds to develop. If the dextrine gelatine film refuses to dissolve, the plate is useless, as then only a very flat relief can be produced.

The plate must be perfectly covered by the acid bath, to which, after the lapse of three hours, 15 to 30 grammes of glacial acetic acid are added, and so on, until the relief has been completely developed. The temperature of the bath should not exceed 66° F., since the gelatine film would otherwise become wrinkled.

As soon as the relief is completely developed, the plate is washed out with clean cold water until all the acid has been removed. Then the relief can at once be reproduced in plaster of Paris, metal, india-rubber, ebonite, earthenware, or gutta-percha.

The reliefs so treated are said to reach a height of $\frac{1}{5}$ to $\frac{1}{4}$ of an inch. Professor F. Luckhardt, at a recent meeting of the Vienna Photographic Society, highly commended them, after he had seen them at the Art Exhibition at Munich. In his opinion the process will prove of special value for archæologists in cases where hieroglyphs are faithfully to be reproduced ; also for decorative uses, for instance, to enchase small pieces of furniture and caskets, especially if the process is used to reproduce the works of old masters, engravings, etchings, or reliefs on wood and leather. At all events, a new field seems to be opened to photography by this process.

AWARDS AT THE PARIS EXHIBITION.—The Secretary of the British Section writes to the daily press that the public announcements of the awards of the juries will be made on Sunday next, at the "Fête des Récompenses," which will be held in the Palais de l'Industrie, in the Champs Elysées. The diplomas representing medals of various values—gold, silver, and bronze—will not themselves be distributed on this occasion, as they will not be ready for some time to come ; nor is it even proposed to read out the list of recipients. All that will actually be done will be to hand to the president of each section a list of the awards in that section. A list of the awards to the British Section, which are very numerous, will be issued to the British exhibitors on Saturday next.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—Prizes, consisting of silver and bronze medals, will be awarded at the annual meeting in November, for best and second-best series of six pictures, without restriction as to choice of subject, for sizes half-plate and under, and over half plate respectively ; for best and second-best series of two enlargements ; and for best and second-best series of six lantern slides. All work must have been taken during the year preceding the adjudication, and the negative, development, printing, toning, and clouds, if any, must be the *bona-fide* work of the competitor.

HALATIONS IN INTERIORS.—Many are the devices which have been suggested to overcome or to correct halation, the great pest in interior photography, but since the introduction of the paper films, and recently the celluloid films, we see less disfigurement from this cause. The use of the flash-light has likewise enabled photographers to obtain most difficult interiors without a trace of the marring influence of over-zealous lights. The flash-light, in connection with celluloid films, will accomplish wonders in a few seconds which formerly hours failed to do. It is surprising that photographers, when taking interiors, do not avail themselves of these two great agents for securing perfect work—the flash-light and the flexible film.—*American Journal of Photography.*

Notes.

The questions which are submitted to a Chancery judge are often so difficult to answer straight off that no wonder he deliberates and refuses to adjudicate until he has the whole of the evidence before him. How, for instance, could Mr. Justice Denman decide off-hand upon the merits of a photographic business which came before him last week? The application took the form of a motion for the appointment of an interim receiver and manager on behalf of a debenture holder in a photographic company which had got into difficulties. About a fortnight ago the directors passed a resolution directing the secretary to suspend payment, and a meeting of the shareholders had been summoned to consider the propriety of passing an extraordinary resolution for winding up, upon which the debenture holders took steps to realise their rights, and the result was the motion referred to, on the ground that the business ought to be continued in the interval, and not ruined by a sudden stoppage. Mr. Justice Denman, however, pointed out that it might be the worst thing possible to order the business to be continued—a deduction which, right or wrong, was, at all events, a logical one, looking at all the circumstances of the case—and refused to make the order as requested. Debenture holders who are simply and purely mortgagees have the quality common to all mortgagees, a remarkably keen eye to their own interests.

The ingenuity of the advertiser is indeed wonderful. Nothing comes amiss to him, from the backs of the *Punch* cartoons to the Pyramids. Photography, of course, has been made use of, chiefly by drapery and millinery firms, but hitherto to advertise the attractions of some particular article of feminine attire. It has been left, however, for a wholesale drapery firm to push the advantage of photography much farther than the mere exhibition of a photograph of a new bonnet. It has had its heads of departments photographed in a group, the group, by the way, not being confined to the "heads" only, but including the whole figure. This photograph has been reproduced by one of the mechanical photo-printing processes, and now forms the principal attraction of last week's issue of the leading trade journal. But the photograph by itself would not be enough, as the physiognomies of these gentlemen, however estimable the latter may be, are supremely uninteresting. Where the advertisement comes in is seen in the following announcement, printed in bold type on each side of the picture:—"These gentlemen will be in the warehouse to meet their friends on Tuesday and Wednesday, September 17th and 18th being special show days."

This is really a very admirable idea, and might be pushed much farther. For instance, would it not ease the path of the commercial traveller if the firm sent cards bearing his photograph to possible customers, with the intimation that "Our Mr. Jenkins, whose photograph we enclose, will have the honour of waiting upon you" on such a day? If the traveller were pleasant looking, so much the better. On the other hand, when an account is over-due, the photograph of the collector—taking care, of course, that the latter is a determined, stand-no-nonsense kind of fellow—might be forwarded with a curt announcement that Mr. Cashem would call at such an hour; and, we fancy, the happiest results would follow.

Who was the scribe who wrote solemnly in the *Echo*, "Amateur photography is the mania of Chicago. There are said to be a thousand of the brethren in the city?" Only a thousand! Chicago is a city which has over half a million inhabitants, and is the centre of western activity not only in pig-killing and curing, but photography also. We should say that the proportion of amateur photographers would be considerably more than a thousand.

Some curious experiments, according to the *Novoe Vremya*, are being carried on in Russia with respect to pigeons and photography. Photographs are taken from a balloon, and the negatives are conveyed by pigeons to a place previously arranged. The first experiment was made from the cupola of the cathedral of Isaac, and the subject photographed was the Winter Palace. The plates were packed in envelopes impenetrable to the light, and then tied to the feet of the pigeons, and by them carried to the station at Volkovo. Though not expressly stated, it goes without saying that the negatives are film or paper negatives, and their application to balloon purposes shows how quickly any advance in photography is turned to practical use.

Mr. W. P. Frith has no very high opinion of photography as a means to assist the portrait painter. He gives in his reminiscences an extract from his diary recounting his difficulties in securing the portraits of the personages who figure in his picture of the wedding of the Prince and Princess of Wales, and remarks incidentally: "The Danish Princes and Princesses baffled me completely; they had no time in the short space allowed them in England to sit to be painted—scarcely for their photographs. I had therefore to trust to that most unsatisfactory process for my likenesses of them, which are consequently the worst in all respects in the whole picture." This was in 1863. Mr. Frith does not tell us who was the photographer, nor whether the royal personages contented themselves with the carte-de-visite, then in the zenith of popular favour. Portrait photography is not quite what it was a quarter of a century ago, and it would be interesting to know if Mr. Frith is of the same opinion now as he was then.

The numerous photographs taken of eviction scenes in Ireland are proving effective weapons in the hands of the Liberal party, who made use of them largely in the Sleaford election contest. The photographs, it appears, were entrusted only to lady canvassers, the reason for which is not very apparent. So far as we know, the candidate has not resorted to photography through the medium of the magic lantern as an adjunct to point the moral and adorn the tale of his eloquence, but no doubt this will come about in future elections.

A NEW METHOD OF PRINTING PHOTOGRAPHIC NEGATIVES.

Mr. Walter Gardiner, M.A., Fellow of Clare College, Cambridge, and lecturer on botany in the University, has discovered a new method of printing photographic negatives, employing living leaves in place of sensitive paper. Mr. Gardiner read a paper on the subject before the British Association. Before dealing with the immediate subject of his paper, the author described how prints may be obtained from *Protococci*, or the free swimming swarmspores of many green *Algæ*. It is possible to take advantage of their sensiveness to light. Into one end of a water-tight box a thin glass plate is securely fitted. The negative to be printed is then placed next the glass, film side nearest. The box is filled with water containing a fairly large quantity of swarmspores. The lid is shut down, and the whole is exposed to diffused light. In the case of a strong and well-developed negative, the swarmspores swim towards the most highly illuminated parts, and there in the greatest numbers come to rest, and settle upon the glass, so that, after some four or six hours, on pouring out the water, and removing the negative, a print in green swarmspores can be obtained. The print is dried, fixed with albumen, stained, and varnished. The author then dwelt upon the well known fact that the whole of the animal life upon the globe depends directly or indirectly upon the wonderful synthetic formation of proteid and protoplasm which takes place in the living tissue of plants containing chlorophyll, *i.e.* green plants, or, to be more exact, in the green chlorophyll corpuscles. He stated that whatever is the exact chemical nature of the process, this is at least clear, that the first *visible* product of the assimilatory activity is starch, which, moreover, is found in the chlorophyll grains. The presence of this starch can be made manifest by treating a decolorised leaf with a water solution of iodine dissolved in potassic iodide. This formation of starch only takes place under the influence of light; the radiant energy of the sun providing the means of executing the profound synthetic chemical change and building up proteid from the carbonic acid of the air, which is taken up by the leaves and the salts and water of the soil absorbed by the roots. If a plant (and preferably a plant with thin leaves) be placed in the dark overnight, and then brought out into the light next morning, the desired leaves being covered with a sharp and well developed negative, starch is formed when light is transmitted, and in greatest quantity in the brightest areas. Thus a positive in starch is produced, which can be developed by suitable treatment with iodine. [A leaf was then developed, and handed round to the audience for inspection.] The author showed that it might be possible to obtain a permanent print by suitable washing and treatment with a soluble silver salt, silver iodide being formed. The author regards this discovery as a most striking illustration of the way in which plants are working for themselves, and so for all living things, and points out that the extraordinary manner in which the green parts of plants—so to speak—catch the radiant energy of the sun, and employ it for analytical and synthetical chemical processes, may be easily and clearly demonstrated.

The British Association.—The *Indépendance Belge* waxes facetious at the expense of the British Association. It says that the English are a wonderful people. They have found out the exact date at which the world was created, they have discovered the exact date at which it will come to an end, they have reduced the soul to a given quantity, they have discovered the germ of melancholia, they have found out how to convert Thames mud into butter, they have discovered the cipher used by Pharaoh in his billet-doux—but they can't find Jack the Ripper. The *Indépendance Belge* goes up one. Stays were discussed by the Anthropological Section. The Mary Ann-thropological Section, evidently.—*The Referee.*

ON THE RELATIVE QUANTITIES OF DEPOSIT OF SILVER PRODUCED BY THE DEVELOPMENT OF A PHOTOGRAPHIC PLATE, IN TERMS OF THE INTENSITY OF THE LIGHT ACTING.

BY CAPT. ABNEY, C.B., D.C.L., R.E., F.R.S.

In a paper read in Section A of the British Association, I alluded to the fact that the transparency of deposit caused by development in a photograph can be expressed as a function of the intensity of light acting, or, what is the same thing, as of the time of exposure, and I have said that it can be brought into the form of the law of error. I will briefly explain how this is done. In a Spurge's sensitometer—which is the most simple instrument I am acquainted with for accurate measurements in experiments such as I am about to describe—different parts of the same plate are exposed to different intensities of light, the intensity being regulated by the size of the apertures through which the light is admitted to the plate; as a matter of fact every third aperture doubles the light admitted, each consecutive hole advancing by $\sqrt[3]{2}$, and, as there are thirty different apertures, it will be seen that the variation of light used is very considerable. When experimenting with this instrument, and after carefully measuring the transparency of deposit, I found that of the number of holes were taken as abscissæ to the curve formed, the ordinates followed the law of frequency as given in the ordinary law of error. In other words, the formula stood thus:—

$$T^1 = T\epsilon^{-\mu x^2}$$

Where T was total transparency, T^1 was the transparency beneath any hole. It counted from the hole where the action of light was so feeble, but there was no deposit. Of course this formula would be put in a different way, converting x into the actual comparative light intensity, but it is in the simplest form here. Now there is some little difficulty in reconciling this formula with theory. Before anything could be done, it became necessary to ascertain whether the deposit caused by development was proportional to the intensity of light acting. It should be remembered that the *transparency of deposit* is a very different matter to the amount of deposit. For instance, we may take a certain number of opaque particles of a substance, and distribute them at haphazard over a given transparent area, and we shall get the transparent area diminished by a certain amount; but it by no means follows if double the number of particles be distributed over an equal and similar area, that the transparent area left will be diminished by double the amount. This is self-evident, for if we were to now continue doubling the number of particles a certain number of times, the whole area would practically become opaque, and no further opacity could be produced by a further increase in number of the particles. As before said, it thus became necessary for an investigation of the theory, to ascertain whether the deposit made by development was proportional to the intensity of light acting.

The plan that, of course, would suggest itself would be to dissolve off the silver from the same sized areas which had been exposed to different intensities of light, and developed, and then to measure by the balance, or by volumetric methods, the amount of silver on each area. This plan fails, however, to give accurate results; the deposit weighs so little, even when a large opaque area is treated, that I have been forced to fall back upon outside evidence to come to a proper verdict on this point. The plan I worked upon is this. If the deposit is proportional to the intensity of light acting, then we ought to get the same curve as with the sensitometer I have described, if on a certain area we distributed a certain number of particles, and on another of equal area twice the number of particles at haphazard, and so on. The question arose how this was to be done. I will not describe the several ways that this distribution

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* Read at the British Association, Section A.

was attempted to be effected, since most were failures. I think that two experiments, in which I succeeded in securing this haphazard distribution, will show that the amount of deposit is proportional to the light acting. Indian ink we know is carbon in a very fine state of division, and that a small quantity of it will colour a fair quantity of water to such an extent that lines ruled with it are black. These carbon particles are so fine that they are held in suspension as a very weak emulsion, for a considerable time. This being the case, it struck me that a solution—I call it solution for brevity's sake, though the term is not strictly accurate—of Indian ink would be a suitable means of testing this point. I need not go into the plan I adopted to get graduated solutions, each weaker one of which contained half the number of Indian ink particles of the next blackest. Suffice it to say that a series of solutions were so prepared.

The question was next how to get a certain quantity of this solution on a given area. After a certain amount of experimenting the following plan was adopted, viz., cutting squares of about one and a-half inch side from the same sheet of very uniform bibulous paper, and soaking them in the different solutions for a given time, and then, after draining out the liquid, hanging them up to dry. By this means a series of tints were obtained, the darkest presumably containing double the amount of colouring matter that the next darkest contained, and so on. These squares were then ready for measurement. The apparatus used for measuring the blackness or the opacity of the darknesses or densities I have described pretty fully before the photographic and astronomical societies. I will only say that the tints were measured both by transmitted and reflected light, and, after making the proper allowances for residual reflection in the latter results, the two curves were found to be identical. A curve based on the law of error was applied, as in the case of the photographic curve, the same formula being used as that already given, but, in this case, x was the number of the solution counted from that solution which gave no tint whatever to the bibulous paper. The results, as given in the table, show that the same law is followed.

Now some objection might be made to this experiment, in that as the Indian ink is made up with gum, that therefore with the stronger solutions proportionally more colouring matter might adhere to the bibulous paper than in the weaker solutions. A further experiment was then devised to avoid this criticism. A large gelatine plate was exposed to light, and developed so that on the whole surface was a dense deposit of silver. The film was removed from the plate, dissolved up by heat, the emulsified metallic silver well stirred up, and kept warm. A solution of the same gelatine as that used in the developed plate was also prepared. Various mixtures of the emulsified metallic silver and plain gelatine were prepared, each solution containing twice the amount of silver than the next darkest. A fixed quantity of these solutions was taken and flowed as evenly as possible over glass plates of equal area whilst on a level stand. They were allowed to dry, and the transparency of these different films measured. In this case I don't think there can be any adverse criticism, since the experiment was carried out with the very same material as were the photographs which were measured, the only difference being that in one case the density was given by development, and in the other by mixtures. The measurements showed that the law of error again was followed. These two results make it pretty certain that the amount of silver deposited in development is proportional to the intensity of light-acting, in both cases the exposure being the same.

There is one peculiarity in these observations in the case of the photographs which is only right should be noted, and that is that the zero of the abscissæ is taken empyrically. This is a necessity, and it has to be supposed that there is some intensity of light which is so feeble that no deposit will occur during development with a limited exposure. Prof. Rücker has pointed out to me that the formula $T^1 = T\epsilon^{-\mu x}$ should, at first sight, theoretically apply to the case of photographs when x is the number of particles, it being the same problem as the penetration of light through some particles suspended in the atmosphere, of which Clerk Maxwell gave the solution. This does not hold, however, and we shall have to look to some other considerations for reconciling theory with experiment.

THE FOLLOWING TABLES GIVE THE RESULTS.

Indian Ink Tints. The quantity of black particles being doubled in each successive tint.

No. of Tint, No. 10 being the darkest.	Observed Transparency.	Calculated Transparency.	Remarks.
10	2·6	2·44	
9	4·5	4·5	In the
8	8·0	7·9	formula
7	13·0	13·1	
6	20·0	20·0	$T^1 = T\epsilon^{-\mu x^2}$
5	29·5	29	
4	40 5	38·8	T=66
3	49·6	48·8	μ=·033
2	55·0	58	x being
1	63	63·4	
0	66	66	No. of Tint.

Precipitated Silver in Gelatine. The quantity being doubled in each successive tint.

No. of Tint, No. 7 being the darkest.	Observed Transparency.	Calculated Transparency.	Remarks.
7	1·0	1·1	
6	3·5	3·4	In the
5	9·0	8·7	formula
4	19·0	19·0	
3	35·3	34·0	$T^1 = T\epsilon^{-\mu x^2}$
2	50·6	52·0	
1	67·0	67·0	T=73
0	73·0	73·0	μ=·085
			x being
			No. of Tint.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY.*

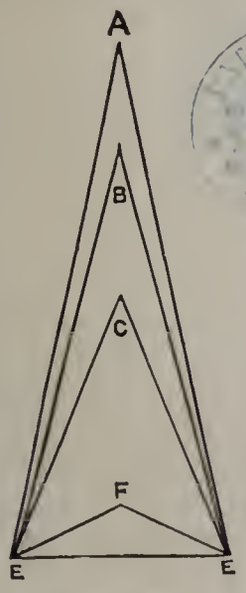
BY W. M. ASHMAN.

MORE than a quarter of a century has elapsed since stereoscopic photographs on paper, and in the form of glass transparencies, were in great demand. At that time the lenticular stereoscope, in various forms, was a familiar object in the majority of households. It is impossible to give any satisfactory reason for its being relegated to the lumber room, like many other temporary scientific novelties, but the fact remains that to-day there are very few drawing rooms or libraries in which a handsome instrument may be found, with its accompanying case of interesting views and other subjects. There are, however, some hopeful signs of a revival of interest in this especially beautiful department of photography, and to assist as far as possible in bringing about this desirable end is the purpose for introducing the subject in these chapters. Although there is a great deal of ground to be gone over, far too much for one article, enough may be said to induce beginners to take up this branch, and to indicate the direction in which their work will lie.

About fifty years ago Professor Wheatstone, in "Philosophical Transactions," showed that solid bodies are seen with a different perspective with each retina, and that if two pictures of an object are drawn with this variation, they can be blended into one by means of the stereoscope, and so present the subject in relief. The distance between the axial lines of the human eyes is somewhere about two and a half inches, and it follows that, as each eye conveys an image to the brain, of all objects included in an angle of about 30°, there must be a slight deviation in the perspective between the two points of view for long distances, and more pronounced deviation for objects nearer to the observer. It has been said that the sense of relief, or solidity, is really produced by the effort of the two eyes to accommodate themselves to the angles necessary to bring into focus the different parts of the object observed. Thus, if a line be drawn from pupil to pupil, and this is made a fixed base, a variety of angles will be subtended by lines

* Continued from page 541.

drawn from each end to various points in that which is viewed. Let E E′ (Fig. 24) be the two pupils, then the angles E C E′, E B E′, and E A E′ will be naturally produced by the effort of each eye to focus the points rapidly, and so compass the different planes in which those points lie. If the object be very close (as at F), we have the physical distortion known as squinting ; and if two points very far off be looked at, the difference in the angles will be so very small as to produce no sense of solidity, which accounts for the flatness of a landscape in the most distant parts, or the coast line when observed from a vessel at sea. But that the principle is there at work, though beyond



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Fig. 24.

the power of our sight to recognize it, is proved by an experiment recorded by J. Traill Taylor, which is worth noting. It will be seen that, to enlarge the angle E A E′, we have only to lengthen the base line, that is, to increase the distance between E and E′, when we can easily obtain as large an angle as that of E F E′. Acting upon this fact, a view was taken of a distant headland from the sea, and after proceeding several hundreds of yards, another view was taken of the same, and so enough variation in the perspective was produced to give relief to the ultimate picture when viewed in the stereoscope. If a short rod, as a pencil, is held horizontally in an axial line with the eyes quite still, and, by opening one eye at a time, is viewed by each independently, each end is seen as if it were at two different points, indicating the two angles by which objects in the ordinary course are observed. Upon employing both eyes at once a coalescence occurs, each one accommodating itself somewhat, and the position of the object out of the direct line is identical to that seen by whichever eye, when used alone, subtends the shortest axial line. The nearer the rod is to the eyes, the more difficult it is to make each end of the rod clear; thus we have a measure, by means of that distance, of the accommodating power of the eyes, and of the angle of vision which each one can command. Using both eyes we can distinguish easily any moving body so long as its motion is not more rapid than in the seventh of a second ; but we cannot do so if we use only one. So in photographing moving objects, if we wish to obtain the illusion of solidity, and with that a better idea of *motion*, we must employ two lenses, mounted far enough apart to give the requisite angle. Rigid subjects, on the other hand, may be very well managed with one lens, so attached to the front of camera as to be movable from one side to the other, or else arranged on the principle devised by Latimer Clark, of which more will be written further on.

Unquestionably the binocular camera is the best to use for the production of the ordinary size of stereoscopic pictures—especially portraits—the only disadvantage being the necessity for cutting the negatives in two, and transposing them right and left before printing, or else of mounting the prints in that way by cutting and reversing them. The result of a mistake in this direction would be to give the effect of intaglio rather than relief, that is, pseudoscopic instead of stereoscopic. Any camera that will take a plate 7½ by 5, or 7¼ by 4½—very good sizes—which allows a margin for selecting the best central point will do for the purpose if an extra front is attached, carrying two lenses of equal focal length. They should be mounted three inches apart or thereabouts for objects not near at hand, and preferably of moderately short focus—three or four inches. A division inside the camera, extending nearly to the front, is usually requisite, though it need not touch it unless very wide angle lenses are employed. This division is generally made after the fashion of a camera bellows, of cardboard covered with a thin black material, so as to close or extend with the movements of the camera in focussing or shutting up, and is removable at pleasure. As to lenses, they depend upon the work to be done. If portraiture and groups in the studio, a regular double portrait combination must be used for quickness ; small lenses of short focus are usually paired expressly for stereoscopic photography. For out-door work a pair of single achromatic lenses are all that one could wish except for architectural effects, when long vertical lines occur near the margins of the pictures. Even then there is a considerable set off to be found in the fact that such distortion is very nearly, if not quite, put right by the optical effect in the stereoscope. In that instrument only single lenses are employed—sometimes achromatic, when expense is no object—and therefore there is a tendency to distortion in their action upon the view, but in a reverse direction, so that the errors of the negative are often quite balanced, and always reduced in amount. Theoretically, the lenses of the stereoscope should be of the same focal length as that of the lenses in the camera by which the negative was produced, but there is a considerable margin within which fine effects can be obtained. There is nothing either in negatives or prints that would indicate a stereoscopic effect, and if minutely examined, only a very little more subject can be made out at one side than the other ; it is only when the positives are viewed in the proper instrument, and in their right position on the mount, that the solidity of the object is evident. Referring to size of plate again, it is well to state that the real space covered by two such pictures as are formed in an ordinary stereoscopic slide, without more margin than is necessary for trimming, is about 6½ by 3½ inches, but a larger plate is preferable, for reasons stated above.

Two cameras can be used for this purpose if fitted with twin lenses, so long as their size admits of their being placed sufficiently near together, or apart. There is a difficulty connected with the correct representation of eyes in a portrait taken with a binocular camera when the instrument is rather near to the sitter for the purpose of getting a head and bust picture. Mr. Taylor points out that in this case the sitter's eyes will be represented in the one portrait as looking straight at the object, be it the camera or anything else, and in the other at a point more or less removed from this. It is true such pictures are not often required, and when they are, the only course is to adopt the method of one camera with sliding front, and the eyes must be fixed on the lens wherever that is moved to. With a quick portrait lens and sliding front to a camera, the necessary changes can be so quickly made that the sitter is not kept an undue time in position, and the chief point is to secure the same expression in each picture, as any great difference produces an unpleasant effect when seen in the stereoscope.

(To be continued.)

WHAT IS THE ORIGIN OF PETROLEUM?*

BY WILLIAM ANDERSON, M. INST., C.E.

ONE of the most remarkable features of the last thirty years is the introduction of petroleum, and the wonderful development to which the trade in it has attained.

Under the generic name of petroleum are embraced a vast variety of combinations of carbon and hydrogen, each of which is distinguished by some special property. At ordinary temperatures and pressures some are gaseous, some are liquid, and some solid, and most are capable of being modified by suitable treatment under various temperatures and pressures. The employment of petroleum in the arts is still extending rapidly. Used originally for illuminating purposes, it is now employed as fuel for heating furnaces and steam boilers; as a working agent in heat-engines; valuable medicinal properties have been discovered; and as a lubricant it stands unrivalled.

As an illuminant, even in this country, it is, to a large extent, superseding every other in private houses, and even in public lamps, because it gives a cheaper and more brilliant light than ordinary gas, and leaves the consumer free from the tyranny of great and privileged companies. As fuel, it is especially convenient, cleanly, and economical.

"What is the origin of petroleum?" In the year 1877, Prof. Mendeleeff undertook to answer this question; and as his theory appears to be very little known, and has never been fully set forth in the English language, I trust you will forgive me for laying a matter so interesting before you. Dr. Mendeleeff commences his essay by the statement that most persons assume, without any special reason—excepting, perhaps, its chemical composition—that naphtha, like coal, has a vegetable origin. He combats this hypothesis, and points out, in the first place, that naphtha must have been formed in the depths of the earth. It could not have been produced on the surface, because it would have evaporated; nor over a sea bottom, because it would have floated up and been dissipated by the same means. In the next place, he shows that naphtha must have been formed beneath the very site on which it is found; that it can not have come from a distance, like so many other geological deposits, and for the reasons given above—namely, that it could not be water-borne, and could not have flowed along the surface, while in the superficial sands in which it is generally found no one has ever discovered the presence of organized matter in sufficiently large masses to have served as a source for the enormous quantity of oil and gas yielded in some districts; and hence it is most probable that naphtha has risen from much greater depths under the influence of its own gaseous pressure, or floated up upon the surface of water, with which it is so frequently associated.

The oil-bearing strata in Europe belong chiefly to the Tertiary or later geological epochs; so that it is conceivable that in these strata, or in those immediately below them, carboniferous deposits may exist and may be the sources of the oil; but in America and in Canada the oil-bearing sands are found in the Devonian and Silurian formations, which are either destitute of organic remains, or contain them in insignificant quantities. Yet, if the immense masses of hydrocarbons have been produced by chemical changes in carboniferous beds, equally large masses of solid carboniferous remains must still exist; but of this there is absolutely no evidence, while cases occur in Pennsylvania where oil is obtained from the Devonian rocks underlying compact clay beds, on which rest coal-bearing strata. Had the oil been derived from the coal, it certainly would not have made its way downwards; much less would it have penetrated an impermeable stratum of clay. The conclusion arrived at is, that it is impossible to ascribe the formation of naphtha to chemical changes produced by heat and pressure in ancient organized remains.

One of the first indices to the solution of the question lies in the situation of the oil-bearing regions. They always occur in the neighbourhood of, and run parallel to, mountain ranges—as, for example, in Pennsylvania, along the Alleghanies; in Russia, along the Caucasus. The crests of the ranges, formed originally of horizontal strata which had been forced up by internal pressure, must have been cracked and dislocated, the fissures widening outwards, while similar cracks must have been formed at the bases of the ranges; but the fissures would widen downwards, and would form channels and cavities, into which naphtha, formed in the depths to which the fissures descended, would rise and manifest itself, especially in localities where the surface had been sufficiently lowered by denudation or otherwise.

It is in the lowest depths of these fissures that we must seek the laboratories in which the oil is formed; and once produced, it must inevitably rise to the surface, whether forced up by its own pent-up gases or vapours, or floated up by associated water. In some instances the oil penetrating or soaking through the surface layers loses its more volatile constitutents by evaporation, and, in consequence, deposits of pitch, of carboniferous shales, and asphalte take place; in other cases, the oil, impregnating sands at a lower level, is often found under great pressure, and associated with forms of itself in a permanently gaseous state. This oil may be distributed widely according to the nature of the formations or the disturbances to which they have been subjected; but the presence of petroleum is not in any way connected with the geological age of the oil-bearing strata; it is simply the result of physical condition and of surface structure.

The process of the formation of petroleum seems to be the following:—It is generally admitted that the crust of the earth is very thin in comparison with the diameter of the latter, and that this crust incloses soft or fluid substances, among which the carbides of iron and of other metals find a place. When, in consequence of cooling or some other cause, a fissure takes place through which a mountain range is protruded, the crust of the earth is bent, fissures are formed; or, at any rate, the continuity of the rocky layers is disturbed, and they are rendered more or less porous, so that surface waters are able to make their way deep into the bowels of the earth, and to reach occasionally the heated deposits of metallic carbides which may exist either in a separated condition or blended with other matter. Under such circumstances, it is easy to see what must take place. Iron, or whatever other metal may be present, forms an oxide with the oxygen of the water; hydrogen is either set free, or combines with the carbon which was associated with the metal, and becomes a volatile substance—that is, naphtha. The water which had penetrated down to the incandescent mass is changed into steam, a portion of which finds its way through the porous substances with which the fissures are filled, and carries with it the vapours of the newly formed hydrocarbons, and this mixture of vapours is condensed wholly or in part as soon as it reaches the cooler strata. The chemical composition of the hydrocarbons produced will depend upon the conditions of temperature and pressure under which they are formed. It is obvious that these may vary between very wide limits, and hence it is that mineral oils, mineral pitch, ozokerit, and similar products, differ so greatly from each other in the relative proportions of hydrogen and carbon. I may mention that artificial petroleum has been frequently prepared by a process analogous to that described above.

Such is the theory of the distinguished philosopher, who has framed it, not alone upon his wide chemical knowledge, but also upon the practical experience derived from visiting officially the principal oil-producing districts of Europe and America, from discussing the subject with able men deeply interested in the oil industry, and of collecting all the available literature on the subject. It is needless to remark that Dr. Mendeleeff's views are not shared by every competent authority: nevertheless the

* Abstracted from the Presidential Address to Section G, British Association.

remarkable permanence of oil-wells, the apparently inexhaustible evolution of hydrocarbon gases in certain regions, almost force one to believe that the hydrocarbon products must be forming as fast as they are consumed, that there is little danger of the demand ever exceeding the supply, and that there is every prospect of oil being found in almost every portion of the surface of the earth, especially in the vicinity of great geologicol disturbances.

Improved methods of boring wells will enable greater depths to be reached ; and it should be remembered that, apart from the cost of sinking a deep well, there is no extra expense in working at great depths, because the oil generally rises to the surface or near it. The extraordinary pressures, amounting to 300 pounds per square inch, which have been measured in some wells, seem to me to yield conclusive evidence of the impermeability of the strata from under which the oil has been forced up, and tend to confirm the view that it must have been formed in regions far below any which could have contained organic remains.

RESEARCHES ON SULPHITES.*

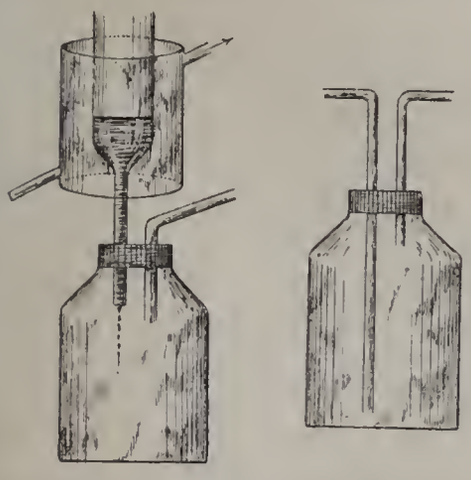
BY P. J. HARTOG, B.SC. (LOND. AND VICT.)

The constitution of sulphites is a question which cannot yet be regarded as finally settled. By M. Berthelot's advice, I undertook a further investigation of these salts in his laboratory. In the present paper I propose to give a short account of the methods used and of the results which I obtained, and also of some of the more immediate theoretical conclusions to which these results lead.

The great difficulty experienced in the preparation of the alkaline sulphites is to avoid their oxidation to sulphates. I may, perhaps, describe in detail the method by which I have succeeded in preparing these salts in the pure state. As they are very soluble, washing the crystals means losing the greatest part of the yield, and it is important to avoid from the first all oxidation of the solutions from which they are crystallized. Hence it is necessary to begin by expelling the oxygen of atmospheric origin dissolved in the water which is to be used for their preparation. M. Berthelot has shown that the most effectual—I may say, the only effectual—way of doing this is to pass a current of nitrogen or of carbonic acid through the water.

Carbonic acid cannot be used in preparing sulphites, as carbonic acid and sulphurous acid share the base between them, according to a law which has not yet been determined.

In cases where it was desired to exclude all traces of oxygen, the nitrogen prepared by means of Berthelot's



extremely convenient apparatus was passed through two wash-bottles containing chromous chloride. This arrangement was used in all thermo-chemical experiments.

* Read before the British Association, Section B.

To avoid contact with the air all operations were conducted as far as possible in one vessel—generally a litre bottle fitted with a caoutchouc cork through which two tubes passed.

Let me take as an example the preparation of a potassium sodium sulphite, $KNaSO^3$.

300 grm. of soda crystals are introduced into the bottle with about 100 gr. of deoxygenated water, and saturated with SO^2, sodium bisulphite being formed. The necessary amount of pure potash is added, dissolved in about its own weight of water. The bottle is then transferred to the oil bath. A piece of pumice stone is introduced to prevent bumping ; this detail is a most important one, for on it the whole success of the operation depends. The bottle is connected with the water pump, a condenser being interposed, and the oil bath is heated to 120°. The potassium sodium sulphite is deposited in beautiful hexagonal prisms. I obtained similarly K^2SO^3, which is deliquescent, as a mass of microscopical crystals, which I drained on cotton wool in a cylindrical funnel in an atmosphere of nitrogen. It is very advantageous to surround the funnel with a copper cylinder containing boiling water, as the salt is much more soluble in cold than in hot water, which is also the case with some other sulphites.

I obtained Na^2SO^3 anhydrous by a similar method. Schultz-Sellack declares that the anhydrous salt is got by heating an ordinary solution of sodium sulphite, but gives neither analysis nor details. Now I found on evaporating a solution of sodium sulphite on the oil bath that a mixture consisting of anhydrous sodium sulphite in the form of hexagonal prisms, and the hydrated sulphate $Na^2SO^3,7H^2O$ is deposited ; the average composition of the mixture was $Na^2SO^3 + \frac{1}{5} Na^2SO^3,7H^2O$.

I obtained Am^2SO^3, anhydrous, by the same method, but it is impossible to obtain it free from sulphate.

I have shown elsewhere that a solution of ammonium sulphite is oxidised much less easily than the crystals of hydrated salt.

By similar methods I have prepared, in quantities sufficient for thermo-chemical determinations, several double salts :—

$2Na^2O, K^2O, 4SO^2, 9H^2O.$ $2K^2O, Na^2O, 4SO^2, 7H^2O.$
$2Na^2O, Am^2O, 4SO^2, 9H^2O.$
$2Am^2O, K^2O, 4SO^2, 4.5H^2O.$
$3MgO, Am^2O. 4SO^2, 18H^2O.$

Now these double salts (some of which have been previously described) contain $4SO^2$ with the formulæ I have given ; and though the formulæ of the first-mentioned salts might be halved by supposing that one molecule of the water, represented as water of crystallisation, is water of constitution, yet by doing so all analogy would be lost between these and evidently allied magnesium and zinc salts containing $4SO^2$, whose formulæ cannot be halved.

It seemed probable to me that not only these salts, but also the metasulphites, $K^2S^2O^5$, $Na^2S^2O^5$, $Am^2S^2O^5$, and the double salts, such as $KNaSO^3$, might be of more complex composition than has hitherto been supposed, and might contain $4SO^2$. I proceeded therefore to determine the amount of heat given off by adding successive molecules of alkaline oxide to sulphurous acid in solution. I will not take up time by the complete discussion of this question, but shall put before you the most interesting and conclusive results.

Let us take the following reactions :—

$2Na^2O, 4SO^2$ diss.* $+ K^2O$ diss. $= 2Na^2O, K^2O, 4SO^2$ diss.
(Derived from fresh sodium metasulphite) evolves + 27·29Cal.
$2Na^2O, K^2O SO^2$ diss. $+ K^2O$ diss. $= 4KNaSO^3$ evolves +27·28Cal.

the same amount of heat being evolved for successive eqts. But now let us substitute ammonia for potash, and we get—

* Diss. = dissolved in a large quantity of water.

$2Na^2O, 4SO^2$ (diss.) + Am^2O diss. = $2Na^2O, Am^2O, 4SO^2$ diss. evolves + 25·05Cal.

$2Na^2O, Am^2O, 4SO^2$ diss. + Am^2O diss. = $4NaAmSO^3$ evolves + 23·32Cal.

We find precisely the same phenomena if we start from a solution of potassium metasulphite. We find—

$2K^2O, 4SO^2$ diss. + Na^2O diss. = $2K^2O, Na^2O, 4SO^2$ diss. evolves 27·82

$2K^2O, Na_2O. 4SO^2$ diss. + Na^2O diss. = $4KNaSO^3$ evolves 28·23Cal.

$2K^2O, 4SO^2$, diss. + Am^2O diss. = $2K^2O, Am^2O. 4SO^2$ diss evolves 26·19Cal.

$2K^2O, Am^2O, 4SO^2$ + Am^2O diss. = $4KAmSO^3$ diss. evolves 23·86Cal.

To express the matter in words. In the meta-sulphites of sodium and potassium, whose simplest formula is $K_2S_2O_5$, and $Na_2S_2O_5$, the sulphurous acid is already half saturated; if we add successive half-molecules of potash and soda to their solutions, we find that the same amount of heat is evolved approximately for each addition, and we might suppose, if we possessed no further facts, that the reaction is the same. But the case is different with ammonia; the heat evolved by the addition of successive half-molecules is very sensibly different, and we may conclude that the reaction is not the same; hence we are led to double the formulæ as I have done in the above equations.

I intend to make cryoscopic determinations with the solutions of these salts.

I may conclude this paper by mentioning two further facts:—

1. The consideration of thermo-chemical data leads one to infer the existence of at least two normal potassium sodium sulphites having the formula $KNaSO_3$, which may possibly be found in Schwicker aud Röhrig's hydrated salt on the one hand, and in the anhydrons one which I have prepared, on the other.

2. I have found that sodium metasulphite, $Na_2S_2O_5$, also exists in two isomeric forms. The freshly prepared salt undergoes gradual transformation into an isomeric modification, about 2·7Cal. being evolved during the process.

It seems probable that in all these salts there exists a central ring of sulphur, or sulphur and oxygen atoms, very similar to the benzene ring of organic chemistry.

The complete solution of the problems on which I have touched—problems of a kind which one is apt to look on as to be met with and solved only in the regions of organic chemistry—seems to me to be of great theoretical interest.

DAYLIGHT UNDER WATER.—M. Hermann Fol reports to the Académie des Sciences the result of the researches that he has been making in the depths of the Mediterranean during the summer months, his object having been to certify how far daylight penetrates. His operations have been carried on in water of remarkable clearness between Corsica and the shores of the Alpes-Maritimes, at a distance of eighteen geographical miles from the nearest land. M. Fol used gelatino-bromide plates exposed during ten minutes, whereby he has found the limit of daylight in those waters to be at a depth of 1,518ft—465 metres. This is 327 ft. short of the limit assigned to daylight in the Mediterranean by the Germans, Chun and Petersen, some years ago.—*The Engineer.*

THE following remarks occur in the *Star* on a photograph, taken at Lord Salisbury's garden party, which is exhibited in a shop window in Pall Mall:—"The portraits are remarkably good. The Prince of Wales is to the left and the Princess to the right of the Shah. Behind His Majesty is the modest person of Malcolm Khan, and next to the Persian envoy stand, full of smiling assurance, Sir Henry Drummond Wolff and Sir Henry Rawlinson. The Prime Minister, uncovered, is quietly gazing at the Shah, whose aigrette awkwardly detracts a little from the dignity of the Lord Chancellor's countenance. Lady Salisbury, from a higher step on a terrace of Hatfield House, peers happily over her husband's shoulder. M. de Staal, the Russian Ambassador, stares sturdily over the heads of all before him, while Lord Eustace Cecil takes modest place in the extreme background."

ARAGO ON THE DISCOVERY OF PHOTOGRAPHY.*

THE academician who has for some months known the secret of the preparations upon which the beautiful designs submitted for our inspection are pencilled, has not thought himself entitled to put to account M. Daguerre's honourable confidence. He has deemed it no more than proper delicacy, before entering upon the wide field of research opened to philosophers by the photographic processes, to wait until a national remuneration shall have placed in the hands of all equal means of investigation. We can do little more, therefore, in speaking of the scientific utility of our countryman's discovery, than proceed upon conjecture. The facts as to the rest are clear and palpable, removing all fears of our being deceived in their consequences.

The preparation employed by M. Daguerre is a reagent much more sensible to the action of light than any other hitherto in use. Never have the rays of the moon, we do not say in a natural state, but even when concentrated by the most powerful lens, or in the focus of the largest reflector, been capable of producing any perceptible physical effect. The plated discs prepared by M. Daguerre, on the contrary, receive impressions from the action of the lunar rays, and the succeeding operations to such an extent as permits the hope that we shall be in a situation to make photographic charts of our satellite. In other words, in a few minutes we shall be able to execute one of the longest, most tedious, and most delicate operations of astronomy.

An important branch of the sciences of experiment and calculation—that which treats of the intensity of light, or photometry, has hitherto made little progress. The philosopher approaches pretty nearly to the determination of the comparative intensities of two luminous sources when near each other and simultaneously visible; but the means of ascertaining this relation are imperfect when the condition of simultaneity does not exist, when the question regards a light visible at present, and one which will not be seen till after the first has disappeared.

The artificial lights, to which, as standards of comparison, the observer in the case in question is reduced to have recourse, seldom maintain the requisite permanence and steadiness; nor, more particularly as respects the stars, do our artificial lights possess the necessary whiteness. From these causes there exist very great discrepancies between the determinations of the comparative intensities of the sun and moon, or of the sun and stars, as given by men of equal scientific acquirements. Thence also the sublime inferences deducible from these latter comparisons, in relation to the humble place occupied by our luminary amid the millions of suns with which our firmament is studded, are still veiled in reserve, even in the works of those authors whose least fault is timidity.

Let us not hesitate, then, to announce the fact. The reagents discovered by M. Daguerre will speed onward the progress of those sciences which confer the highest honour on the human mind. By their aid, the philosopher will be enabled henceforth to proceed on the principle of absolute intensities; he will compare lights by their effects. If he find it useful, the same tablet will present him with the impression of the dazzling rays of the sun, and with the pencillings of rays three hundred thousand times fainter than those of the moon—the rays of the stars. These different imprints he will equalise, either by reducing the stronger lights, through means of excellent methods, the results of recent discoveries, the explanation of which would be here misplaced, or by allowing the brightest rays to operate—say, only for a second—and continuing, according to circumstances, the action of the others for half-an-hour. In short, when observers apply a new instrument to the study of nature, what they expected from it has always proved little indeed compared with the series of discoveries which the instrument

* Continued from page 622.

originated. In this instance, it is upon the *unforeseen* that we are especially to reckon. Does this sentiment appear paradoxical? Some references will demonstrate its justness.

(*To be continued.*)

Patent Intelligence.

Applications for Letters Patent.

14,537. W. SCORER, North Street, Havant, Hampshire, "Photographic Cameras."—September 16th.

14,557. A. M. BROWNE, 2, Whitefriars, London, "Manufacturing Photographic Dry Plates."—September 16th.

14,671. W. R. LAKE, 45, Southampton Buildings, London, "Magic Lanterns."—September 17th.

14,701. J. MALLOCH, 306, Lawnmarket, Edinburgh, "A Glass Plate or other Tranparent Substance Coated with a Non-actinic Film, and Used as a Negative for Photographic and other purposes."—September 18th.

14,823. T. STANWAY, 24, Cauldon Road, Hanley, Staffordshire, "Lifter and Support for Photographic Pictures while under Manipulation."—September 19th.

14,933. L. POWERS, 45, Southampton Buildings, London, "Dark Slides or Plate-holders for Photographic Cameras."—September 20th.

Specifications Published.

12,573. 31*st Aug.*, 1888.—"Photographic Cameras." WILLIAM SCORER, North Street, Havant, Hampshire, Watchmaker and Jeweller.

My invention relates to improvements in photographic cameras, and consists of a device for the easy adjustment of the swing back and the easy closing of the camera with the focussing glass, which is protected by the lower part of the said camera.

By means of my invention a camera is capable of being easily fixed in position, while its rigidity and the safety of the focussing glass are thereby ensured.

In carrying my invention into practice, I make a folding and sliding base or frame upon which are fixed the back and front of the camera carrying the bellows, this camera being either square or conical in shape.

The central part of this base or frame, which carries a support resting upon the tripod stand, is provided either with a tongue, or groove, on which the outer portion slides, and which can be moved away from the lens with the back. The said tripod-stand can be fixed in an ordinary manner or provided with a toothed circular turn-table actuated by a pinion. To the front part of this frame is hinged another part of sufficient width to carry the whole of the camera when closed, and provided with a suitable clamp thereunder, by means of which it is firmly fixed to the said front part, enabling the camera to be opened or closed with facility.

This second part is of suitable length and thickness to correspond exactly when open with the outer portion of the sliding frame which is provided at its lower part with a groove, in which slides a metal piece. Upon this piece pivots the back of the camera, which can be thus extended and clamped in position, and can be made to swing backward, forward, and sideways. Upon the frame constituting the back of the camera is screwed another metal piece, and the former pivots upon the metal piece before mentioned, which slides under the frame, and is clamped in position by means of a suitable clip. The said metallic piece carrying the back of the camera can be made in one piece, or in the case of large cameras in two pieces connected when the camera is open by a strip of metal being secured in position by one or more milled head screws.

The camera frame is also furnished with a screw for separating the sliding portions thereof, and is used for focussing after a rough adjustment by means of the above-mentioned sliding piece.

LANTERN SLIDE MAKING.—Mr. J. H. Jaques informs us that in the report furnished to us of his paper read before the Birmingham Photographic Society on the 12th inst., there is an error in the formula for iron developer for wet plate transparencies—viz., the quantity of water should have been 8 ounces, not 16 ounces.

Correspondence.

WOMEN AT PHOTOGRAPHIC MEETINGS.

SIR,—I don't quite like the title at the head of this discussion; it does not express our meaning. "Lady Amateurs as Members of Photographic Societies" is a little longer, but, I think, better. Your correspondent "Nemo" makes one or two mistakes, which I should like to correct. He says: "Our place of meeting is a room at the top of five or six flights of stairs, the staircase being badly lighted." I have just been down to see, and find two flights of twenty-one stairs, and two of nine each, and three large windows, averaging 6 feet by 3 feet 5 inches on each landing, and a skylight at the bottom. The stairs on our meeting nights are lighted by paraffin lamps, and there being gas fittings, only needing connection, might easily be lighted by gas.

He then goes on with a tirade against the ladies and their latch-keys. But in my letter—to which he refers, and which he could not have read—I expressly stated that "I have offered to withdraw this claim for latch-keys, and admit them only to lantern exhibitions, lectures, demonstrations, and excursions, but they say "Not at any price."

He then charges me with "bad taste." Why? Is it because I wish to improve the tone and *personnel* of the Society by admitting ladies of culture and position, who have sufficient means to indulge in the expensive amusement of photography? Is it because I wish to help them over their technical difficulties, or is it because I wrote anonymously to ask your help in advising the Society, as the editor of a journal devoted to the interests of a very interesting art and science?

I have the courage of my opinion to write at once, state my name and address at the foot of this letter, and hope "Nemo" and his friends will do the same. To abuse me is useless, and is no argument against the admission of ladies to artistic and scientific societies. If the room is unfitted, it is our duty to make it fit for them.

But "Nemo" takes the high horse and says he holds he is not morally bound to give any reason for declining to admit ladies, and he won't—and he does not. More than that, he dare not; and he claimed the secrecy of the ballot. Why? Because he was afraid these very ladies would trounce him, or that public opinion would hoot at him.

What was carried has now been vetoed, and the ladies are ousted by sixteen to seven. I am sorry that a society of which I have been president for the last four years should have done anything so unwise, but it is so, and I must resign my connection with it.

"Nemo," with delightfully inconsistent logic, points out the inaccessibility of the room to ladies, and yet says, "All through the winter lantern entertainments are given, to which ladies are specially invited." I may say they have attended in considerable numbers. Instead of this being a proof of the gallant and liberal feeling by which he is animated, I should say it rather reminds one of the dog in the manger, who preferred to eat his bone by himself, and arises—as a former president writes to me—from a spirit of selfishness. HENRY BLANDY, L.D.S., Edin. Univ.

1, *Postern Street, Nottingham.*

REACTIONS OF BENZOQUINONE WITH OTHER SUBSTANCES.

SIR,—It pleases me to see in your paper last week the record of experiments by Mr. Sworn on the reaction of benzoqninone with potassium cyanide. Though staying here but a little time, I now send you a short account of experiments of which you shall have full particulars when I get back to my laboratory in Vienna. When para-naphtha-quinone reacts at about a temperature of 100° Centigrade with sulpho-cyanide potassium, a quite similar

reaction takes place. When boric acid and tungsten fluoride are present, a curious new body which darkens in the light is formed; it is the body last cited in the following reaction:—

$C_{10}H_4(HO)_2 + 2(KCNS) + WF_6 + 3(H_3BO_3) =$
Naptha-quinone. Tungsten fluoride. Orthoboric acid.

$C_{10}H_7(KCN)_2 + 4(H_2O) + F_6B_2 + S_2BO_7W$
Naphthaline derivative. Water. Boron fluoride. New body that darkens in light.

Queen's Hotel, Sydenham, Sept. 24. (DR.) J. L. FLEISMAN.

ROYAL CORNWALL POLYTECHNIC EXHIBITION.

SIR,—Referring to the Judges' Report of the above published in your paper, please allow me to state that my picture, "A Favourite Spring," is not, as described by the judges, *a photograph of a print*, but one *taken from nature*. A. G. TAGLIAFERRO.

Proceedings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on the 19th inst., Mr. H. M. SMITH in the chair.

The CHAIRMAN, wishing to change the colour of a bromide print after it had been fixed, poured an iron developer over it. It had the effect of reducing the image.

Mr. W. E. DEBENHAM said that probably an old developer was used that had become oxidised. An old oxalate bath would have a reducing effect; at the same time, he would expect to find the paper much discoloured.

A question from the box was read:—"What is the best medium for mounting silver prints in albums to prevent cockling?"

The CHAIRMAN had recently filled several books with prints; he had allowed them to be under pressure for some time afterwards with blotting-paper placed between the leaves. They showed no sign of cockling.

Mr. W. E. DEBENHAM said that notwithstanding the length of time the prints remained under pressure, if the books were left open, and absorbed any dampness of atmosphere, he should expect to find them cockle. He used gum-arabic, which was applied to the back of the print, and allowed to dry; the mount was damped, and the print and mount then passed through a roller.

Mr. J. J. BRIGINSHAW said that Mr. Cowan, at one of the meetings, recommended starch used in a similar way.

Mr. F. A. BRIDGE suggested springing the mount, and fixing it in the form of a bow, keeping it in this position until after it was dry. Of course, this method could not be used with albums,

The CHAIRMAN said that he had found prints liable to peel off when mounted on to the India-tinted boards.

Mr. F. A. BRIDGE suggested a damp sponge being passed over the mount previous to mounting.

A Member asked for a reliable formula for an emulsion for printing-out opals.

Mr. A. HADDON suggested turning to some of the back numbers of the journals. This subject had been discussed at several meetings of the Society, and formulæ given, duly reported in the journals.

"What is the best preservative for sensitised albumenised paper?" was asked.

The CHAIRMAN said tartaric or citric acid was usually recommended. In practice he found this materially increased the toning difficulties.

Mr. P. EVERITT had floated paper on a bath of citric acid—nine ounces to the gallon—and kept it six weeks; it toned all right.

Mr. W. E. DEBENHAM said he should recommend his old formula, perchloric acid in the sensitizing bath.

To a question whether soaking blotting-paper in a saturated solution of carbonate of soda would destroy any hypo that might be in the paper, Mr. A. HANNON replied in the negative.

PHOTOGRAPHIC CLUB.—At the meeting on October 2, the subject for discussion will be "Backgrounds and Appliances for Home Portraiture."

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper and Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

H. L., Highgate.—Answered by post. We shall be glad to know your success by the method indicated.

REV. H. G.—From the whitish deposit formed on your gelatino negatives by treatment with alum we should infer that by the action of the carbonates used along with the developer some of the alumina had become precipitated from the alum. If citric acid had been used with the latter, this could not have occurred, and even now we should recommend your treating the negatives once more with a dilute alum solution to which citric acid has been added. Next time try chrome alum instead, with a little tartaric or citric acid; but good plates should not requireany treatment of this kind, for the gelatine ought to be proof against frilling from the first.

T. F.—For lantern transparencies you would require *round* pictures, and therefore there would be no disadvantage, on this score, in your using the Kodak camera as proposed. The little negatives ought to bear enlargement to this size, and there is no difficulty about the focus, nor need to use a finder. The roll provides for a hundred exposures.

H. A.—The text-book which answers in all particulars to your description, and contains a special chapter on photo-lithography and zincography, is Capt. Abney's "Instruction in Photography," eighth edition, to be had of our Publishers.

J. A. C.—Answered by post, and reply received. We shall be glad to see the new actinometer.

E. H. M., Plymouth.—There is no help for it; you will have to look up *Anthony's Bulletin* for the completion of the articles appearing two years ago. The extended notices of the Photographic Exhibition of that time may have squeezed out the concluding chapter. This is the only explanation we can give, and it is altogether an editorial question referring to a long past period.

T. L.—Even if it be true that some mildew had formed in your eikonogen sulphite developer after the lapse of six weeks, it points only to the necessity of more frequently mixing the stock solution, or of filtering it shortly before use to separate any floating impurities. It always turns yellow by keeping (see Prof. Liveing's remarks last week, page 610). Your idea of permanence may perhaps be too critically severe.

L. A. M.—It is sufficient in ordinary cases to save the first washings from silver prints, and to recover the silver from them alone in the form of residues; but a very simple test with salt would soon show whether there is any more worth saving. Much depends upon the scale of your operations.

X. Y. Z.—Our impression is that the Stannotype patent is no longer in force, but we will enquire further, and let you know in the course of the week.

NORFOLK BROADS.—Apply either to Mr. Payne Jennings, of Ashstead, Surrey, or to Mr. H. W. Bevan, of Lowestoft, for photographs of the Norfolk Broads.

E. C.—The old barometer at Hampton Court Palace has a diagonal scale with open reading. It is not dated, but the maker's name was Daniel Quare, London.

M. S., Durham.—Colour-blindness in females is exceedingly rare; we have never met with a case. Many thanks for your kind letter.

R. T. J.—It seems very doubtful whether the nature of the chloride salt employed in preparing albumenized paper has any influence on the ultimate tone of the print. Barium chloride was at one time in favour; deliquescent chlorides are manifestly unsuitable, but sal. ammoniac, on account of its low atomic weight, ought to be the most appropriate salt.

V. J., Glasgow, would be glad to learn the present address of Mr. Darker, manufacturer of the "Excelsior Limes." Can any Manchester or other correspondent kindly furnish it?

CYONET.—The necessary qualifications for employment as a photographer in the Government service would not be the same at Chatham, Shoeburyness, Woolwich, Southampton, and Greenwich, because of the different nature of the work performed in these several establishments. In most cases the posts are filled by military men, who receive tuition as part of their official training. Mr. Griggs has done good work of a special character for the India Office, and Mr. Stephen Thompson for the British Museum. Your aim should be to qualify generally, and then offer your services whenever a vacancy may arise; but, for the reason mentioned, a civilian photographer stands but a poor chance.

ST. LOUIS.—We cannot lay claim to being editor of the NEWS, as recently hinted by an American contemporary, who mentions our name with a military title.

THE PHOTOGRAPHIC NEWS.

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PATENT OFFICE LIBRARY

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A STANDARD LIGHT FOR PHOTOGRAPHY.

ONE of the advantages of the amyl acetate lamp to furnish a standard light for sensitometric and other photographic purposes, as recommended by the recent International Congress of Photographers at Paris, is that the colour of the light is eminently suited for the purpose, and is, in that respect, much better than any hitherto so employed. The worst light for the purpose would probably be that which has filtered through ruby glass; about the next worst illumination which could be used is that given by burning magnesium, and by the incandescent carbon poles of the electric arc lamp, since these lights are so abnormally rich in violet and ultra-violet waves. The photographer hardly requires to test his plates in relation to their sensitiveness if intended to be used to photograph the sun or the sky. The International Congress recognised this by suggesting a method for appreciating the intensity of the rays of different colours projected by buildings, trees, and other terrestrial objects, and stated in express terms that the landscape or portrait photographer did not generally want to know the sensitiveness of his plates to direct light from the sky. Yellow light has a more intense action upon the human eye, judged by its recognition by the senses, than any other, and exercises a great average influence when we survey objects around us; other rays are then usually present in abundance, with the exception of the excess of violet and of ultra-violet, which characterises the magnesium light. These highly refrangible rays are the cause of that coldness of which the public complain with the normal electric and magnesium lights, which rays electricians therefore often adopt various devices to largely quench when interiors have to be illuminated.

Much of the ultra-violet light of the sun never reaches the surface of the earth at all; it is cut off by the floating seeds, dirt, and other particles in the atmosphere. On the summits of high mountains, where the observer is above much of this floating dirt, the sky begins to look black; indeed, the comparatively black sky of high altitudes has been photographed by Captain Abney, with snow-clad peaks standing before it in relief. In those pure regions the stars shine with a brilliancy outside the experience of most dwellers in the low lands; we have known them when there was no moon visible, and when their light on one side only of the sky was cut off by clouds, to cast a fairly strong shadow, and to give sufficient illumination to enable the wayfarer easily to keep on his true course. The "Milky Way," which in the low lands may usually be mistaken for an ordinary cloud, is there palpably self-luminous, and resembles a shining mist, a delicate cloud of star-dust. Perhaps the intense blue of some of the Alpine wild flowers depends upon the pure daylight in which they are viewed, and it may be in part due to their physical nature being influenced by the light under which they grow.

Sunlight not alone loses some of its highly refrangible rays in passing through the atmosphere, but when it falls on ordinary objects has more of them absorbed to an enormous extent. Even surfaces which are white to the eye have much power in this direction. Glass is as opaque to the more highly refrangible rays as coal is to all waves which excite vision. When a solar spectrum is projected by means of quartz lenses and prisms, the rays extend beyond the ordinarily visible violet to a distance nearly equal in length to twice that of the luminous portion of the spectrum, and the invisible spectrum of the electric arc light was traced by Stokes nearly six times as far. Helmholtz found that by adopting special means the spectrum can be seen by the eye to extend far beyond its normal termination, as viewed under ordinary circumstances.

The amyl-acetate flame is slightly more yellow than the flame of ordinary coal gas, and it probably emits quite a sufficient proportion of blue and violet waves for practical photographic purposes; at all events, its colour is better for sensitometer experiments than any other light hitherto generally used for the purpose. The magnesium light, apart from its incessant variations due to moving clouds of smoke, and to irregularities in combustion, is one of the very worst which could be used for sensitometer work.

THE EMPEROR OF RUSSIA AND MR. WARNERKE.

THE great impetus which Mr. Leon Warnerke has given within the past few years to photography and photographic exhibitions in St. Petersburg and Moscow is still fresh in the memory of our readers. The Emperor of Russia, who is personally interested in photography, and visited the St. Petersburg Exhibition, has publicly recognised Mr. Warnerke's exertions, for Mr. Warnerke has just received from the Finance Minister of Russia, I. Wychnegradsky, a letter dated September 12th, 1889, saying:—"His Majesty the Emperor . . . . for your useful activity and special researches and improvements in the art of photography in Russia . . . . grants you the order of St. Stanislas, Second Class." This, in Russia, is a high order for a civilian. For a long course of years Mr. Warnerke has been noted in England for original research in photography.

IF some newspaper correspondent is not gulling the people by writing from New York to the *Boston Herald*, says the *Chicago Journal of Commerce*, a chemist, electrical expert and inventor, living in Gotham, has originated a method of taking pictures of passing events by instantaneous photography, and then transmitting them by telegraph, to be reproduced in the columns of a distant journal within six or eight hours after the event occurs. The machine runs by clockwork and electricity. The newspaper reporter thus becomes his own photographer, telegrapher, and artist.

A PERMANENT CONTENTION.

THE following letter on the standing grievance of certain professional photographers in relation to the influence of amateurs comes from a correspondent who has enclosed his name and address :—

To the Editor of the PHOTOGRAPHIC NEWS.

SIR,—Is it not high time that the profession did something to protect themselves from the serious inroads caused by persons calling themselves amateurs?

Some time ago I was asked to state a price for photographing a group of bicyclists and supplying twelve copies. I quoted two shillings per copy, which, in all conscience, is cheap enough. Imagine my surprise and disgust when my intending customer informed me that one of their party, a butcher, offered to do them for eighteen pence. Waiving the question of work for a moment, I can truthfully assert that this sort of thing occurs every day to other photographers as well as myself.

Take another case. How is it the dealers are so unwilling to supply the profession at a rate they could do retail, and yet, for the sake of selling a few extra plates, will do so at a less cost to amateurs than they will to the profession? These are facts I have proved by experience, and many photographers will uphold what I say.

If we must have amateurs, why did not the dealers supply the trade with apparatus and other goods, instead of running off to the chemist? Surely our trade is injured sufficiently by stationers, booksellers, and fancy dealers. Most photographers, at one time, kept a stock of albums; now it is a rarity to see them in any photographer's window. The excuse of the amateur is that he does it for recreation and pastime. Well, if it is a recreation and pleasure to take away another man's living, I must admit they have succeeded remarkably well.

Now, sir, it seems to me that the dealers have no excuse. I ask you, "Who placed them in the position they occupy?" I well recollect in the days of collodion, that the profession bought all their material from the dealers, and now the dealers, by way of recompense to the people who have helped them on, disdain to acknowledge those who kept them going, but, on the other hand, court the favour of the butcher, baker, and grocer, to say nothing of legions of half-clerks—dullards—who know as much about chemistry as a flat-iron, and class themselves as amateur photographers, save the mark!

I would make a last suggestion, that some dealer would offer to supply the *profession only*, and that all photographers who value their interest and living at all would deal with that firm, and that firm alone; this would soon make others follow, and then, perhaps, we might hope to make photography a little more like it once was.

In closing, I would say: Just imagine a firm of wholesale druggists, grocers, or plumbers, quoting their wholesale prices to the general public; and yet it is done every day in our profession. Knowing you to have the true interests of photography at heart, I ask you to kindly find space for the above.

PROFESSIONAL PHOTOGRAPHER.

The problem of amateur *versus* professional photographers has already been thoroughly discussed in photographic journals, so we are not inclined to give space for the reopening of the controversy, for it could do no practical good, and would stir up ill-feeling afresh. Our view of the subject was expressed on the 9th of August last, in an article entitled "Skilled Labour in Photography." In these days high education and skilled labour are the two chief things necessary to enable the worker to hold his own in the battle of life. If causes be traced to their roots, it will be found that the higher general education of some of the chief nations in Europe, being much above that of the general average of education in England is the chief real cause of foreigners being able to beat us in our own country in certain branches of industry.

That scientific research and intellectual activity in photography can be checked in deference to commercial considerations is an impossibility. If amateurs do injury to a proportion of photographers, it must be remembered that they created several photographic industries, which now employ thousands of workers. Where would most of the photo-mechanical processes now be, without the discovery by Mungo Ponton—supplemented by the researches of Becquerel—of the action of light on the bichromates?

Those photographers who are suffering from the changes now taking place, cannot do better than to make themselves skilled labourers, by perfecting themselves in some difficult branch of the subject—so difficult as to keep back the great majority of amateurs. Is there not a great future, for instance, for ceramic portraiture?

THE CONSTITUTION OF MATTER.*

BY WILLIAM ANDERSON, M. INST. C.E.

IN the case of gases, it is almost self-evident that they are composed of particles, so minute as to be invisible, in a condition of great individual freedom. The rapid penetration of odours to great distances, the ready absorption of vapour and of other gases, and the phenomena connected with diffusion, compression, and expansion seem to demonstrate this. One gas will rapidly penetrate another and blend evenly with it, even if the specific gravities be very different. The particles of gases are, as compared with their own diameters, separated widely from each other; there is plenty of room for additional particles; hence any gas which would, by virtue of its molecular motion, soon diffuse itself uniformly through a vacuum will also diffuse itself through one or more other gases, and once so diffused, it will never separate again. A notable example of this is the permanence of the constitution of the atmosphere, which is a mere mixture of gases. The oxygen and the nitrogen, as determined by the examination of samples collected all over the world, maintain sensibly the same relative proportions, and even the carbonic acid, though liable to slight local accumulations, preserves, on the whole, a constant ratio; and yet the densities of these gases differ very greatly.

Liquids, though to a much less degree than gases, are also composed of particles separated to a considerable relative distance from each other, and capable of unlimited motion where no opposing force, such as gravity, interferes; for under such circumstances their energy of motion is not sufficient to overcome the downward attraction of the earth; hence they are constrained to maintain a level surface.

The occlusion of gases without sensible comparative increase of volume shows that the component particles are widely separated. Water, for example, at the freezing-point occludes above one and three-quarter times its own volume of carbonic oxide, and about 480 times its volume of hydrochloric acid, with an increase of volume, in the latter case, of only one-third; and sulphuric acid absorbs as much as 600 times its bulk of methylic ether. The quantity of gas occluded increases directly as the pressure, which seems to indicate that the particles of the occluded gas are as free in their movements among the particles of the liquid as they would be in an otherwise empty containing vessel.

Liquids, therefore, are porous bodies whose constituent particles have great freedom of motion. It is no wonder, consequently, that two dissimilar liquids, placed in contact with each other, should interpenetrate one another completely, if time enough be allowed; and this time, as might be expected, is considerably greater than that required for the blending of gases, because of the vastly greater mobility of the particles of the latter. The diffusion of liquids takes place not only when they are in actual contact, but even when they are separated by partitions of a porous nature, such as plaster of Paris, unglazed earthenware, vegetable or animal membranes, and colloidal substances, all of which may be perfectly water-tight in the ordinary sense of the term, but yet powerless to prevent the particles of liquids making their way through simultaneously in both directions.

The rate of diffusion increases with the temperature; but an increase of temperature, we know, is synonymous with increased molecular motion of the body, and with

* Abstracted from the Presidential Address to Section G, British Association.

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increased activity of this kind we would naturally look for more rapid interchanges of the moving atoms. Such phenomena are only conceivable on the supposition that active molecular motion is going on in an apparently still and inert mass.

When we come to solid substances the same phenomena appear.

The volumes of solids do not differ greatly from the volumes of the liquids from which they are congealed, and the solid volumes are generally greater. The volume of ice, for example, is one-tenth greater than that of the water from which it separates. Solid cast-iron just floats on liquid iron, and most metals behave in the same way; consequently, if the liquids be porous the solids formed from them must be so also; hence, as might be expected, solids also occlude gases in a remarkable manner. Platinum will take up five and a half times its own volume of hydrogen, palladium nearly 700 times, copper 60 per cent., gold 29 per cent., silver 21 per cent. of hydrogen and 75 per cent. of oxygen, iron from eight to twelve and a half times its volume of a gaseous mixture chiefly composed of carbonic oxide.

Not only are gases occluded, but they are also transpired under favourable conditions of temperature and pressure, and even liquids can make their way through. Red-hot iron tubes will permit the passage of gases through their substances with great readiness, common coal-gas under high pressure transpires through the steel of the containing vessel, and it is well known that mercury will penetrate tin and other metals with great rapidity, completely altering their structure, their properties, and even their chemical compositions.

The evidence of the mobility of the atoms or molecules of solid bodies is overwhelming. Substances when reduced to powder, may, even at ordinary temperatures, be restored to the homogeneous solid condition by pressure only. Thus, Prof. W. Spring, some ten years ago, produced from the powdered nitrates of potassium and sodium, under a pressure of thirteen tons to the square inch, homogeneous transparent masses of slightly greater specific gravity than the original crystals, but not otherwise to be distinguished from them. More than that, from a mixture of copper filings and sulphur he produced, under a pressure of thirty-four tons per square inch, perfectly homogeneous cuprous sulphide, Cu_2S, the atoms of the two elements having been brought, by pressure, into so intimate a relation to each other that they were able to arrange themselves into molecules of definite proportion; and, still more remarkable, the carefully dried powders of potash, saltpetre, and acetate of soda were, by pressure, caused to exchange their metallic bases and form nitrate of soda and acetate of potash.

Energy in the form of light operates changes in the surface of bodies, causing colours to fade, and giving to photography the marvellous power which it possesses. Light decomposes the carbonic acid of the atmosphere in the chlorophyll of green leaves, and determines chemical combinations, such as chlorine with hydrogen to form hydrochloric acid, or carbonic oxide with chlorine to form chlorocarbonic acid. It is inconceivable that these effects could be produced unless the undulations of light were competent to modify the molecular motions already existing in the solid liquid and gaseous bodies affected.

Practical Index of Photographic Exposure.—In a fourth edition of this handy little book on exposures, Mr. A. R. Wormald quotes an article from the Year-Book of Photography for 1880, by L. Vidal, in justification of the use of exposure tables. We need only repeat the opinion the compiler also quotes from the Photographic News, to the effect that by those who are diffident of the accuracy of their judgment, as well as by those who have little experience, what aid science can give, either in the shape of well-ascertained data, or of tables to save the trouble and liability to error of individual calculation for every particular case, will be welcomed.

PHOTOGRAPHIC OPTICS.

BY W. K. BURTON.

Chapter IX.—View-Meters and Finders.

"View-meter" is a term used to describe a small instrument which may be used to discover what amount of landscape will be included on the plates with any given lens. Its object is to discover, without the trouble of setting up the camera, which of a set of lenses must be used to include the subject settled on for the picture. The remarks on "Angle of View," Chapter VI., may with advantage be read in this connection. The simplest of all view-meters is a piece of string with some knots on it. It is held at arms length in front of the operator, the distance between the hands being then determined by the position of two of the knots. There is then included between the hands the amount of landscape that the lens to which the knots apply will throw on the plate. Such a meter is very rough, but is wonderfully useful for those who carry a number of lenses; and it can very easily be made. A knot is made at one end of a piece of string. The longest focus lens is fixed on the camera. The amount of distant view included is observed. The knotted end of the string is taken in the left hand, and the string is drawn out at arms length till there is included between the hands just the same amount of view as was on the plate, and a knot is made where the string is held by the right hand. The same is then done for each lens. Each knot then represents the angle included by one of the lenses.

Most view-meters are constructed on the principle of looking at the landscape through a rectangular opening of length and breadth proportional to those of the plate. There is what is called an "eye-piece," which is simply a small hole to look through, toward the rectangular aperture, the only object of the so-called eye-piece being to ensure that the eye is held at a certain fixed distance from the aperture. The distance between the eye-piece and the aperture is generally variable to represent different lenses.

The annexed diagram shows a form of finder sold commercially, and will serve to make the principle of the instrument clear. B here is the aperture, and the square hole above A is the eye-piece. The distance between A

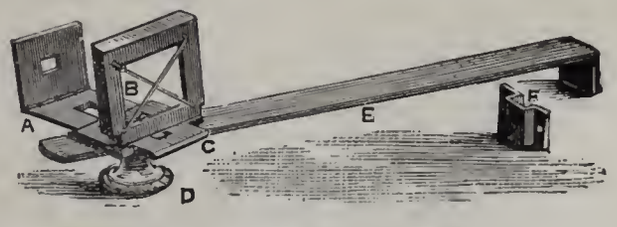


Fig. 45.

and B is adjustable by sliding the aperture-piece along the plate A C, and clamping it by the screw B. The parts E F are merely for fixing the instrument to the camera when it is to be used as a finder, as will be described hereafter.

We will take an example to show the manner of adjusting this or any other view meter. Let us suppose that the camera is for 12 by 10, and that the opening of the view meter is 3 by 2 inches. This is not the precise shape of the 12 by 10 plate, but it is very nearly the shape to which we will probably trim the prints, and it is enough to remember that on the plate there will always be a little more subject both at top and bottom than can be seen through the meter.

We will suppose that the lenses in common use are of focal lengths, 20 inches, 16 inches, 14 inches, 12 inches, 10 inches, 8 inches, and 7 inches. We have now only to do a proportion sum as follows for each lens.

12 : 3 : : 20 : x the distance that we must have between the eye-piece and the aperture, so that there may be seen

through the meter the same amount of view as the lens includes.

The distances will be, for the lenses mentioned, 5 inches, 4 inches, 3½ inches, 3 inches, 2½ inches, 2 inches, and 1¾ inches. These distances, however, to be quite correct, must be between the optical centre of the lens of the eye and the plane of the aperture, and as it is not practicable to measure this, or to know exactly how far the optical centre of the eye-lens will be behind the eye-piece, the best thing to do in practice is to adjust the meter once for all by experiment for each lens as described for the crude string arraugement, and to mark the position of the aperture for each one.

It will be evident that the view-meter would be quite efficient with the distance between the "eye-piece" and the aperture fixed, if the latter size could be varied, and some view-meters are made on this principle. The fixed aperture shows the amount of view included by the widest angle lens, and there is a slit into which may be fixed smaller apertures cut in pasteboard or thin metal, just as in the case of a lens with Waterhouse diaphragms.

Finders.—The object of a finder is to be able to see what amount of subject is included by the lens whilst the dark slide is in the camera, and it is therefore impossible to look at the ground glass. They are particularly useful in the case of instantaneous work, particularly the taking of yachts, &c., as it is by means of them possible to follow the motion of the object, and ensure that it occupies the proper place on the plate.

It will be evident that the meter just described might be used as a finder simply by fixiug it to the camera with the plane of the aperture parallel with the plane of the plate, and so that no part of the camera obstructs the view of the subject through the "eye-piece" and the aperture ; and, indeed, it often is so used.

I have used with success a very ingenious finder made by Mr. J. Adams. In principle it is somewhat the same as the above would be were the principle of fixed distance between eye-piece and aperture just explained adopted, and were a set of variable apertures used. Besides this, however, it has one or two poiuts of novelty which make it specially worthy of notice. In the first place a mirror is used reflecting the light at right augles, so that the operator takes up a position at the side of the camera, where he may conveniently manipulate both the dark slide and the shutter. Besides this, there is a vertical and horizontal movement of the eye-piecc contrived exactly iu the same way as the same movements on the front of a camera. The use of these is to adjust the eye-piece, after the instrument has been fixed on the camera, so that precisely the same view may be included as that ou the ground glass, even if rising or side sliding front be used.

The cut is a sectional plan of the instrument showing it about half size. It is made of vulcanite, is

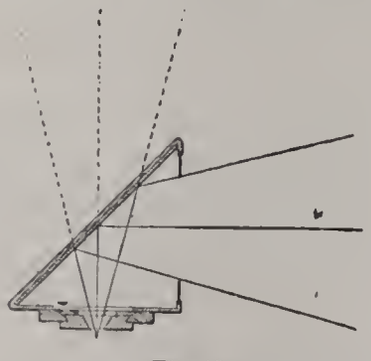


Fig. 46.

very small, and proved in our hands thoroughly practicable. It is not, so far as I know, made commercially.

A totally different form of finder is that which includes a small lens and a ground glass. It is, in fact, a miniature camera, and it will be evident that if such be used having the ratio of focal length to length of plate, the same as iu the large camera, and if it be properly fixed on the large camera, there will always be on its ground glass the same amount of subject that the large lens includes. This is the form of finder generally used with detective cameras. In this latter case the lens of the finder is sometimes made of the same focal length as that of the main camera. In this case it is possible to focus by the aid of the finder—if both lenses are moved by the same rack—as well as to "find" the subject ; but where, as is commouly the case, the lens of the finder is of much shorter focal length than that of the camera, there is no means of focussing after the dark slide is in the camera, and there is, therefore, no means of ensuring sharpnes; in the image by focussing after the dark slide has been inserted, unless we are using a very small stop, or the object is so distant that we may depend on its image being sharp when we focus for "the distance."

I know of two finders applicable to cameras which act as focussers. One is due to Mr. J. Traill Taylor. He purchases a cheap telescope whose objective is of the same focal length as that of the camera. The objective tube of the telescope is now fixed to the front of the camera, care being taken to keep the axis of the telescope and that of the photographic lens parallel. An object is focussed on the ground glass, and the eye-piece of the telescope is drawu out till the same object appears quite sharp through it. The eye-piece is now fixed to the back of the camera so that the telescope slides iu and out as the camera is racked in and out. The image in the camera will now always be sharp when the same object is in focus as seen through the telescope, and it is therefore possible to focus the former by looking through the latter.

The only objection that there is to this arrangement is that it does not act very well as a finder. It may be used to keep the camera directed to the object, but it does not show how much subject is included, or how large the image is on the ground glass, a very important matter when, for example, an instantaneous picture is being made of a yacht comiug towards the camera. A device by Lioucl Clark overcomes this objection. He uses a cheap lens of the same focal length as the camera leus—a spectacle lens which costs a few pence will do, he says—and adjusts that over the front of the camera. The ground glass of the camera is arranged so that, if hinged upwards, it will be held in a vertical plane, or, more strictly speaking, in a plane parallel with its normal position.

The iliustration will show the arrangement.

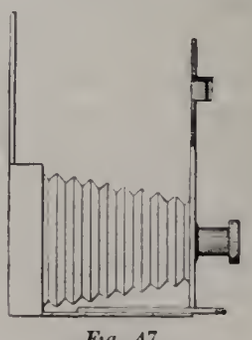


Fig. 47.

The focussing cloth thrown over the upturned ground glass and the spectacle lens form a second camera. It is only necessary to focus some object sharply, with the ground glass in its normal positiou, to turn up the ground glass, and to adjust the leus A so that it gives a sharp image on the upturned ground glass, to fix the position of the lens A with relation to the camera front. The upturned ground glass will then at any time show the same amount of subject as is included by the priucipal lens B, and if the camera be racked out till the image on the upturned ground glass is sharp, that on the sensitive plate will be sharp also.

PHOTOGRAPHS OF THE RED END OF THE SPECTRUM.*

BY COL. J. WATERHOUSE.

In November 1875, I exhibited to the Society some photographs of the red end of the spectrum about A and a short distance below it, obtained on dry collodio-bromide of silver plates stained with anilin blue, and given a momentary exposure to white light before being acted on by the spectrum. In these photographs, however, it was noticeable that under the influence of the red as well as of the blue rays the image of the spectrum was strongly reversed, *i.e.*, instead of being a photographic negative, it was a positive, showing the lines as dark lines on a clear ground. The photographs now before you are on gelatine dry plates stained also with a blue dye, but they show no traces of this reversal in any part of the spectrum, and not only extend much farther into the infra-red region, but show infinitely better definition and greater dispersion in this part of the spectrum owing to the employment of gratings in place of prisms.

The dye I have used for staining these plates is alizarin blue ($C_{17}H_9NO_4$), the quinoline of alizarin. It is prepared from nitro-alizarin by heating it with glycerine and sulphuric acid, and is found in commerce as a paste insoluble in water, and only slightly so in alcohol. It dissolves in liquor ammonia with a greenish-blue colour. By mixing the paste with a concentrated solution of sodium bisulphite the dye dissolves, and when dry forms a dark purple powder, known as alizarin blue S or anthracene blue. In this form it is readily soluble in water, the solution in distilled water being at first of a brownish orange colour, turning blue on exposure to air. By keeping a few days the colour forms a flocculent precipitate, and is then only partially soluble in dilute ammonia.

Examined with the spectroscope, solutions of the dye do not give a very marked absorption spectrum.

The plain orange solution of alizarin S in distilled water absorbs the violet, blue, and green up to about *b*.

The greenish-blue ammoniacal solution absorbs the red, orange, and yellow, very strongly down to about D ½ E, with a general lowering all over the spectrum. There are no distinct absorption bands. I do not find any marked difference in the absorption spectra of the ammoniacal watery solution of three samples of the dye in my possession.

I. Alizarin blue paste, from the Elberfeld Factory, formerly F. Baeyer and Co.

II. Alizarin blue S, from the Badische Anilin and Soda Fabrik.

III. Anthracene blue, from Dr. Schuchardt, of Gorlitz.

In his work "*Practische Spectral Analyse Irdischer Stoffe*," Dr. H. W. Vogel gives two very different absorption spectra for the ammoniacal watery solutions of pure alizarin blue and of anthracene blue, also obtained from Schuchardt; the first agrees with my observations—but the second, which shows maximum absorption between D and E, does not.

The photographs now exhibited have for the most part been taken with No. II, but others have been taken with Nos. I and III. The effect of all of them seems very similar, but further trials are required to ascertain which is best.

The plates I have used have been the ordinary commercial gelatine dry plates. Wratten's "Instantaneous" have perhaps given me the best results, but the "Ordinary" have also proved wonderfully sensitive under the action of the dye. The plates are stained by bathing them for one or two minutes in a solution of the dye in distilled water in the proportion of one part of the dye to 10,000 parts of distilled water, with 1 per cent. of strong solution of ammonia added. The solution has at first a strong greenish tint, but this soon changes to blue, and I have noticed that after a time it again takes a greener tint.

With a small spectrograph on Dr. Vogel's principle, consisting of a Browning pocket spectroscope attached to a camera in front of a single element of a small Steinheil aplanatic lens—the addition of this lens is, I find, a great improvement to the instrument as originally proposed by Dr. Vogel—the spectrum obtained on the stained plates shows very intense action through the violet and blue regions as far as *b*; from E to C there appears to be a minimum of action, and then it rises again with clearly marked bands of increased sensitiveness between C and A, strongest between C and B, and *a* to A. Below A the sensitiveness quickly diminishes.

I have found the sensitiveness to red differ considerably on plates prepared at different times, and have not yet discovered to what this is due. With a screen of deep ruby glass in front of the slit, the sensitiveness to red becomes very marked, and the maximum sensitiveness is found between D and A, the remainder of the spectrum being either cut off at D, or showing only slight traces of action from F to H, according to the length of exposure.

On a plate taken about 8.30 a.m. on the 19th March, with the plane Rowland grating in the first order spectrum, using a deep ruby glass screen, exposing ten minutes, the slit being ·02 millim., the sensitive action in the red commences just below D, and seems gradually to increase to A; then diminishing to about λ 8,000, beyond which lines are distinctly visible, beyond the Z group, up to about λ 8,400. Considering that these photographs have been taken without any special appliances for securing the transmission of the infra red rays, it is probable that with them a much greater extent of the infra red spectrum might be photographed on plates stained with this dye.

With the concave grating also, using a deep ruby glass screen, I have been able to obtain lines in the infra red region to about λ 8,300 with much greater dispersion and distinctness than the plane grating will give. The photograph I have with me shows the spectrum from C to A and below. It is taken on a Wratten's "Ordinary" plate, a slow kind which, unstained, would show no action beyond E. It is unfortunate that the sensitiveness of the plates falls off so much just below A, so that the infra red spectrum has not sufficient density to print well, although up to A the image shows too much density for the lines to print clearly. The various photographs, however, serve to show the value of the dye as a ready and simple means of photographing the spectrum from C to A, with ordinary dry plates.

Using plates stained with a special preparation of quinoline blue—cyanin—and sulphate of quinine, Mr. J. C. Burbank has been able to photograph the infra red rays from A to λ 9,900, or to about the limit of Capt. Abney's latest map, which was prepared from photographs made on collodion plates containing a greenish form of bromide of silver, specially sensitive to the infra red rays. I have tried cyanin prepared in this manner, and found that, though it is undoubtedly sensitive to the infra red rays, its maximum sensitiveness is between D and B, and between B and A its action is much weaker than that of alizarin blue.

The cyanin and quinine solution, however, is troublesome to prepare, and neither it nor the plates keep well; moreover the dye is expensive, so that some more simple and more certain stain is desirable, and if alizarin blue, which chemically is allied to cyanin, can take its place for such observations, it will be an advantage. I may mention that it has already been tried by Schiendl and Eder, but they do not appear to have recognized its great sensitiveness for the red rays, which is not so apparent with prism spectroscopes as with gratings, and requires the use of yellow or red screens to produce its full effect.

Dr. Eder has recommended cœrulein as a sensitiser for the red rays, but though it certainly is useful, the maximum

* Col. Waterhouse, who is President of the Asiatic Society of Bengal, sends us this copy of a memoir which he read before that organisation. At the meeting he exhibited some photographs of the red end of the spectrum from C to Z, taken with Rowland's plane and concave diffraction gratings.—Ed.

of effect is produced between D and B, while with alizarin blue it is between C and A. I have also found it uncertain in its action, but hope to make further trials of it with the gratings, as well as of a dye called gallocyanin, obtained by the action of nitroso-dimethyl-aniline on tannic acid, which also I have found is a strong sensitiser for the red rays.

I have also lately been trying a new fluorescent phthalein dye, recently introduced by the Badische Anilin and Soda Fabrik, called Rhodamine—the phthalein of meta-amido phenol—which I thought might be likely to be useful in orthochromatic photography for copying coloured drawings, &c. It undoubtedly has capabilities in this direction, but, so far as I have tried it, seems inferior to erythrosin in sensitiveness for yellow. It is prepared by fusing phthalic anhydride with diethyl-meta-amido-phenol, and forms a reddish-violet powder, very easily soluble in water, the solution being of a bright crimson, with a strong orange fluorescence. It is not very soluble in alcohol. Acetic acid dissolves it, and the solution shows a very vivid scarlet fluorescence. Ammonia produces no visible change. Dilute mineral acids slightly redden, but do not, as with the eosins, destroy the fluorescence of its watery solutions; on the contrary they rather heighten it. Nitrate of silver precipitates it from the watery solution, but not readily; the brick-red precipitate is very soluble in pure water.

Examined in the spectroscope, a strong watery solution absorbs the spectrum strongly in the blue, green, and yellow, from *a* ½ D to F ½ G, though the only distinct absorption band with a weak solution is about midway between D and E.

Gelatine dry plates stained with a solution of rhodamine in distilled water at 1:10,000 with 1 per cent. of solution of ammonia, show two very marked regions of increased action—one between G and F, the other from E to D, strongest from D to D ½ E. The photographs taken with the small spectrograph show a curious but well marked series of bands of increased sensitiveness in the parts of the spectrum where the action of the dye is most marked. The action of the yellow rays about D is quite as strong as, if not stronger, than on plates stained with the best of the eosin dyes, but for copying coloured pictures I have not found rhodamine with ammonia equal to erythrosin either with or without a yellow screen; further trial is, however, requisite.

The addition of a small quantity of nitrate of silver to the ammoniacal solution of rhodamine greatly increases the general sensitiveness of the plates, but does not seem to heighten the yellow sensitiveness, either with the spectrum or with coloured pictures, so much as it does with erythrosin.

It is, however, noticeable that plates stained with a solution of the dye containing acetic acid in place of ammonia appear almost as sensitive in the yellow as those prepared with ammonia, and give about equally good results for copying work. If on further experience this is proved and found to work with certainty, it will be of importance, because the use of eosin dyes in conjunction with ammonia for staining gelatine dry plates for orthochromatic photography has been protected by various patents. It is possible that further experiments with acid-stained plates, in conjunction with the use of specially suitable yellow screens, might result in a method of using this dye for orthochromatic photography which would be efficient and open to general use.

In photographing the spectrum with the concave gratings, I have found the rhodamine-stained plates useful for the region immediately about D. On a plate I have with me, showing the D lines in the second order, seven lines can be clearly seen between D_1 and D_2, though eleven are sometimes visible to the eye.

Another new dye from the same manufactory called *Nile Blue*, which also belongs to the rhodamine series, shows considerable sensitiveness to the region between D and B, by the addition of ammonia; though not so much so as alizarin blue. Without ammonia, the general sensitiveness of the plate is much reduced, as Dr. Eder has remarked is the case with most blue dyes, and the image of the spectrum does not extend beyond *b*.

It is noticeable that the spectrum taken in the small spectrograph on plates stained with the ammoniacal solution of this dye shows numerous narrow bands of extra sensitiveness similar to those in the spectrum of rhodamine, showing that both dyes belong to the same group. These bands in the photographed spectra of the two dyes would be an interesting subject for further enquiry.

I have to acknowledge the kindness with which the managers of the Badische Anilin and Soda Fabrik have supplied me with samples of the dyes referred to.

ARAGO ON THE DISCOVERY OF PHOTOGRAPHY.*

Some children casually attached two glass lenses of different focus to the opposite extremities of a tube. They thus produced an instrument which enlarged distant objects, and represented them as if near at hand. Observers of more skill applied it with the sole, the modest hope, of seeing the stars a little better—stars known from the remotest antiquity, but which till then men had been able to study very imperfectly. Scarcely, however, is this chance gift turned toward the firmament than myriads of new worlds are discovered. Searching into the constitution of the six planets known to the ancients, these observers find it to be analogous to the earth's by mountains whose altitude they measure, by atmospheres whose vicissitudes they trace, by the phenomena of the melting and renewing of polar snows, similar to those of the terrestrial poles, by rotatory movements corresponding to those which here below regulate the alternations of day and night. Directed to Saturn, the tube of the children of the Middleburgh spectacle-maker disclosed there a phenomenon, the strangeness of which exceeded whatever the most enthusiastic imaginings had been able to realize.

We mean that ring—or, if the expression be better—that bridge without supports, 71,000 leagues in span, and 11,000 leagues in breadth, which environs on every side the globe of the planet, without approaching it in any part nearer than 9,000 leagues. Had anyone foreseen that, applied to the observation of Jupiter's four moons, this tube would enable us to detect the rays of light in their speed of 80,000 leagues per second, that attached to graduated instruments it would serve to demonstrate the existence of no stars whose light comes to us in less than three years, that, in short, following out with its assistance certain observations, certain analogies we should have attained, within immense probability, the conclusion that the ray by which, at any given instant, we descry certain nebulosities, has parted on its journey from these regions several millions of years before—in other terms, that these nebulosities from the successive propagation of light would be visible from the earth several millions of years after their entire annihilation?

The telescope for near subjects—the *microscope*—would furnish subjects of remarkable analogies, for nature is not less admirable in her minuteness than in her immensity. Applied at first to the observation of certain insects whose forms naturalists wished merely to enlarge in order more correctly to reproduce them by the graving tool, the microscope unveiled, subsequently and unexpectedly, in air, in water, in all liquids, those animalcules, those infusoria, those strange reproductions in which we may one day hope to grasp the first principles of a rational explanation of the phenomena of life. Recently directed to the minute fragments of different stones hitherto ranked among the hardest, the most compact of which the crust of our globe is composed, the microscope has disclosed to the eyes of astonished observers the fact that these stones have

* Continued from page 639.

lived—that they are a compost formed of millions of millions of microscopic animals kneaded together.

This digression, it will be recollected, was intended to undeceive those who would wrongfully shut up the scientific applications of M. Daguerre's processes within the circuit of what is actually known, the outline of which we have traced. But we hope differently—and do not facts already justify our anticipations? We might speak, for example, of certain ideas which we entertain of methods of rapid investigation which topography might borrow from photographical principles. I shall attain my object more directly, however, by introducing here a curious remark related to us yesterday by M. Daguerre. According to his observations, the hours of the morning and those of the evening equally distant from mid-day, and consequently corresponding to the same altitudes of the sun above the horizon, are not alike favourable to the production of photographic images. For example, at all seasons of the year, and under circumstances of atmospherical influence in appearance the same, images are formed with more rapidity at eleven in the morning than at five in the afternoon, at eight o'clock than at four, at nine than at three. Let us suppose this result verified, and the meteorologist obtains an additional principle, one element more than he possessed for the construction of his tables. Thus, to former observations on the state of the thermometer, barometer, hygrometer, and transparency of the atmosphere, there remains to be added an element not detected by the instrument previously in use; an account must be taken of a particular absorption, which cannot be without influence upon many other phenomena, on those even connected with physiology and medicine.

Gentlemen; we have thus endeavoured to collect into one view whatever the discovery of M. Daguerre presents that is most interesting under the four heads of Novelty, Utility to the Arts, Rapidity of Execution, and the valuable resources which it offers to science; we have earnestly laboured to make you participate in our convictions, because these are lively and sincere,—because we have examined all, studied all with the sacred faithfulness imposed upon us by your suffrages; because, had it been possible to misconceive the importance of the Daguerreotype, and the place it is destined to hold in the estimation of men, all our doubts would have ceased on perceiving the eagerness of foreign nations to lay hold of an erroneous date, of a doubtful fact, of the slightest pretext, in order to stir up questions of priority for the purpose of adding to their own crown of discovery the beautiful ornament which the photographic inventions will ever form. Let us not forget to proclaim that all discussion on this point is now at an end, and must cease, less from the claims to authentic priority produced by MM. Niepce and Daguerre, than by reason of the incredible perfection of the results at which M. Daguerre has arrived.

Were it necessary, we could easily produce here the evidence of the most eminent men in England and Germany, before whose praise all that we have said in favour of our countrymen would fade as into nothing. This discovery France has adopted; from the first moment she has cherished a pride in liberally bestowing it a gift to the whole world. Still we were far from being surprised at a sentiment almost generally entertained by the public, arising from a passage in the first exposition laid before this House, which, being misapprehended, seemed to imply that the Administration had trafficked with the inventor—that the pecuniary conditions of the contract now proposed for your sanction were the result of a chaffering. Gentlemen, it is of importance to place these facts in their proper light.

The members of this Chamber to whom the Ministry gave full powers never bargained with M. Daguerre. Their communications had solely for object to determine whether the recompense so justly due to the accomplished artist should be a pension or a sum paid at once. From the first, M. Daguerre perceived that the payment of a stipulated sum might give to the transaction the base character of a sale. The case was different with a pension. By a pension you recompense the warrior who has been wounded on the field, and the magistrate who has grown grey on the Bench; it is thus that you honour the families of Cuvier—of Jussieu—of Champollion. Reflections like these could not fail to present themselves to a man of his exalted character, and M. Daguerre decided on a pension. All other arrangements were left to the Minister for the Home Department. M. Daguerre himself fixed the amount at 8,000 *frs.*, to be divided equally between himself and his partner, M. Niepce, Junr. The proportion payable to M. Daguerre has since been raised to 6,000 *frs.* (making 10,000 in all), both on account of the condition specially imposed upon that artist of publishing the secret of painting and illuminating the Dioramic views, and making known all future improvements with which he may enrich his photographic methods. The importance of this latter engagement will certainly not appear doubtful to any person when we inform you, for instance, that a very slight advance beyond his present progress will enable M. Daguerre to apply his processes to executing portraits from life. Far from fearing that M. Daguerre will leave to other experimenters the care of adding to his actual success, we have rather sought how to moderate his ardour. Such, and we frankly confess it, was the motive which induced us to desire that you would declare the pension *unattachable* and *unalienable*. This amendment, however, we now perceive to be unnecessary, an existing law recognizing the principle.

Your commission have now only to recommend unanimously that you adopt simply, and without alteration, the bill proposed by the Government.

Detective Camera.—We have been favoured by Messrs. Swinden and Earp with a view of their camera, which secures the only medal given for apparatus at the Photographic Society's Exhibition. The principal object aimed at in the construction has been to combine as many advantages as possible, dispensing with double backs as ordinarily used, and avoiding the introduction of mechanism that is likely to get out of order. The camera is constructed to carry twenty dry-plates, and is fitted with a rapid rectilinear lens of 5½ inches focus equivalent, and a Kershaw shutter. Its dimensions are for quarter-plates 5⅝ inches wide by 6⅜ inches deep by 10⅜ inches outside. The working of the instrument may be described as automatic, the only movement required to change the exposed plate and bring the next into true register being to slightly raise and draw back a small bolt in the bottom of the camera. The plates are placed in a receiving chamber in a vertical position in the rear, to which access is had by a door. When the chamber is provided with its full complement of plates—or any less number—a wooden follower is placed against the last plate, and a couple of rods with springs which run in recesses in the sides of the camera are turned on to it. These have sufficient tension to feed the plates forward in succession as discharged. The bolt under the camera raises the exposed plate into an oblique groove above, and the pressure of the springs forces it to the same angle. On withdrawing the bolt, the plate slides over a ledge, the action of the springs at the same time turning it over face downwards in the same manner as the leaves of a book fall over when held open at right angles. In this manner the whole series of plates is discharged, each sensitive film being in exactly the same position at the time of exposure as the preceding plate. The camera is provided with an indicator which shows the number of plates remaining unexposed, and which, with the pinion piece for regulating the focus, is fixed under the camera so as not to be obstrusive. A shutter is provided midway in the instrument for shutting off the light from the lens, making the plate-chamber light-tight when so required. The front of the camera opens so that it can be used for time exposures on a stand in the ordinary manner, and provision is also made for exposing the plates in an upright position. It is provided with a finder and focussing indicator which works inside the latter, so that these two important points are under observation at the same time.

Notes.

Some improvements will be made in this journal in two or three weeks' time, and they will doubtless please its readers.

What between the natural ignorance of the majority of the public on photographic matters, and the blunders of those who should know better, some curious impressions get abroad. Here is a case in point. In a certain well-known London photographic print shop are some photographs of broken waves, printed in carbon of a sea-green tint, and labelled "Instantaneous carbon photographs" (*sic*). A lady looking at the pictures exclaimed to a friend, "Why! here is one of the new photographs in natural colours there's been so much talk about. Isn't the sea the exact colour? But, do you know, dear, that they can't reproduce every colour; the sky ought to be blue, but it strikes me as a little greenish." Oh, yes," said the other lady, "but then, you know, blue is always such a difficult colour to take." And they went away perfectly satisfied that in the "Instantaneous carbon photographs" they had seen the solution of the problem which has exercised the minds of so many ever since the discovery of photography.

The official text of the decisions of the International Photographic Convention, held at the Paris Exhibition, has not yet been published, but its purport is known. Many of the questions belonged purely to the scientific side of photography, but others were of interest to photographers generally. Thus, in regard to a standard of size in plates, which formed the sixth question, the Convention has accepted as a normal international plate one measuring 18 by 24 centimetres—or roughly speaking 7 inches by 9½—and for other plates a size obtained by doubling successively both these dimensions, or, for smaller sizes, dividing them by two. The Congress recommends that dark slides shall be constructed to receive plates of the exact dimensions stated. Desirable as it no doubt is that there should be one uniform standard in the size of plates, we doubt whether the recommendations of the Congress will have any practical effect. So far as the photographer is concerned, the present English and American measurements do not cause him any inconvenience.

It is when the tourist is on the Continent that he finds the discrepancy between English and foreign plates at all awkward. But such cases must be so rare that practically no account need be taken of them. Most English photographers take a sufficient supply of plates with them, or, if not, can procure English brands in the majority of large cities. The question, after all, is a manufacturers' one, and concerns not only the makers of apparatus, but the makers of plates. The manufacturers will certainly be slow to rush into alterations unless there is a very decided demand.

With the decision of the Convention on another question discussed all will agree. It thinks the Custom House authorities of different countries should make the necessary arrangements for opening in dark rooms only, packages containing sensitive preparations. It has adopted a special mark, a red sun on a black ground, with the inscription in two languages, to denote the containing of sensitive plates. This is a very definite proposition, and one which should be brought under the notice of the Customs authorities of the countries most concerned. Officialism, however, is slow to move, and we fear it will be a long time before this much-desired Custom House dark-room is an accomplished fact.

The third question discussed, to which we may draw attention, concerns photographic copyright. The Convention has expressed the opinion that photographs should be protected by the same laws as those which apply to artistic property. It has settled the points which it recommends should furnish the basis of legislation; namely, the distinction to be established between the proprietary right in a negative, and the right to use the negative. In the absence of any special agreement, the Convention thinks the negative should belong to the photographer, but not the right of reproduction from the negative. Most photographers will, we think, agree with the conclusions arrived at by the Convention.

The fashionable photographic craze just now among ladies is to be photographed in evening dress. As a society journal remarks: "This gives a chance of airing the latest novelty in jewelry, and the more brooches that can be crowded on a bodice the more it accords with the latest whim." No doubt there is a good deal of truth in this, but we fancy that the retoucher's pencil is a still more important factor. The bust displayed by a V-shaped dress is, when the light is soft, beautifully rendered by photography. Any little inequality in the texture of the skin, or any approach to the "salt cellar" stage as regards that awkward space between the neck and shoulders at a certain age, can be removed in the one case, or considerably softened in the other. The consequence of all this is that ladies who are proud of their figures have now a chance of asserting themselves. There are hosts of women who are prouder of their shoulders and bust than of their faces. Naturally, they put on a V-shaped ball dress and rush to the photographer.

Somebody has been hoaxing the daily papers. The virtues of "Nuktigonia" have been proclaimed far and wide during the past week, and for a little time unfortunate photographers, both professional and amateur, will be pestered by enquiries from curious unphotographic friends to tell them all about the new discovery. For it is claimed for "nuktigonia" that it will do away with the dark room. To use the words of the concocter of the original paragraph announcing the discovery, "by its use the active rays of light are neutralized when the exposed plate is placed in a developer of which it is a component part." How the exposed plate is to reach the "nuktigonia" developer the inventor does not say. Of course any photographer knows hosts of plans have been devised by which a dark room can be dispensed with, but in all these cases the ordinary developer satisfied every practical requirement.

NOTES ON THE PHOTOGRAPHIC EXHIBITION.

First Article.

One's first impression of the Pall Mall Exhibition is decidedly favourable. The hanging has been well and skilfully done, and the effect as a whole is agreeable. No doubt, to a great extent, the hanging committee have been assisted by the exhibitors themselves, the majority this year wisely abstaining from eccentricities in framing which, on former occasions, made the judicious grieve, and must have caused the hanging committee to feel inclined to tear their hair. A few exceptions of course there are. Some people are not happy unless they are "original;" accordingly one exhibitor has conceived the novel notion of treating photographs as though they were articles of jewellery. A hedge of gold surrounds a desert of plush, and on the desert are oases of raised mounts, three-quarters of an inch high, supporting the photographs. I don't know what the originator of this method of framing was aiming at, but it is very certain that, if every exhibitor were of the same mind, the Albert Hall would not be too large an arena for the display of the annual show.

But these oddities are few and far between, and so also are the Brobdignagian monstrosities which, year after year, used to glare stonily at one from elevated positions, and, *horribile dictu*, occasionally from the line. A life-sized head may be very wonderful from the optician's point of view, but it is questionable whether photography as an art is at all benefitted. Only one ambitious attempt at portraiture as regards size is at all obtrusive. This is a full-length portrait of a lady who, celebrated for producing the smallest musical sound with which man—and woman, too now-a-days—has been blessed, I suppose, looks down smilingly, by way of compensation, from the largest frame in the room. I do not object to Mrs. Shaw appearing in this guise, because the picture is certainly a thing of ingenuity, if not a joy for ever. Three enormous negatives go to make up the lady's figure, and the piecing together of the sections of paper, and the uniformity of the tone, are marvels of ingenuity and careful printing; but why, oh! why did Messrs. Elliott and Son countenance *La Belle Siffleuse* in a dress the pattern of which represents a shower of life-sized handcuffs? The skirt of the "Lady Whistler" is simply a nightmare.

Continuing the record of first impressions, the absence of what was once lumped together under the title of *genre* pictures is very noticeable. The ancient and ugly dame who used to figure everlastingly by a cottage fireside with a washing tub, a basket, and a broom carefully disposed around her, and jugs on a shelf high up in shadow in the upper part of the picture, has well nigh disappeared. The "arch" young lady, a shade more objectionable than her elder relative, who was presented to us under various titles smiling an impossible smile, is no longer to be seen; the babies of various dimensions and ages, and with faces more or less inane, are very much reduced in number. In a word, photographers have not only advanced in artistic perception, but more accurately guage the range and limits of their appliances. When a story is now attempted to be told, it is more by suggestion than by literal representation.

Take, for instance, Mr. Lyddel Sawyer's "Dangerous Company," No. 84, the earliest number in the catalogue, to which the word "medal" is attached. The picture is a delightful bit of woodland scenery. The young fellow half in his boat, half lounging on the bank, is evidently "making eyes" at the country lass, who, nothing loth, loiters on the way to flirt. The man, we can see by his profile, is young and good looking; the girl may be pretty—one is forced to believe she must be—but the face is too much buried in shadow for precise determination. In the old days we should have seen both faces with that crystallised look on the features which too often accompanies photographic portraits. There would not have been the least doubt of the intention of the photographer, and he would have been equally determined that you should see what he meant. You were to be saved all the trouble of investing the picture with your own imagination, and, as a natural consequence, you never thought of the picture, but of the photographer. There is scarcely an atom of the photographer about Mr. Sawyer's picture. The figures are part of it; the charm of the landscape is heightened by their presence. Whether the poetry of the picture is not weakened by the title is open to question. Speaking personally, I would rather that Mr. Sawyer had left it unnamed.

It is by no means certain that the delightful effect of distance, and the pleasant gradations which mark this clever work, are not greatly due to the toning process. "Dangerous Company" is printed on Mr. Valentine Blanchard's new platinum paper, and certainly, as in another example in the gallery to be noticed in its place, nothing could be finer or more satisfying to the eye. In mentioning platinum I may observe, what indeed is so obvious it must at once strike the visitor who knows nothing of the mysteries of the art, that silver printing is almost banished from the exhibition. Tints are as varied as of yore, but coldness has taken the place of warmth. Photographic printing is now in a kind of transition period, and the examples of platinum toning now on view are full of suggestive material for discussion. The subject is, however, too ample to be more than alluded to in the present article.

In going through the exhibition for the first time the awards naturally attract prior attention. The Society has gone back to the old system, and even those who object on principle to giving medals must admit that practically the effect is good. Not only the number of exhibits is larger, but the average of merit higher than last year, when the medals were withheld. One cannot of course expect a perfect unanimity of opinion in every case, but as a whole it is very difficult to find fault with the decisions of the judges. Taking the list of medals in the order in which they stand, the award next to that of Mr. Sawyer's already mentioned is represented by a couple of pictures, Nos. 99 and 101, in a series of studies by Mr. B. Gay Wilkinson, jun. The judges have, it is evident, a keen eye to what is now a hackneyed phrase, "artistic merit." Whether by accident or design—for in photography good luck counts for much—Mr. Wilkinson has been very happy in producing a couple of little pictures full of vitality. No. 99, representing a shrimper striding along at low water in the stealing dusk of evening, has wonderful go. No. 101, "Prawning," is less striking. As in Mr. Sawyer's work, the surroundings and figure are in perfect keeping.

"The Cathedral of Cologne"—No. 129—and the "Staircase in the Royal Castle at Brühe, Cologne"—No. 638—by Anselm Schmitz, are veritable *tours de force*, and a medal has been rightly awarded to the two conjointly. Both are literally triumphs of technical skill. They are of vast size, yet equality of tone and delicacy of details are admirably maintained from margin to margin. Mr. F. M. Sutcliffe has long since established a reputation for true artistic perception. This year the judges have singled out three pictures, Nos. 136, 137, and 138, as deserving a medal, and their judgment will be endorsed by others. "Saturday Afternoon"—a capital study of a fisherman and his wife—a "Fish Stall," and "Dinner Time," are the subjects to which the award has been especially assigned. Mr. Sutcliffe has the art, in common with Mr. Gale and others of the same school, of making one forget the small size of his pictures. One would not wish them to be other than they are. Of the three photographs, I like "Dinner Time" the least. It has not so natural a look as the others, and certainly does not suggest mid-day. If Mr. Sutcliffe's ploughmen dine at the aristocratic hour of seven, then the picture is well named. This, however, is a minor point. Like Mr. Sawyer, Mr. Sutcliff has chosen Mr. Blanchard's platinum paper.

In the pictures of Lake sceuery by Green Brothers, to one of which, No. 178, a medal has been awarded, we get a totally different class of work from that just mentioned. It is landscape pure and simple, aud landscape depending upon broad effects rather than minute detail. The medal picture, "Head of Derwentwater," has a suggestion of mist which is very beautiful ; the sky-line of the hills in the distance, always a difficulty in photography, has been exceedingly well managed, and the aerial perspective exceptionally good. At the same time I am not sure the general public would not prefer No. 177, a study of cattle, to the oue selected by the judges, and the latter would probably reply, "So much the worse for the general public." Anyway, it is certaiu No. 177 runs the medal picture very closely.

Mr. Ralph W. Robinson's collection of portraits of Royal Academicians is probably unique, and, considering the difficulties of the task, Mr. Robinson is to be congratulated on his success. The portraits are twenty-eight in number, aud dressed for the most part in the usual sartorial attire. It has not yet been settled whether a sitter, because he is au artist, is any easier to pose aud photograph thau an ordinary mortal who goes to the city every day from ten till five and pores over a ledger. Indeed, I should fancy he would be a little more fidgetty ; besides which, there is the awful responsibility resting upon the operator that he is photographing a live R.A., and a lurking suspicion that the R.A. is criticising him all the time. When the R.A. comes to the photographic studio, he is to a certain extent in the photographer's power ; but when, as Mr. Robinson has done, the photographer goes to the artist's studio, then the undertaking is rendered doubly ouerous. Hence all praise is to be given to Mr. Robiuson for his series. They are, as might be expected, a little unequal, but the inequalities are more matters of comparison than inherent faults. To have secured portraits of such men as Millais, G. F. Watts, Storey, Colin Huuter, Briton Riviere, Val. C. Prinsep, Stacey Marks, Boehm, and a host more, iu their own studios, and surrouuded possibly by their pet properties, is really a public service, and it is gratifying to see that the judges have appreciated Mr. Robinson's labour by conferring a medal upon him for three of the series, Millais, Storey, and Wooluer.

Mr. Harry Tolley's picture No. 447, "Cutting Hay," upon which a medal has been bestowed, does not approach his well-known "Lonely Shore." But such a gem as the latter can only be expected once in a lifetime. "Cutting Hay" is artistic, as might be expected from Mr. Tolley, but it does not rouse enthusiasm. Coming to Mr. Robert Faulkner's portrait of Professor Stuart Blackie, we come to what is not only the finest portrait in the gallery, but what is probably as fine a piece of photographic portraiture as one can point to. To say that the expression of Professor Blackie's mobile face in his happiest vein with the fire iu his eye, and his features quiveriug with emotion, is absolutely rendered, would be to say that which is not true, simply because it is impossible. Mr. Faulkner has given us the popular professor in his sober professorial mood. The pose is simple, yet dignified ; the face is in repose ; it is invested with a fine air of thought, and the eyes have that far-off, rapt look so often seen iu the student. To this superb portrait one might return again aud again, and each time with satisfaction. It is superfluous to say that it has gained a medal.

The remainder of the medals, bestowed for purely technical merits of a mechanical kind, will be dealt with in their proper place. Meanwhile it may be mentioued that the Typographic Etching Co. have been awarded a medal for a specimen of English photogravure by Messrs. A. and C. Dawsou, from the well-kuown photograph of Mr. J. Gale, "Sleepy Hollow"; and a similar mark of appreciation has been gained by the Autotype Company for their copy of Holman Huut's "Early Christian Missionaries Fleeiug from Persecution." Wide Angle.

PRINTING ROOM DEVICES.

BY C. BRANGWIN BARNES.

For every bad or mediocre photograph, which is such from defects or faults in the operating, there are at least twenty in which all the faults can be clearly traced to the printing room. Such has beeu the case from the earliest days of the silver printing process, is the case at the presеnt time, aud will continue so, at least uutil the importance of good and perfect printing is thoroughly recognised, and the really good and perfect printer is placed on an equal footing with the operator. It is advanced on behalf of the latter that he must have had some art education, or at least some natural ideas of art iu his compositiou, and that such being the case he is entitled to receive a greater amount of remuueration for his services than a printer, whose duties are mostly mechanical and easily learued. Away with the insinuation. As an operator I must state that in my opiniou a printer who is merely mechanical is not worth his salt. I have kuown what it is—and where is the operator who has not—to have my best and most cherished productions ruined by a mechanical printer. I have looked upon a negative, as a painter would do upon his painting, with feelings of pleasure, mingled mayhap with some slight modicum of pride, which may have beeu justifiable or not, and have awaited the proofs with anxiety, fondly hoping that I had beaten all my previous efforts. When the mechanically-produced abortions have been before me, I can compare my feelings to nothing but those the same painter would experience on viewing one of the cheap German—so-called—engravings of his work.

To produce good priuts from eveu the best of negatives, care is required, and although a mere mechanic may be the essence, nay, the very quintessence of carefuluess in his way, it is nevertheless a staring fact that the care he evinces is not of the right sort. A good printer requires just as much art kuowledge as a good operator, aud without art kuowledge care alone is of little use, wheu applied to the production of photographic prints. When I used the term "the best of negatives," it must be borne in mind I did not speak of *perfect* negatives, for there be very few indeed that comc under that heading ; there is always a little something that is not exactly the thiug, either due to the operator, to the developer, or to the plate itself, and it is this little something which the good priuter should do his best to correct.

The backgrouud is perhaps in fault, of the same shade all over ; the mechanical printer will not notice that, or, if he does, will perhaps think how "beautifully even" it is—in other words, how *mechanically perfect*. The art printer, on the other hand, will dodge his print, and produce that backgrouud in gradatiou. To him who has the requisite knowledge of what is wanted, nothiug is easier than to do this ; but it is the very lack of such knowledge that causes the careful mechanical printer to fail. Perhaps the knowledge of what to do in the way of dodging negatives may be of service to printers in general, though I do not for one moment intend to imply that in large busiuesses, where many hundreds of prints are turned out daily by one or two printers ouly, that each and every print can be dodged and doctored iu the same way that every sitter has to be iu the hands of the operator. But at any rate, any glaring inaccuracies iu the negatives can be rectified, and that with the expenditure of very little extra time or trouble on the part of the printer. Negatives that are a little thin and lacking in pluck should never be laid down to face the light in the ordiuary way ; they should be stood on edge in the quietest light that cau be found, and if the resulting print is not then sufficiently bright, fumed paper should be brought into requisition. A foggy negative, whether the fog be chemical or light fog, or caused by a misty atmosphere at the time of exposure, should always bc printed on fumed paper. It is very little trouble to fume a few sheets of paper daily for use ou

special negatives, but the practice of so doing is, I am sorry to say, much rarer than it should be.

The paper to be fumed should be bone dry, and should be left in the fuming box for from ten to fifteen minutes; the strongest ammonia—liquid—should be used, and the sheet of paper fastened, face downwards, to the lid of the box at least eighteen inches or two feet above the saucer containing the ammonia. It should then be hung up to dry, and for the free ammonia held by the paper to evaporate, which will take perhaps another fifteen minutes. The time and trouble will be much more than repaid by the increased beauty and brilliancy of the prints, and the printer who uses this dodge will find that his employer will grumble less at his work than heretofore. It is the privilege of employers to grumble at their assistants now and then, and it should be the aim of the assistants to give them as little cause for grumbling as possible.

Hard negatives, giving chalky prints, should be printed on weakly sensitized paper, or on paper that has been left on the bath too long, and when possible in the direct rays of the sun. If this does not have the desired effect, wash a sheet of sensitized paper, then re-dry it, and it will be found to print with much more harmony and considerably diminished contrast. Should, however, the contrast still be too great, the printer who is determined to succeed has still another loophole open to him; he can flash the print. By flashing the print I do not mean place it face upward in the light, and thus turn the whole of the whites into greys of a more or less muddy tint, but place it the other way about, that is face *down*, and print the reverse side of the paper; this will be found to slightly tinge the whites without damaging the other parts of the print, and can be carried to any extent, according to the harshness of the negative.

An under-exposed negative, in which the whites are not particularly harsh, but in which the blacks are so thin that to get the other parts sufficiently printed they all become merged in one sooty mass, requires a different treatment still. The negative should be covered on the reverse or glass side with tissue paper, and the white portions picked out, leaving the negative exposed in those parts only; it should then be printed on fumed paper, and if the blacks are still too deep, a second layer of tissue paper may be placed over the first and treated in the same manner. Negatives which have been covered with tissue paper should be printed in the quickest shade light obtainable. If a small portion of a negative be too thin, and print too black in comparison to the remainder, a wash of blue paint, prussian blue, or indigo should be lightly brushed over that portion, on the glass side.

Negatives in which white draperies occur—such as wedding dresses, infants' frocks, and so on—nearly always require a little doctoring before printing, or the drapery comes out very patchy and chalky. The tissue paper over the whole of the plate, with the draperies picked out, acts well in many cases, but occasionally this allows the white to print through too much, and represents a grey instead of a white. When such is the case "papier minerale," which is more transparent than tissue, should be substituted, or in the absence of that, the negative—glass side, of course—should be coated with *plain* collodion which has been coloured with Judson's dye, crimson preferably, though almost any colour, with the exception of blue, may be used, and the collodion over the draperies should then be scraped away in the same manner as the tissue or minerale paper.

Cracked or broken negatives should always be printed through tissue paper and on a board suspended from a roasting jack, which same board should always be used for printing vignettes. Of course it is needless to add that the roasting jack should be kept in motion. Occasionally a re-order comes in for a negative in which the varnish is found to have cracked. This is best remedied by rubbing black lead powder, the scrapings from pencils, carefully into the cracks, when they will be found not to show at all, or at any rate very faintly, in the print.

Negatives with defective backgrounds, or which have become scratched or are very spotty, should in all cases be vignetted, so as to avoid much spotting.

Medals and decorations on the breasts of military men or court officials, even when treated with the greatest care by the operator, very rarely print out to show the design; the printer can, however, get over this difficulty with the aid of a hand magnifying or sun glass, taking care not to bring the focus exactly upon the plate, or the result will be disastrous. This same magnifying glass may often be used for other white patches, or what would be such without its aid.

Then as to landscapes and other out-door subjects with skies: no print should ever be turned out by a professional with a broad expanse of bald white paper where the sky ought to be. A few cloud negatives should be amongst the accessories of each and every printing room, and they should be in constant use. Some little judgment will be required in fitting the proper clouds to the proper subjects, but better slightly tone the paper, without putting any clouds, if that judgment be not used. This toning or tinting should be graduated, and the graduation may be either from the top to the horizon, or from the horizon to the top; some subjects will be found better suited by the one, some by the other.

A device well worth knowing, and which should be in use in every photographic printing room, consists in putting a double thickness of sensitized paper on all dense, slow printing negatives—the back piece may be any old spoiled print—and the object of this will be at once seen when tried, as the whites do not discolour, even after two or three days in the pressure frame.

Devices in the after processes of cutting, toning, and so on, must be left for a future paper.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY.*

BY W. M. ASHMAN.

The method of carrying out the purpose by means of one camera was perfected by Latimer Clark, and a plan of the most convenient form of this apparatus is given in Fig. 26. It is suited to a studio portrait or a near view, and can be easily constructed to do duty for more distant objects. A small portrait camera with a sliding back, arranged to take two pictures upon one plate, is exactly adapted for this purpose, care being taken to use the left-hand half of the plate when the right-hand object is being photographed, and *vice versa*, so that there is no need of any transposition in the finished print. The principle is that of a parallel rule, and will be readily understood by reference to the letters. A is the baseboard, carrying a movable table to which the camera is fixed, either with little projecting blocks M M, or by the two pins which enter holes in the camera base. C and D are two laths, pivotted at one end by screws E and F, to the movable table B, and at the other end to the under side of two wooden nuts L L, which work in the wooden screw S S S S. This screw is in one piece, the ends working in fixed blocks K K, and the centre provided with a wheel H, working in a split block for the purpose of turning the screw in one or the other direction. Half the screw is cut with a right-handed thread and the other half with a left-handed one; so that, upon turning H in one direction, the nuts L L approach nearer to each other and lessen the convergence towards the object when it is not far off, and while the reverse action of the screw produces considerable obliquity of the axis of the lens, to suit more distant points. The limit of the play of the table is effected by wooden pegs placed in the holes at P and P. The dotted lines show the position of the table with camera attached, as ready for the exposure of the right hand-picture, only the convergence of the table is not indicated as it should be. For studio work or near views the size of the base-board need

* Continued from page 635.

not be more than ten inches in width and twelve from back to front. A block fastened to the base and grooved on the edge to fit the movable table keeps the latter from rising under any circumstances, but it can be much smaller than shown at T.

In place of the screw adjustment, the same object can be attained by having a series of equidistant holes in the

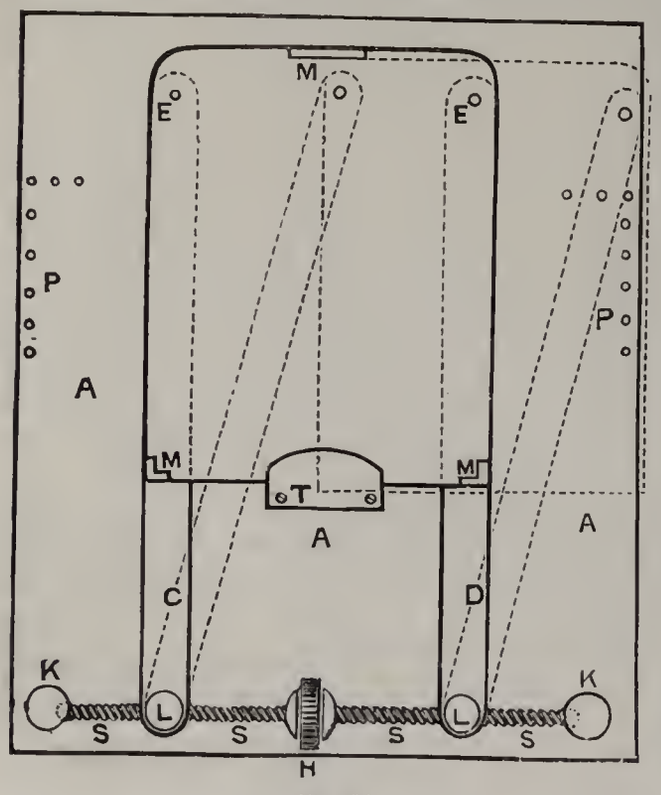


Fig. 26.

base-board at either side of the central line, just where the screw is, into which a pair of brass pins fit tightly after passing through a hole in the ends of the laths.

The mounted pictures are more readily seen as one in the stereoscope if they are attached to the mounts with the centres rather less than three inches apart—two and three-quarters is generally enough. It is necessary to keep the bases of each pair of pictures in a right line, and they should be so cut as to leave more of the view or object on the left-hand side of the left one than otherwise, and more of the right-hand side of the right one than shown on the left one. The reason for this is seen by observing a view through any opening, like a window, with each eye separately, while the head is kept still. The necessity for transposition of pictures when the negative has not been cut and fixed in the right way to a sheet of clear glass before printing from, must always be borne in mind when a binocular camera is used. There is, however, the alternative plan of printing the left-hand side of a negative upon the right-hand side of the strip of sensitised paper or transparency plate, and *vice versa*, but this involves two printings.

The stereoscope is an instrument so well known that very little description is here needed. A pair of plano-convex or double convex lenses of 1 inch to $1\frac{3}{4}$ inches in diameter, are generally employed, but a favourite method is to cut a 3 inch lens in two, remove the angles, and mount them with the thickest edges together. In either case the focus is about six inches, and the pair of lenses are mounted rather less than $2\frac{1}{2}$ inches apart at the end of a box or sliding platform, according to the subjects to be viewed therewith. The former is most useful when transparencies are employed. In Brewster's original stereoscope the lenses were fixed in relation to each other, but Helmholtz arranged that the lateral distance between these could be altered to suit different observers' eyes, and an additional advantage is gained by having the means of modifying the distance between the lenses and the stereoscopic picture to accommodate all varieties of sight. What is required is that upon looking into the instrument, the axial lines from each eye are rather nearer the margin than quite central, and this is more perfectly ensured in the cut lens arrangement, which resembles two prisms with a very small angle, and their thin edges approaching each other. Such an instrument is sometimes called the lenticular stereoscope, and is the invention of Sir David Brewster, who in 1849 exhibited it to the British Association. After all, it is only suitable for pictures of comparatively small dimensions, and the favourite size of each print or transparency is $3\frac{1}{4}$ by 3 inches. In larger sizes recourse must be had to an instrument known as the reflecting stereoscope of Professor Wheatstone, views up to 15 by 12 inches being quite admissible. Two mirrors are set at an angle of 90° to each other, and the edges which touch are directed to the observer thus, V. The two pictures are placed on the right and left of the mirrors at such an inclination that each is seen by the observer reflected in its mirror, and the two so superposed as to appear as one. Hardwick says of the Wheatstone reflecting stereoscope, "The principle of the instrument is as follows:—Objects placed in front of a mirror have their reflected images apparently behind it. By arranging two mirrors at a certain inclination to each other, the images of the double picture may be made to approach until they coalesce, and the eye perceives a single one only." This is explained by the following diagram, Fig. 27, where the images of the

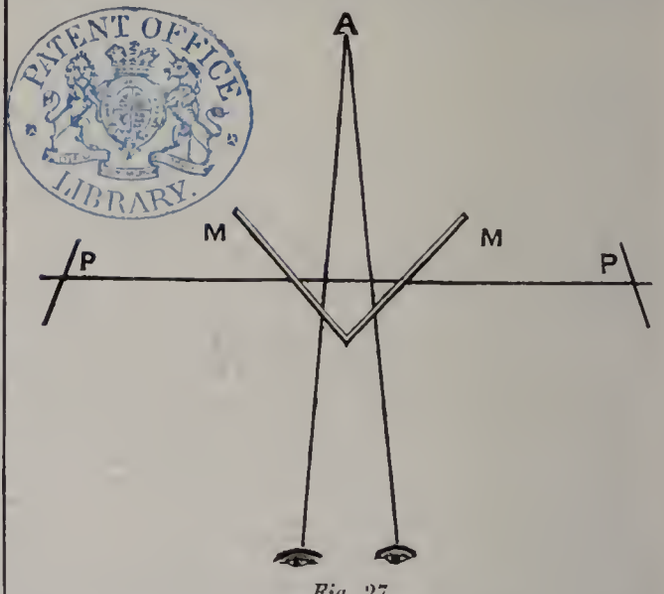


Fig. 27.

pictures PP may be imagined to meet at A behind the mirrors MM.

In taking two views to be examined by means of a reflecting stereoscope, the position of the camera must be changed for the second picture by slipping it along an imaginary base line for a distance proportionate to that of the objects from the camera. Thus, Wheatstone's directions are, one foot separation for every twenty-five feet of distance, and, as already pointed out, when that which is very far off is required to be represented in relief, the amount of separation between the points of view becomes considerable. Accurate measurement in this particular is not, however, an essential condition, and it may be varied for special purposes. The rule is, that in all cases the wider the area between these points of view, the greater the solidity or relief appears to be, and it is very easy to distort the shape even to grotesqueness by making that distance too great.

Photographic Club.—At the meeting on October 9th the subject for discussion will be "The Best Form of Dark Slide."

REPORT OF THE PHOTOGRAPHIC CONVENTION.

The delegates of the Photographic Club have rendered a report, written by one of them, from which we make extracts.

"In the apparatus department there did not appear to be any novelty. However, a detective camera, designed by the Platinotype Company, and exhibited by Messrs. Noakes, attracted a great deal of attention, one of the main features being the special method of changing plates. We think, however, that this instrument, which appears to have many commendable qualities, would be rendered more serviceable by the introduction of finders, ensuring the proper centreing of the subject on the plate. Mr. Gotz showed a new form of tripod, which, to our minds, is most certainly in advance, so far as handiness and steadiness are concerned, on anything that has been so far put on the market. Some objects of historical interest, consisting of very fine Daguerreotypes and negatives on waxed paper, taken by the respective authors of those processes, were exhibited by Mr. Friese Greene. Other members also showed old-form cameras, and, in particular, one of the pantoscopic type, provided with a 'water lens.'

"The Convention of 1889 did not bring forth the announcement of any new discovery in the realm of photographic processes.

"The number of investigators who are devoting their time to the development and improvement of photography is daily increasing, and there cannot be any doubt that all this research will lead to considerable progress. I think, however, that there is cause for regret that so little is done towards elucidating the principles upon which photography, as a science, is based. It must be clear to all that an accurate knowledge of the true reactions undergone by the silver haloids, when subjected to the influence of light, would be an invaluable guide to all those who are endeavouring to perfect the processes now in use, or to devise new ones.

"It is, however, satisfactory to find that some attention is being given to the instrumental means used in photography.

"Some discussion took place with reference to the most favourable length of focus for detective work, and the balance of opinion was in favour of relatively long-focus lenses.

"In our opinion, the use of portrait lenses in hand cameras would necessitate some modification in the general construction of the camera. Large apertures are accompanied by considerably less depth of focus, and a great deal more precision in focussing is consequently indispensable. It does not seem possible to set the focus by judgment with a portrait lens, the slightest deviation rendering the picture useless, through insufficient sharpness. It would, therefore, be advisable to introduce a modification by means of which the picture could be sharply focussed before exposure.

"The large diameter of the lenses increases the difficulty in obtaining a suitable shutter, and this point also will require attention.

"A very important discussion took place on the 'Report of the Committee upon Lens Standards' being read. This report was deemed inefficient, and was referred back to the Committee. Some gross errors were pointed out, and several speakers commented severely on the way in which the Committee had performed its mission.

"The advisability of having a series of standard flanges to be used by all opticians was warmly approved of, but, at the same time, it was pointed out that whatever system was to be arrived at, the co-operation of the principal lens makers would be essential to success.

"With reference to stops, general satisfaction appeared to be given by the system actually in use. A member, however, thought that the sub-divisions of focal length had better have for unit a decimal number. Efforts were being made in many directions to secure the adoption of the decimal system, and if a change were to be made in lens fittings, it might be as well to make the parts on that system.

"It was resolved to appoint a Committee, in which should be included the principal opticians. This Committee would endeavour to arrive at a solution of the question, equally satisfactory to the interests of the opticians and to that of the photographic public.

"Every evening lantern-slide exhibitions were given, and slides of great beauty were shown. Pre-eminent among these displays was Mr. E. Muybridge's lecture on animal locomotion, profusely illustrated by the optical lantern, and also by an instrument specially constructed for the purpose, and called the zoopraxiscope.

"Mr. Muybridge's researches throw much light on the subject of animal locomotion, and show how little has hitherto been known about this subject. The works of some of the most esteemed painters are proved to be faulty in this respect, and it is much to the credit of photography to have been the means of rectifying grievous errors in the delineation of animals in motion.

"Some slides were exhibited showing the apparatus used. Forty-eight cameras were set up in series of twenty-four and two twelves, so that simultaneous views were obtained of the same subject from three points of view. The most interesting part of the appliances is the arrangement which effects the exposure. The apparatus is electro-magnetic, and so designed that variable speeds of rotation can be given to it. As the drum revolves, it releases consecutively the shutters of the lenses, and it will be readily understood that if the speed of the drum is proportional to the rate of motion of the animal under experimentation, it will be possible to take a series of pictures representing the various phases of one and the same stride, as the animal passes along the course in front of the main battery of twenty-four cameras. The electric current can, of course, be applied at the most suitable moment at will.

"A series of lantern slides obtained from the negatives of consecutive phases being placed in the zoopraxiscope and thrown on the screen, the animal is seen in movement in a most realistic manner.

"It is to be hoped that Mr. Muybridge will, if he has not already done so, embody in a book the result of his observations. His experiments were all made with portrait combinations, and this brings us back to the statements made in Mr. Traill Taylor's paper with reference to the use of lenses of this class for instantaneous work. A feature of Mr. Muybridge's apparatus is that the shutters are on a stand entirely independent from the cameras themselves, thus avoiding any chance of vibration being communicated to the apparatus. These shutters are of the drop type, and in this case a considerable height of fall is provided before the aperture actually passes in front of the lens.

"The results obtained by Mr. Muybridge will, no doubt, encourage other experimenters to devote some attention to this branch of photography. The difficulties are certainly very great, and the apparatus requisite very considerable, and consequently expensive.

"I will conclude this report by an account of what passed at the general meeting held at the Society of Arts on August 21st, and at the council meeting on August 24th.

"Mr. Andrew Pringle, president, in the chair. The attendance was thin, the weather being most unfavourable. After reading and signing the minutes of the previous meetings, the first matter on the agenda was discussed. This was the selection of a locality for next year's meeting. An informal invitation having been received last year from Chester, it was agreed that the meeting be held next year in that town. The co-operation of the Liverpool and Manchester Photographic Societies was to be obtained. Chester has many advantages, there being a great deal of subjects for photography.

"The members of the general committee were then elected. Some discussion took place with reference to the advisability of augmenting the subscription of members of the Convention. It was proposed that in future the subscription should be 10s. instead of 5s; but many speakers appeared to think this increase disadvantageous, so it was finally decided that the subscription should remain fixed at 5s. At the same time, those who contemplated joining the Convention next year were requested to send in their subscription at once, so that the secretary should be able to have something on which to base his estimates. It was also decided that the date of this year's meeting being most unfavourable, future conventions should be held at an earlier date, either at the end of June or the beginning of July."

London and Provincial Photographic Association.—Thursday, October 10th, will be the first lantern night of the season. Visitors invited.

Photographic Society of India: Exhibition.—The above Exhibition will open in Calcutta on December 1st. No charge will be made for space. Mounting is compulsory; framing is optional, but is strongly advised, and framed pictures will secure best positions. The committee will undertake to have glass put in frames if requested to do so, the cost being about fourpence per square foot. The amount can be sent in postage stamps.

THE PARIS EXHIBITION AWARDS TO EXHIBITORS.

BY LEON VIDAL.

PRIZES AWARDED TO BRITISH EXHIBITORS.

Gold Medal.—T. R. Dallmeyer, James Lafayette, Ross & Co., John Thomson, Henry Vanderweyde, Walery, Watson & Sons.

Silver Medal.—T. P. Gibson, J. F. Shew & Co., Sands and Hunter, Frank M. Sutcliffe, Werner & Son, West & Son, John Fergus, Frith & Co., Fred. Hollyer, Hayman Seleg Mendelssohn.

Bronze Medal.—James Burnside, T. Blaine Scott, York & Son, W. Byrne.

GRAND PRIZES OR DIPLOMAS OF HONOUR.

1.—Association Belge de Photographie, Brussels.

2.—United States Geological Survey, Washington.

3.—Collective Exhibition of the Applications of Photography to Science and Public Services, Naval and War Departments. Service of the Saltpetrière, MM. A. Girard, Henry Frères, Janssen, Marey, Moessard, Moussette, Thouronde, G. Tissandier.

4.—Lumière and Son, Plaque Photography and Photogravure.

5.—Dujardin, Photogravure.

6.—Nadar, Portrait Photography.

FOREIGN EXHIBITORS.

Gold Medal.—Bellingard, Lyons—photography; Mathieu-Deroche, Paris—enamels; Rowland, United States—spectroscopy; Macs, Belgium—collotype; Monckhoveu, Belgium—photographic plates; Carlos Relvas, Portugal—photography; Miuistère Marine, France—photography; Dr. Damaschino, Paris—photography; Michelet, Paris—photogravure; Berthoud, Jr., Paris—collotype; Quinsac and Baquè, Paris—collotype; Fleury Hermagis, Paris—optics; Terpereau, Bordeaux—photography; Famin and Co., Algiers—photography; Ekskin, Low Countries—photo-lithography; Solovioff, Russia—photography; Orell Fuseli, Switzerland—polychrome printing; Barker, United States—photography; University of California, United States—photography; O'Chanessy, Australia—photography; Alinari Frère, Italy—photography; Neurdeim, Paris—photography; Rydeville, Paris—enamels; Boyer, Paris—portraits; Chalol, Paris—portraits; Pirou, Paris—portraits; Chary, Paris—portraits; Balagny, Paris—film photography; Eastman and Co, United States—sensitive papers; Géruzet, Belgium—photography; Jomah Martin, New Zealand—photography; Lindt, Australia—photography; Henrique and Co., Spain—collotype; Miènsemend, Cairo—monuments; Molteni, Cairo—optics; Martinotto, Grenoble—photography.

Patent Intelligence.

Applications for Letters Patent.

14,976. B. ACRES, 131, Richmond Road, Hackney, London, "Photographic Developing Dish."—September 23rd.

15,020. J. PUMPHREY, 160, Angelina Street, Birmingham, "Apparatus for Rocking, Lifting, and Manipulating Photographic Plates."—September 24th.

15,025. A. MCDONALD, 1, Lawn Terrace, Silloth, "Apparatus for Burnishing Photographs."—September 24th.

15,099. A. MCDONALD, Silloth, "Combiuation Oil Stove for Photographic Purposes."—September 24th.

15,163. A. D. LOWAN, 186, Fleet Street, London, "Improvements in Photographic Cameras."—September 26th.

15,164. A. D. LOWAN, 186, Fleet Street, London, "Improvements in Photographic Shutters."—September 26th.

15,263. W. BRIERLEY, Central Chambers, Halifax—Robert Schorr, Germany—"Colcured Impressions, Lithographs, or Zincographs, by Photography."—September 28th.

15,289. N. BROWNE, 73, Cheapside, London, "Photographic Shutters."—September 29th.

Correspondence.

WOMEN AT PHOTOGRAPHIC MEETINGS.

SIR,—I think most amateurs will feel grateful to Mr. Blandy for so boldly championing the cause of the admission of ladies to photographic societies. One has only to visit the Exhibition in Pall Mall to see what good work some ladies can do; and the reason that more do not reach the higher walks of our art is largely the fact that they have hitherto been excluded from membership in our clubs. When the male amateur realises all the help and instruction he has gained from his club meetings—how his standard has been raised, and himself impelled by competition with others to greater diligence and painstaking in his work—he will feel what a very great help, and, indeed, necessity, club membership is to those who wish to get on, and how exceedingly hard it is on lady amateurs to be excluded therefrom.

3, *Featherstone Buildings, London.* GEORGE W. ALLEN.

SIR,—To anyone who is able to read between the lines, Mr. Blandy's letter explains the situation. From the animus which he displays, it is evident that he is conscious of being not only on the losing, but on the wrong side. He accuses me of resorting to "the secrecy of the ballot box." I may say, in passing, that the method to be adopted in voting never occupied my thoughts for one moment; but what possible objection can your correspondent have to voting by ballot? Would he prefer that the vote taken on any given resolution should represent, not the desire of the people engaged in voting, but the fear of certain consequences indicated in his letter—the fear lest his lady friends should "trounce" them, and public opinion hoot at them?

At the previous meeting Mr. Blandy, president, and Mr. Knight, secretary, two violent partisans, constituted themselves scrutineers. Is this state of things preferable, in Mr. Blandy's eyes, to voting by ballot? I should like to know whether he would dare to carry his notions about the ballot box iuto the larger arena of politics. By a singular obliquity of mental vision your correspondent seems to have conceived the idea that ladies have been treated cavalierly by our Association, and need a champion. If it pleases him to perform a piece of Quixotic gallantry, we don't complain; but to talk about our having ousted them from the Society is going a little too far. How can you deprive people of what they never possessed? The argument that an association of gentleman is bound to admit ladies to membership, or give a good reason why they should not be admitted, is puerile and absurd. The only wonder is, it was ever advanced seriously.

Nobody denies to ladies the absolute right to do as we have done—form themselves into an association. When they do so, we shall not send in applications for membership, and consider ourselves treated with injustice if we are refused. I am sorry that Mr. Blandy has thought well to sever his connection with the Society; but if the penalty attached to his presidency is that we must accept him as a dictator, I think the Society is to be congratulated on his resignation.

In conclusion, as I naturally do not desire to bring down on my devoted head the consuming wrath of Mr. Blandy's lady friends, and as I wish to escape the "hootings" of the public, I must still ask to be allowed to subscribe myself, NEMO.

PHOTOGRAPHS ON BUSINESS CARDS.

SIR,—Referring to one of your notes in your issuc of the 27th, *re* the advisability of using photographs on travellers' advice-cards, it may interest you to know that the idea has already been worked out, both in this country and America. For about three years previous to my retirement from "the road" I used an advice-card, also a business card with photo-process portrait and facsimile autograph, and found both exceedingly useful.

Bradford, Sept. 30th. H. SNOWDEN WARD.

A SPIRIT LEVEL.—From Messrs. Sharp and Hitchmough we receive one of their new "Aptus" revolving spirit levels to be attached to the reversing back of a camera for the adjustment of the horizontal, the level being revolved at right angles to indicate the horizoutal when the back is reversed. When the level is placed on the top of the camera, it takes the place of an ordinary tubular level.

Proceedings of Societies.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 26th prox., Mr. T. E. Freshwater in the chair.

Mr. J. T. Atkinson had recently exposed some extra rapid plates, using a detective camera; on developing them a few weeks later, he was able only to get a ghost of an image. Some plates of medium sensitiveness used at the same time gave good results. This raised a question in his mind as to the keeping qualities of a very rapid plate after exposure.

The general opinion of the members was that the plates had been wrongly labelled.

Mr. H. M. Hastings showed a print from a negative taken from the carriage window of a train travelling between fifty and sixty miles an hour; the image was fairly sharp.

Mr. J. Hubert asked if an isochromatic plate could be made to give as good a result without a yellow screen as when this was interposed.

Mr. C. H. Cooke said that he had found no difference between the ordinary and isochromatic plates when a yellow screen was not used.

Mr. P. Everitt preferred a plate containing iodide, as being more suitable for landscape work.

Mr. F. A. Bridge had obtained always the best results on plates of this kind.

Mr. F. W. Cox complained of grease marks on platinum paper purchased in tubes; he believed it was due to some wax or grease put round the bottom of the tin tube by the makers.

The Chairman asked the cause of innumerable little blisters appearing on plates after fixing; this occurred recently, and was quite a new experience to him. He used an alum bath before fixing. The plates were not washed previous to fixing. He considered the alum kept the fixing bath cleaner, and prevented the plates from being discoloured.

Mr. W. E. Debenham said that a suitable negative with yellow image would print as quickly as a grey one; he did not mean a yellow stained negative.

Thursday next will be a lantern night.

North Middlesex Photographic Club.

September 23rd.—Mr. E. T. Hiscock in the chair.

Mr. A. Le Vierge exhibited prints taken at Battersea Park, and a chronometric shutter giving exposures varying from $\frac{1}{6\frac{1}{4}}$th of a second to three seconds.

Mr. Pither wished to know if there were any trustworthy way by which shutters could be timed. He knew most of the usual methods, which, for rapid exposures, were of no use whatever.

It was suggested that the device shown among the exhibits of the Paget Plate Co. at the Crystal Palace exhibition was as good as any.

Mr. Pither considered that for such exposures as are sometimes spoken of—say the $\frac{1}{300}$th part of a second—this device would be of no use whatever, for a slightly greater weight on one side of the revolving disc than the other would cause the disc to go slower when that side happened to be ascending, and so cause a considerable amount of error.

Mr. S. T. Chang exhibited a detective camera.

Mr. Bishop said that the patents for the transferrotype process were taken out in October, 1884, but it was not introduced commercially until about eighteen months ago. The advantages claimed for the process are that it allows of an image being developed in the ordinary manner, after which it may be transferred to any surface thought desirable. It is also one of the easiest and quickest methods of making a reversed negative for mechanical processes. Window transparencies may be made cheaper by it than by any other method, and the Eastman Co. also claim for it that it is useful for making lantern slides. The speaker then exhibited a transparency made by it. The *sine qua non* of a lantern slide, he said, is that it shall be absolutely clear in the high lights; here this process fails, for, he added, the gelatine is covered by a fine granularity or reticulation. The Eastman Co. say that this is of no consequence, as it does not show when projected upon the screen; but it does. Among the different things to which the image may be suitably transferred are opal, plaques, tiles, lamp shades, ground glass, panels, and vases. The simplicity of the process is such that anyone who has worked the bromide paper is capable of using this one successfully. The paper is made by being first coated with a soft soluble gelatine; this, when dry, is coated with the sensitive emulsion, which latter is insoluble when dry. After an exposure to light of about the same time as for bromide paper, it is developed with oxalate of iron; then it is put into a bath of acetic acid one part, water 240 parts, after which it is fixed, washed, and then squeegeed into contact with the surface to which it is intended to be fixed. Then it is blotted, placed on one side to dry for half an hour, when it is ready for stripping; this is done by pouring hot water on it, which, soaking through the paper, dissolves the soluble substratum of gelatine and allows the paper to come away, leaving the film attached to the surface of the article. All that remains to finish it is to wash off the partly dissolved gelatine. The Eastman Co. advise the use here of a piece of cotton-wool with which to lightly rub the surface while under the water; the reader of the paper preferred a large camel's-hair brush—known as a water-colour wash brush—as being less likely to leave any pieces behind. The lecturer then proceeded to illustrate his remarks by developing a print, after which he transferred about half a dozen of different sizes, some to opal, others to ground glass.

A question was asked as to the reason for letting the prints dry for half an hour on the surface of the glass before stripping.

Mr. Bishop replied that if stripped before that time there was a probability of the film leaving the support; which he illustrated by stripping one which he had a few minutes before squeegeed into contact. The result was that the picture frilled slightly at the edge. It having been remarked that this process gave reversed results, Mr. Bishop replied that this might be overcome in several ways: first, those who used film negatives would find no difficulty whatever, as films could be used from either side; or if the stripping films were used as negatives, these would be reversed, and so give the resulting print in the proper position. Another method—of which several of the results were shown—was by copying the negative in the camera with the glass towards the lens. Mr. Bishop also mentioned that Mr. Jackson, of the Eastman Company, and himself, had carried on several experiments in the hope of being able to effect the double transfer, and although they had been partly successful, the results were not good enough for him to recommend the method. Another way which he had tried himself, and which he illustrated, was to place the developed print in the hot water without squeegeeing to anything, and so float the image off the support, when it was turned over and placed in position on whatever article it was desired to be fixed. He said that if this method was used, it was necessary to print very much darker, as a quarter-plate print would expand until it covered a half-plate.

Mr. Pither asked if the tone obtained could be modified in any way.

Mr. Bishop replied that Mr. Jackson had used pyro and soda in some experiments, and found that by varying the proportions it was possible to alter the tone.

The Secretary asked if it would not be possible to proceed in the usual way, and at the finish change the tone by one of the various methods of intensification.

Mr. Bishop said that of course they would be as amenable to any after-treatment as other images were.

At the next meeting, Mr. S. Herbert Fry will give a demonstration of enlarging. Visitors are welcome to attend.

Liverpool Amateur Photographic Association.

The 258th meeting was held on Thursday, the 26th inst., at the Association's Rooms, 3, Lord Street, Liverpool, Mr. A. W. Beer in the chair.

The President drew attention to the arrangements for the competition prints and lantern slides, and announced the following names of the judges:—Mr. Geo. W. Webster, Mr. Jno. Finnie, and Mr. E. R. Dibdin, for prints and enlargements. Mr. Geo. E. Thomson, Mr. E. L. Grundy, and Mr. Paul Lange, for lantern slides.

A smoking social meeting will be held on Friday, 18th Oct., at 7.45 p.m.; musical arrangements under the direction of Mr. W. A. Roberts. There will be another in November, of which Mr. H. H. Williams takes the management. The one to be held in December will be given by Mr. H. J. Nicholls.

Mr. Forrest submitted an Eastman bromide print developed by hydrokinone; the result was favourable. He also exhibited a specimen lantern slide upon Carbutt's celluloid film, and claimed for the latter adaptability for the purpose in every way.

Mr. GEO. E. THOMPSON said that he had experienced many instances of yellow fog with Thomas's lantern plates. He found that where development had to be retarded, yellow fog was almost sure to result; but when the details came up quickly, there was no fog.

The PRESIDENT said he had used many dozens of Thomas's plates during the season, and from his experience was convinced that the plates were all right, but the developer was often wrong. He found the developer, as formulated, deteriorated, and the same might be said of the eikonogen developer. When fog and loss of brilliancy appeared, he at once made up fresh developer. With regard to the warm colour for lantern slides, he found that with a very strong negative fifteen to twenty seconds' exposure—by contact—to daylight, gave a beautiful terra-cotta or warm brown colour by either hydrokinone or Thomas's "Pyro" formula.

Mr. THOMPSON said he obtained the most satisfactory warm tone with pyrogallol, carbonate of ammonium, and bromide of potassium. He then gave his lecture entitled "Rambles along the Riviera, from Marseilles to Genoa," the result of a three weeks' visit in February last. The slides were quite up to the high level of artistic excellence attained by him in "Up the Mediterranean," "Sunny Italy," and "The Waterways of Holland." The views, coupled with his humorously attractive delivery, pleased the listeners.

HACKNEY PHOTOGRAPHIC SOCIETY.—The ordinary meeting will be held on 10th inst., when a paper will be read by Mr. J. Hubert, on "Bromide Enlarging," with demonstration.

CAMERA CLUB NOTICES:—Thursday, October 3rd, 8 p.m., opening of the fourth One Man Exhibition at the Club. Pictures by Mr. H. P. Robinson. Monday, October 7th, 8.30 p.m., first smoking concert of the season. Thursday, October 10th, 8 p.m., first technical meeting of the session. Mr. W. Ashbury Greene will read a paper on "Detective Cameras." Members are requested to bring apparatus. A show of cameras will be arranged. Thursday, October 17th, 8 p.m., description and demonstration by Mr. Lyonel Clarke of his platinum toning process. Thursday, October 24th, 8 p.m., lantern evening; members are requested to inform the secretaries if they can bring slides. Thursday, October 31st, 8 p.m., discussion on "Eikonogen," to be opened by Mr. H. M. Elder, M.A. Monday, November 4th, 8.30 p.m., smoking concert. Offers of assistance requested. Thursday, November 7th, 8 p.m., Mr. Andrew Pringle will read a paper entitled "One Hundred and Thirty Exposures." The paper will be illustrated by examples.

SILVERING MIRRORS.—The following, by M. Bory, for silvering mirrors, is a very simple process: The plate of glass is first carefully cleaned, and laid on a perfectly level table, which must be kept at a temperature of 25° to 30° Cent. To silver a plate of 1 square metre two liquids are prepared, the first consisting of ten grammes of double tartrate of soda and potash dissolved in one litre of distilled water, and the other of five grammes of nitrate of silver dissolved in three grammes of pure ammonia, and diluted with one litre of water. The two liquids are then intimately mixed, and a small portion of the mixture is spread evenly over the glass, when the remainder is poured on. In the course of thirty or forty minutes the silver is precipitated in its metallic form, and, the *Scientific American* says, adheres closely to the glass, which needs only then to be freed by tilting from the superfluous fluid, slightly rinsed with water, and placed upright to dry. A coating of varnish is afterwards applied with a brush.

THE SOLUBILITY OF GLASS.—Experiments on the solubility of glass in water have been made by F. Mylius and F. Foerster. The principal conclusions deducible from the experiments are given in the *Journal of the Chemical Society* as follows:—"(1) Water-glass is decomposed by water into free alkali and silicic acid, a certain proportion—varying with the time of action, concentration, and temperature—of the latter becoming hydrated and dissolved. (2) Potash glasses are far less soluble than soda glasses, but the difference decreases with increase of the proportion of lime present. (3) Soda and potash are united in glass both to the silica and the lime. The resistance of glass towards the action of water is dependent on the presence of double silicates of soda or potash and lime. (4) Of all sorts of glass, the plumbiferous flint-glasses are least soluble in boiling water. (5) The relative resistance of glasses is different toward hot and cold water. Tables are given in the original showing the solubility, as determined by digestion with boiling water for five hours, of various glasses commonly found in commerce, and the chemical composition of the same glasses."

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper and Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

W. H. B.—The earthquake at Colchester and neighbourhood happening so long ago (April 22nd, 1884), it is perhaps doubtful whether you would now be able to obtain photographs showing the damage done; but you might enquire of Mr. P. Damant, of Mersea Road, Colchester, who published at the time a series including Langenhoe Church, the Rose Inn, Peldon, houses at Wivenhoe, and others, all of which exhibited striking proofs of the devastation. We can send you one or two photos of St. Botolph's Priory, but here the damage done was not so considerable.

X. Y. Z.—Mr. Walter Woodbury's tin-foil process, afterwards known as the Stannotype, was first described at a meeting of the French Photographic Society in May 1880. There is no patent which stands in the way of its adoption. Another ingenious modification was proposed by Mr. Léon Warnerke (see the NEWS for 1880, p. 200); instead of facing the gelatine mould with a sheet of tin-foil, or taking the impression of it in soft lead, Mr. Warnerke suggested the taking of a cast in Spence's metal, which is very fusible, but hard and tenacious, although somewhat brittle. It would therefore require very careful backing or mounting to prepare it for use as a printing block, but the idea seems again being made the subject of further experiment, and it is certainly well worth following up, as the material is so cheap.

A. D.—The notice in Monday's *Times* is very full and satisfactory, excepting in regard to the point you mention, Mr. Fred. Hollyer's reproductions being described as "portraits," and praised as such. The word "Palinotypes" frequently occurring is an obvious misprint not calculated to mislead a photographer, and they are correctly entered in the catalogue.

W. R.—You have only to adapt a small finder to your camera to follow the movements of the animals, and enable you to judge the right moment of exposure; but for this class of work you have let the best period of the year slip by. A twin camera might certainly be employed if you have one, but if you focus to a plane, and note when the animal occupies that position, no finder or second lens is really necessary.

W. S.—The report of the judges is beyond appeal, and no advantage would be gained by printing your letter. As you say, the apparatus is referred to another tribunal, and any public criticism just now would defeat your own object; but care will be taken when the time comes to notice any points of novelty or improvement in the collection of apparatus generally.

PINHOLE.—Of course you will be visiting the Exhibition, and there you may see for yourself some excellent examples of pinhole photography by Mr. G. Davison—Nos. 234 to 237. They are landscapes, in the taking of which time was of no consequence.

V. J.—A correspondent has kindly favoured us with the address of Messrs. C. and R. Darker, who may be found at 58, Malham Road, Forest Hill, S.E.

J. A. C.—It would be useless to keep a record at our office when all the specifications can be consulted at the Patent Office close by. Mention the name and subject, and we will try to find the information you want. As to the manufacturer's address for boxes, slabs, and book covers, apply to the British Xylonite Company, Homerton, N.E. For celluloid films of more transparent quality, enquire of Mr. J. Désiré England.

RURAL.—The Camera Club's exhibition of Mr. H. P. Robinson's works opens to-day at 21, Bedford Street, Covent Garden, and is well worth a visit. You have only to present your address card, and ask for admission.

M. A. CAMBS.—Now is the best time to apply for election into the Photographic Society of Great Britain, for you get in under the most favourable terms; the entrance fee alone has to be paid for the present year. Write to Mr. Edwin Cocking, at the Gallery, 5A, Pall Mall East, S.W., who will give you all the necessary information. If you are personally known to a member, it had better be stated, although the University degree would probably carry you through.

J. M.—The blotting paper may have become contaminated by too frequent use, and so the prints, originally well washed, may have absorbed traces of impurity from the pads.

J. C. P.—You might enquire of the Eastman Company, 115, Oxford Street, W., who may chance to keep the "grotesque foregrounds" amongst their stock of American accessories. If not procurable there, it would be easy to get one or more sketched exactly to meet your requirements.

NEMO.—If you desire warmer tones in your silver prints, you have only to shorten the period of immersion in the gold bath, or use this latter somewhat diluted.

Other correspondents in our next.

PATENT OFFICE LIBRARY.

THE PHOTOGRAPHIC NEWS.

VOL. XXXIII. No. 1623.—*October* 11, 1889.

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THE LONDON CHAMBER OF COMMERCE.

LAST Tuesday a wise step was taken by some of the leading manufacturers and merchants connected with photography, in setting the example to others of joining the London Chamber of Commerce. Combination is necessary in these days of fierce competition, when commercial firms have to contend occasionally with upheavals from below, and with applications of pressure from above, some morally justifiable, others indefensible, but both unpleasant. In times past the Hanseatic League was called into existence by analogous circumstances; it exercised a great and beneficial influence in Europe, and tended to curb sections of society teeming with predatory instincts.

Mr. Watson made some sensible remarks at the meeting reported upon another page, to the effect that in the new step it was not desired to exclude anyone who had a commercial interest in photography, also that other persons ought to be excluded, as they did not want mere talkers to advise them about their own affairs. This sound argument might have been pushed farther, by laying down the law that a commercial combination should confine its action to commercial subjects; the notice convening the meeting included, as matters within the scope of the Section, such problems as a standard of light in photography. This is a scientific, and not appreciably a commercial subject, about which the decisions of a purely commercial organisation would possess but scant authority. The insertion of this and one or two other non-commercial subjects in the notice, tended to throw an academic and somewhat weak aspect upon the meeting, not hereafter to be justified by facts.

For instance, of one chief advantage of joining the London Chamber of Commerce not one word was said at the meeting—namely, the system it has instituted of settling trade differences by arbitration rather than by law; moreover, the Chamber will, when invited, arbitrate for disputants who are not among its members. The bye-laws of the Chamber set forth that in order to facilitate the settlement by arbitration of disputes arising out of commercial transactions, the council has appointed an arbitration committee, consisting of members of their own body. In any case in which the intervention of the Chamber is desired in the matter of an arbitration, a written application to that effect, signed by one or more of the disputants, and containing an agreement to be bound by the bye-laws of the Chamber, has to be addressed to the Secretary. The application must be accompanied by a fee of £1 1s. if the applicant is a member of the Chamber, or £2 2s. if he is not a member. The secretary then brings the application before the arbitration committee, who, upon being satisfied that, by the agreement of reference, they are duly empowered so to do, and that it is a case suitable for arbitration, will, at the request of the disputants, or either of them, name an arbitrator or arbitrators, or an umpire, as the case may require, to act in the matter of the arbitration. In any case in which, by the agreement of reference, they shall be duly empowered so to do, and where the disputants shall have agreed to be finally bound by their decision, the committee will hear and determine any appeal from the award or decision of an arbitrator or arbitrators, or an umpire. Where any such appeal is made to them, the written application addressed to the secretary must be accompanied by a minimum fee of £15 15s. if the appellant is a member of the Chamber, or £21 if he is not a member. The arbitrators, umpire, or committee of appeals, is empowered to employ an accountant, or to obtain legal advice, at the cost of the disputants, but no professional man is allowed to appear for either of them. In each case of appeal the award is in accordance with the decision of the majority. Unless the committee decide to the contrary, the arbitrations may be conducted in the council-room of the Chamber, upon the disputants undertaking to pay tariff charges.

Small tradesmen, especially when their work does not include skilled labour, are in even more need of combination than large trading firms. At present the copyright laws seem to most interest those photographers who are joining the London Chamber of Commerce, but other subjects proving the advantage of union are sure to arise before long; as Mr. Bird said, a Photographic Section had better be formed, and then wait upon events. Like the good old Dutch commander, Peter Stuyvesant, when he did not like the outlook, the Photographic Section will sharpen its trusty broadsword upon the kitchen door-step, and, smiling grimly, "wait upon events," which means that events will wait upon the Section.

Yesterday the following paragraph was posted to the newspapers:—

"A meeting interested in the photographic trade was held at the offices of the London Chamber of Commerce, Botolph House, Eastcheap, on the 8th inst., Mr. Walter S. Bird (Autotype Company) presiding, there also being present Messrs. W. England, Frank Bishop (Marion and Co.), Friese Greene, Wm. Grove, A. S. Hayman (S. Fry and Co,, Limited), W. H. Harrison, H. S. Mendelssohn, Henry Sturmey, Thos. P. Watson (W. Watson and Son), S. Buchanan Wollaston, and L. Warnerke. It was unanimously agreed to form a Photographic Trade Section of the Chamber, for the purpose of advocating trade interests as apart from the scientific or amateur interests of photography. The question of copyright, it was considered, should be one of the first to be dealt with by the new Section in co-operation with the Printing and Music Trade Sections, which were reported to be already dealing with their respective branches of the subject. It was also thought that the new Section might co-operate with the Electrical Trade Section for the establishment of a standard of light, and also in regard to the adoption of the Whitworth screw as a means of obtaining uniformity of size."

THE PYROCATECHIN DEVELOPER.

Dr. Carl Arnold has published, says *Wilson's Photographic Magazine*, that although a gramme, fifteen grains, of pyrocatechin now costs twenty-five cents, whilst a gramme of hydroquinone costs only one cent, the new product may be utilized without greatly increasing the cost of development, as its developing power is about fifteen times greater than that of hydroquinone.

To develop a plate 18 by 24 centimetres, or 7 by 9 inches, requires one-twentieth of a gramme of pyrocatechin, to which have been added 5 grammes, or 77 grains, of carbonate of potash, and a sufficient quantity of water. In travelling, the author prepares the developer as follows:—He makes the alkaline solution of the required degree of concentration, and then adds a small pinch of pyrocatechin, which he dissolves by agitating. This new developer possesses all the advantages specified by the author, who writes on this subject in *La Nature*; it may be applied to bromized paper as well as to diapositives. There is no doubt that if the use of this product becomes general, its price would soon rapidly fall.

Dr. Phipson writes to the *Moniteur de la Photographie* that pyrocatechin, whose developing action seems to be about fifteen times greater than that of hydroquinone, is a very interesting substance. Its solutions in the alkalies become green when exposed to the air, and finally brown and black. This green colour, in his opinion, seems identical with green hydroquinone; in fact, hydroquinone and pyrocatechin—oxyphenol—are isomeric, and both have the formula $C_{12}H_6O_4$. But he has not made many experiments with this product, having only handled it during experiments made with certain kinds of tannins. Pyrocatechin is produced in the dry distillation of many bodies, especially of the tannins, which impart a green colour to the iron salts. It is also met with in non-purified wood vinegar. It is very soluble in water, still more so in alcohol, but very little in ether; it easily reduces nitrate of silver, the salts of gold, of platinum, and, with heat, the tartrate of copper and of potash. It seems to have no action upon the ferrous salts, but with ferric-chloride it gives a dark green colour, becoming red by the addition of an alkali, or of ammonia. Nitric acid converts it into oxalic acid and a yellow substance. Some English photographers who have tried it as a developer assert that its action is much slower than that of pyrogallic acid; but this appears to be its only defect.

MR. H. P. ROBINSON'S PHOTOGRAPHS AT THE CAMERA CLUB.

Numerous selections from Mr. H. P. Robinson's celebrated photographs from the earliest date are now on view at the Camera Club, Bedford Street, Strand, London, where anyone may inspect them on presentation of his card. The exhibition, about which we shall have more to say hereafter, was opened on Thursday night, last week, when the appended letter from Mr. Robinson was read by the honorary secretary, Mr. George Davison, amid occasional titters from the listeners, as some of the reader's utterances were criticised therein from an adverse point of view.

Dear Davison,—It seems to be expected that every "one-man" exhibitor shall say something about the contents of the show which the Club is so good as to open for him. The Journal is published some days in advance of the exhibition, and affords one the opportunity to play the overture before the curtain rises to begin. Therefore, I proceed to execute, of necessity, some fanfares on my own trumpet, and give some account of my aims and objects. I am sure the members of the Club will not misconstrue my purpose in speaking frankly of myself and works.

It will be orthodox to introduce here, after the manner of the best biographers, a simple juvenile anecdote, which may well do duty as a sort of text to the little sermon into which I am sure to drift before I get much further.

When I was entering my teens I had the presumption to send a pencil sketch and short historical account of Ludlow Castle to the *Illustrated London News*, a now famous paper, which was then in its early years. After many months I experienced the often-described pleasure of seeing myself in print for the first time. Myself, yet not myself. The editor had touched up both the sketch and the notice. By his knowledge of *composition* he had turned the crude facts with which I had furnished him into *art*. Now, although I was born under the walls of the castle, and had love, feeling, and admiration for my subject, none of these alone or together enabled me to make a presentable sketch, or to write a readable account. Yet when I compared the print with the original I found that very little had been done to it; but the little that was done, both to the sketch and history, had made all the difference. The application of the editor's knowledge of the rules, both of art and literature, made the sketch pictorial. The description read full and smoothly, and both were to my eyes truer than before. The facts were not altered, but dressed up. The dry facts of nature had become truth to nature. How I envied him the skill with which he had used those few touches and adjectives! Before this I had crude notions that if I "stuck to nature," as teachers even then used to indefinitely proclaim should be done, I should succeed, but afterwards I studied how to make both sketch and words pictorial.

"Nature I loved, and after nature, Art," but I learnt that nature was only the raw material of art.

I have always had a profound conviction that I am not a heaven-born genius, and never since this little episode had any confidence that I could achieve astonishing results by intuition alone, and therefore plodded on from that time to study art in the old-fashioned way, by trying to learn what was taught by the accepted lights of the time. In pursuing this course I met with Burnet's Essays, and have never regretted what I learnt from them of composition, light and shade, and the education of the eye. There is a disposition, at present, with some eccentric writers to scoff at anything like rules of art. They may be able to do without them—nothing is denied to supreme genius—but for my part I am always ready to confess that, aided by an enthusiastic love for art, much of the little artistic merit my pictures may show is due to a life-long study of the principles of composition and chiaro-oscuro as laid down by Burnet and others.

There is a tendency, as I have said, of late to think little of scientific composition, and when it is obtrusive, as it never should be, I admit, and have always enforced, it defeats its own intention, and becomes as cramping and crippling as any other chains and fetters. There are some who try to set up in place of rules and principles deduced from the experience of years a sort of vain yearning for nature, which they cannot explain. The expression of these yearnings is very well as eloquent exhortations to do good work, but as far as I can see it teaches nothing. Photographers are not yet sufficiently advanced in art to take advantage of the indefinite; they want to be taught how "to do things."

A writer whose articles, when sane, and himself at all times, whether lucid or incoherent, I greatly admire—it may prevent confusion if I mention that I mean yourself—has written disparagingly of what he is pleased to call "composition mongers," and says:—

"It would be better for photography if all of this kidney could be brought to see in what consists the difference, and how great it is, and to reflect that before artistic expression is possible, there must be feeling for the finer beauties of nature, power to see character in a scene, thought in selecting only what renders and expresses this character, and training—not hap-hazard practice—in the further part of camera handicraft—namely, the production of the images as true as possible to what the eye has seen and the mind selected."

This is all very true as far as it goes, but it is not a knowledge of the rules of composition that prevents the student feeling them. In my opinion, all these fine things come after composition has been studied, not before it. The mind as well as the eye has to be taught to see truly. He would be a rare artist who saw all this by intuition. Anyhow, he would not be the average photographer as I know him. This writer recommends the practice of poetry to those who know nothing of the grammar of the language in which they are expected to express themselves; in fact, he more than suggests the improbability of grammar being of any use. The practical man said of "Paradise Lost," "What does it prove?" If it proved nothing else, it proved that Milton had learnt the A B C of his art before he wrote the poem, and knew

something of spondees and iambics; dactyls and anapæsts; hexameters and pentameters; heroic, elegiac, and lyric measures. In other words, he knew his composition. It is my contention that one of the first things an artist should learn is the construction of a picture. He should learn how to express himself before he begins to deliver his soul. Dogberry expressed naturalistic ideas when he said that reading and writing come by nature; we of the old school do not think so.

It is sometimes said that I never go beyond the structure of a picture in my endeavours to teach art; in fact, that I do not teach art at all. This is quite true. I endeavour only to teach the means by which art is produced. It would be presumption in me to try to go further. I have never felt that the poetry of art could be taught, and if it could, there seems to be a sort of desecration in analysing the feeling for the beautiful. It is easy to talk of awe-inspiring mysteries; it would not be difficult to write volumes of rapturous language—it is done every day; but what do they mean? I know that beyond composition and chiaro-oscura, which can be taught, there is much which cannot be conveyed in word. This is what an old friend, snapping his fingers, used to call "that." "That" is too seldom seen in a photograph, or, indeed, in a painting. "That" is the poetry, the thought, the feeling, the sentiment, the something that sends a thrill of pleasure through you, the touch of art, the indescribable essence. "That" is something that can be seen and felt, but which evaporates at the approach of the descriptive word. "That" it is which must be born in a man, or come to him, for it cannot be taught. "That" can be cultivated and improved, but not created. And because I have never tried to teach the unteachable, the enemy hath said I teach nothing but mechanical tricks. So that what with the unteachable, according to me, and that which to you is like the Turk, unspeakable, everything ends in the truly satisfactory conclusion that there is nothing to learn. That is the humour of it; and that is where the so-called naturalistic attempts to upset the lessons of the past have brought us.

To conclude this part of my letter. The rules and principles that guided Turner, Wilkie, and many other great artists have been good enough for me, and, whether mistaken or not, that has been my line of study, and the pictures in this little exhibition are the result. If they are wrong they will at least help to teach the young photographer what to avoid.

Having preached my sermon, let us now come to the photographs.

The pictures I send extend over more than thirty years, commencing with "Fading Away"—the first serious effort of a young beginner—and ending with the "Merry Fisher Maidens" of the present year. I must ask those who are kind enough to inspect them to take into consideration the various periods in which they were done. In 1858, the date of "Fading Away," although there were several clever landscape photographers, there was only one photographer who seemed to have any serious care for, and to persistently practise, photography as an art, but he was a great one. The name of O. G. Rejlander belongs to history, and his works, unfortunately, have almost passed away. It can be easily imagined, then, that in this dearth of art any photograph that made an approach to a pictorial result attracted attention; and "Fading Away," therefore, enjoyed the honours of sensationalism. "The eternal 'Fading Away,'" as a critic in the *Daily Telegraph* said, "became as great a torment as a popular nigger melody." On more of this it would not become me to dilate, but "is it not written in the chronicles" of photography? This picture carries us back to a time when manipulation was not the "dead sure thing" it has since become. Operators had to make their pictures their own to a much greater extent than they do now. For instance, I made my own collodion, and albumenized the paper on which this picture is printed. I should not omit to mention that the jokers of the period did not fail to avail themselves of the obvious possibilities of the title in connection with photography. But the reply is, that the copy I now exhibit was printed more than thirty-one years ago, was toned with hypo and gold, was very imperfectly washed, has been the round of the exhibitions, and has stood fairly well.

I do not mean to weary you with a history of each picture, but it may be of interest to refer briefly to one or two others.

My ambitious object was to endeavour to show that photography could attack, if it could not quite conquer, many subjects that belonged to the painter, and in doing this I confess to having often overstepped the limits by which the practice of our art ought to be bound. In the "fifties," pre-Raphaelite pictures attracted much attention, and I thought I would attempt to show that the curious feeling and weird effect shown in many of these pictures could be conveyed by photography. Hence "The Lady of Shalott" (1861). The object in this case was to neglect picturesque composition, and to make as formal an arrangement as possible. Unfortunately pictorial instinct prevailed at the last moment, and I made the dying figure draw up one knee to break the line. This ruins the picture. The whole sentiment should be one of dreariness, and monotony of line would have helped the effect, and, I may perhaps add, have been less absurd. My excuse is, that both the art and artist were young. Anyhow, the picture had the desired effect, and attracted still more attention to pictorial photography. In the following year I determined to make a greater effort, and "Bringing Home the May" was the result. It would not be easy to describe the immense trouble the execution of this picture involved. During most of the time of the blossoming of the hawthorn the weather was bad, and quantities of "May" were collected every evening for a fortnight, only to die without being used. Combination printing, also, was not so easy as it has since become. The use of register marks had not been discovered, and every negative had to be joined by sight. Each copy took about nine days to print, often only to be destroyed from the paper becoming discoloured or refusing to tone evenly.

I call attention to "Sleep" (1866), only to point out the brilliancy of the print after the lapse of twenty-three years. This I attribute to its having been coated, or water-proofed, with plain collodion, both back and front, as recommended by Mr. Blanchard, who is one of those to whom we owe many useful improvements, often unrecognized, in the details of practice.

I had intended to finish my letter here, thinking you might have had enough, but you urge me to continue, offering at the same time, as is your kindly way, much judicious advice as to the proper conduct of that which is to follow. You ask me to crowd in incidents and anecdotes, old criticisms and modern personalities. I can obey the order to "go on," but I cannot comply with your last cheerful request. I never indulge in personalities. I am not a practitioner of that graceful pastime. In all the controversies which I have had and enjoyed, I have never been personal. I have not even, as far as I recollect, relieved my feelings by calling a brother controversialist by such a mild term as "composition monger," or such a name as "Rip Van Winkle." But I do not mind giving you a sample of the elaborately over-knowing critic of a quarter of a century ago. The race is, of course, extinct now, and I confess that combination printing offers irresistible temptation to those who can see so much further than the end of their nose, and care to exhibit their accomplishment.

The four figures near the stile in "Autumn" (1864) were taken on one plate at one operation. It is necessary for you to bear this in mind as you read the following extract from a long and elaborate criticism. The critic thinks that each figure was taken separately and combined, so he proceeds to demolish the ignorant photographer most scientifically, thus:—

"We now see, then, how a picture, to be true to nature—or, in other words, to be in good drawing—must, to start with, indicate by its *point of sight*, and its visible or suggested *horizontal line*, the *height* and *position* of *one* person in *one* spot, at a certain *distance* from its surface or plane."

The critic then proceeds to prove his position by reference to "Autumn":—

"This piece, in which a number of photographs, separately and in themselves good, are combined, represents a group of figures and a landscape. There is one figure perched on a stile; there are two seated and two standing. Now in this photograph we have suggested to us, in the first place, no fewer than four different horizontal lines, which are indicative of its being a view which was seen by *one* person at *one* time in *one* spot, *from four different points of view—mirabile dictu!* or, of its being an impossible something which would exhibit various objects, with the same relative positions and appearances, to four different people viewing them from *four different spots!* Judging by the horizontal line of the landscape, the camera, when the whole or part of it was taken, stood about level with the shoulder of the tallest figure. Judging in the same way by the figure on the stile, it was lower when he was taken, still lower when one of the seated figures was photographed, and was yet lower when the picture of the other seated figure was obtained. Now, as one spectator could not conveniently see, say, four horizons at once, we must admit that this picture is merely an impossible view, such as no one person ever saw at one time in nature."

And yet, as I have already said, the four figures near the stile were not combined together, but taken on one plate!

The same sort of thing has occurred often. Here is a more modern sample. This time the subject is a little picture I have called "Dorothy"—I have no objection to confess to an untruth when I am guilty of one; "Dorothy" was *not* the name of the model. There is a copy of the picture on the walls. The critic enters into elaborate proof that the lighting is all wrong. He says:—

"In 'Dorothy' we may also point to the lighting. The general character of the picture is very pleasing . . . but then comes the *bête noir* of 'composition' photography—the lighting. The picture represents a girl leaning on the wainscoting of a window, which is the only apparent source of light in the apartment; at any rate, the picture does not lead us to suppose there is any other. One side of the face is strongly lighted, but the shadow side is, to our idea, far from being sufficiently in shadow. The proximity of the figure to the window would in nature entail very heavy contrast—certainly more than exists in the picture before us; besides which, a marked shadow of the head would be thrown upon the white handkerchief which covers the shoulders of the figure. Then, again, if the furniture and accessories be examined, we shall find some serious vagaries of light—the shadows running *to* the light, or in any direction but *from* it."

After all this conclusive proof that it was printed from several negatives, how can I ask you to believe that this picture was taken on one plate only, at one operation, and is wholly unsophisticated? "Dorothy" was taken in the black-oak wainscoted drawing-room of one of the most delightful and picturesque old halls in North Wales, without any alteration whatever in the light. The larger picture "Pamela" (here is another absolute untruth!) was taken in the same room in a subsequent year.

The mistakes, easily demonstrable, about "Carolling," by those whose cleverness exceeded their knowledge, were more amusing still. But this is too recent, and I like my critics too well to be unkind to them. I have much to thank them for. They have given me a great deal of pleasure, and pain only when there has been an evident intention to be offensive. I have then been sorry for them more than for myself, and seek consolation in the philosophical reflection that there is not much good in a man who never made an enemy.

There is another point in which combination pictures give pleasure to all critics, both professional and amateur, and I rejoice with their joy. Their delight in finding the joins is only equalled by mine in providing joins in the wrong places for them to discover. I always fail in trying to persuade photographers that the joining is *not* the principal part of the picture, and that I care very little whether it is visible or not. I cannot convince them that deception is not the great merit of the combination printer.

There is one point on which I have come to a very definite conclusion. It is a great mistake to enter into details of what might be called the birth history of your picture; to explain all the little dodges by which you get your effects. You may wish to teach and be of use to your brother photographers, but the information is sure to be used against you some time or other. I could point out many instances, only it is not worth while. I will, however, give just one by way of sample. I have always used what may be called trained models, from a conviction that I could get nearer to the truth of nature than with the raw native. I will not stop to argue this point now; all I want to point out is that I never heard anything of the unnaturalness of my figures and their attire until I pointed out in one of my little books how I used these figures. The cautious critics, in this case, did not prophesy until they knew. Another reason for not being too explanatory is that you deprive your friends of a great deal of pleasure. They can often enjoy a picture when they have not been behind the scenes and seen the machinery, but their pleasure goes when the mystery vanishes, and they are able to say, "Oh! that's how it's done, is it?"

I have mentioned a few of the pictures, and must leave the others to speak for themselves. Some of the old prints are a little "off-colour," but I thought it would be more interesting to the members to see the early prints, and in many cases it would not have been possible to prepare fresh ones.

I have done. I will not apologise for these pages of personal twaddle and display of self, for they are written on your own compulsion. But I cannot conclude without some recognition of the delight photography has given to thirty odd years of my life. From the time Dr. Diamond found me practising with my first camera, and urged me to continue, until this present evening, I have been bound up in the art. They have not always been peaceful years, but there has been enjoyment even in the hottest controversies, and I have very rarely met with anything that passed the bounds of friendly rivalry, for photographers, as a rule, of both sexes, are good fellows. Above all, photography has been the moving cause of the making of many delightful friendships, not the least of which I count yours and that of many members of the Camera Club. H. P. Robinson.

PHOTOGRAPHERS AND THE LONDON CHAMBER OF COMMERCE.

Last Tuesday afternoon, at Botolph House, Eastcheap, London, the heads of some of the leading photographic firms met to take preliminary steps towards establishing an alliance with the London Chamber of Commerce of persons commercially interested in photography. Sir Vincent B. Kennett-Barrington, Chairman of the Council, presided.

The Chairman said that he was there in his official capacity, and whilst not knowing much himself about photography, he welcomed them in the name of the Council of the London Chamber of Commerce, which would do all it could to advance their views and to aid in the formation of a photographic section. The proposed Section would have the advantage of the help of an already organised staff; it would also have a room in which to hold its meetings; and if photographers wished to influence Parliament or any thing of that kind, they would be backed by a powerful body, and, what was more important, the Chamber would see that the matter was not allowed to drop. Among the subjects which might be considered by the proposed section were:—The ownership of and copyright in negatives, fire insurance rates, Merchandise Marks Act, decimal weights and measures, organisation of international and other exhibitions and juries, patent and trade mark laws, foreign tariffs, relations with foreign photographic societies, treatment of sensitized plates when passing through British and foreign Custom Houses, uniformity of screw threads, uniformity of dimensions and numbering of diaphragms and other portions of apparatus, standard of light, and so on. Other matters, with the special organisation of the Section, could also be dealt with from time to time as they arise. The section would have the right to nominate a member of the Council, *ex officio*. He would add that nearly every important trade in London is now represented by a Section of the London Chamber of Commerce, and that if photographers formed a Section also, the Council would do all it could to promote their views. He took it that the first question before that meeting was, "Is it desirable to form a Photographic Section?"

Mr. Frank Bishop remarked that the object of their presence there was to form such a Section.

Mr. W. S. Bird thought that photographers would be much strengthened by such an alliance, which would prove particularly useful when the question of artistic copyright came to be discussed by Parliament.

The Chairman thought that a committee of photographers might be formed then and there to organise the Section; it could hold its meetings in that Chamber.

Mr. W. S. Bird moved that a Photographic Section should be formed in connection with the London Chamber of Commerce.

This was seconded by Mr. Frank Bishop, and passed unanimously.

Mr. T. P. Watson asked if that meeting could not at once discuss some subject of interest to the trade.

The Chairman thought that it had better be done by the Section when formed.

Mr. Bird thought it desirable to form a strong Section, and then to wait upon events.

Mr. Bishop was in favour of all photographic trades being represented.

Mr. H. S. Mendelssohn proposed and Mr. William England seconded that a committee, with power to add to their number, be formed to organise the Section. This was passed unanimously, and the following members thereof were appointed:—Messrs. Leon Warnerke, W. S. Bird, Frank Bishop, H. S. Mendelssohn, Friese Greene, T. P. Watson, T. R. Dallmeyer, William Grove, and S. G. B. Wollaston. It is intended to add largely to this list of names. Mr. W. S. Bird was elected chairman of the Committee.

Sir V. Kennett-Barrington here vacated the chair, and a vote of thanks to him was passed.

Mr. W. S. Bird then took the chair at the first meeting of

the Committee of Organization, which then dealt with a few matters of detail.

Mr. Watson thought that it would be well to form a Section consisting of such persons only as had strong commercial interests in photography; they did not want persons who were not so interested in the trade to take part or to give them advice. In the step they were taking they ought to be unwilling to shut out anyone whatever who had a commercial interest in photography.

Mr. S. G. B. Wollaston thought that the provinces should be represented on the Committee.

Mr. Bishop remarked that those present were joining the "London" Chamber of Commerce.

The secretary, Mr. Kenric B. Murray, said that they were then forming the first Photographic Section, so if provincial photographers were admitted it would not be interfering with any other Chamber.

It was then resolved that the meetings of the Committee of Organization should be held on the first Monday of every month, at five o'clock, after which the meeting broke up.

DISC DIMENSIONS WITH OPTICAL LANTERN OBJECTIVES.*

Supposing we are called upon to use a magic lantern in a hall 25 feet in length, we first ascertain the size of disc desired, which we will suppose to be 10 feet. With an objective having a focus of 6 inches, how far from the screen must the lantern be placed in order to produce a 10-foot disc?

Here is the rule by which it can be ascertained:—

Let A = focus of objective.
„ B = diameter of slide.
„ C = diameter of disc.
„ D = distance between lantern and screen.

Multiply the diameter of the circle required (C) by the focus of the lens (A), and divide by the diameter of the slide (B).

$$\frac{C \times A}{B} = D = \frac{10 \times 6}{3} = 20 \text{ feet.}$$

It is thus seen that, in order to produce a 10-foot disc with a 6-inch objective, the lantern must be placed 20 feet from the screen.

On the other hand, we may possess several lenses of different foci, and it is necessary that the screen and the lantern must occupy certain positions, which we will suppose to be just 20 feet apart, and that the diameter of the disc must be 10 feet. How are we to ascertain whether we must use a lens of 4, 5, 6, 7, or other number of inches in focus?

Multiply the distance between the lantern and the screen (D) by the size of opening of slide (B), and divide by the size of disc (C).

$$\frac{D \times B}{C} = \text{A focus of lens} = \frac{20 \times 3}{10} = 6\text{-in. focus.}$$

Again, we have a lens of 6-in. focus, and intend that 20 feet shall intervene between the lantern and the screen, and wish to know what size of disc can be produced. In order to calculate this, it is necessary that we multiply the distance between the lantern and the screen (D) by the size of slide opening (B), and divide by the focus of the lens used (A), which gives us

$$\frac{D \times B}{A} = \text{C size disc} = \frac{20 \times 3}{6} = 10\text{-ft. dia. disc.}$$

The above ready reference table has been computed by the foregoing rule, and by a glance it will show the relations between lantern and disc with object glasses of every focus from 4 inch to 15 inch.

READY REFERENCE TABLE.

Distance between Lantern and Screen.	FOCUS OF LENS. 4-in.	5-in.	6-in.	7-in.	8-in.	9-in.	10-in.	11-in.	12-in.	13-in.	14-in.	15-in.
	DIAMETER OF DISC.											
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
10 feet	7 6	6 0	5 0	4 3	3 9	3 4	3 0	2 9	2 6	2 4	2 2	2 0
11 „	8 3	6 7	5 6	4 9	4 2	3 8	3 4	3 0	2 9	2 6	2 4	2 2
12 „	9 0	7 2	6 0	5 2	4 6	4 0	3 7	3 3	3 0	2 9	2 7	2 5
13 „	9 9	7 10	6 6	5 7	4 11	4 4	3 11	3 7	3 3	3 0	2 9	2 7
14 „	10 6	8 5	7 0	6 0	5 3	4 8	4 2	3 10	3 7	3 3	3 0	2 9
15 „	11 3	9 0	7 6	6 5	5 8	5 0	4 6	4 1	3 9	3 6	3 3	3 0
20 „	15 0	12 0	10 0	8 7	7 6	6 8	6 0	5 6	5 0	4 7	4 3	4 0
25 „	18 9	15 0	12 6	10 9	9 4	8 4	7 6	6 10	6 3	5 9	5 4	5 0
30 „	22 6	18 0	15 0	12 10	11 3	10 0	9 0	8 2	7 6	6 11	6 5	6 0
35 „	26 3	21 0	17 6	15 0	13 1	11 8	10 6	9 6	8 9	8 1	7 6	7 0
40 „	30 0	24 0	20 0	17 2	15 0	13 4	12 0	10 10	10 0	9 2	8 6	8 0
45 „	33 9	27 0	22 6	19 3	16 10	15 0	13 6	12 3	11 3	10 4	9 8	9 0
50 „	37 6	30 0	25 0	21 5	18 9	16 8	15 0	13 8	12 6	11 6	10 9	10 0

Examples.—An 8-in. focus lens at a distance of 35 feet will give a disc of 13 feet 1 inch. To produce a disc of 12 feet with a lens of 10-in. focus, the lantern and screen must be separated by 40 feet. To produce a disc of 15 feet at a distance of 45 feet will require a lens of 9-in. focus.

At the Paris Exhibition, Messrs. Ross and Co., opticians, obtained the *grand prix* for instruments of precision. The *grand prix* is the highest award the authorities could give; about thirty of them were conferred in the British Section, and about 250 gold medals therein.

Death of Mr. Gillard.—A correspondent announces the death of Mr. William Gillard, of Gloucester, in the 49th year of his age. As a photographer, he occupied a prominent position, having been a successful competitor at many photographic exhibitions, at which he obtained numerous medals for his pictures. His work, in consequence of its artistic excellence, was not only highly appreciated and patronised by the leading families in his own county, but also by those residing in places far beyond its confines.

* *The Optical Magic Lantern Journal.*

THE EIKONOGEN DEVELOPER.

In the descriptive circular, presumably issued by the inventor or dealer, eikonogen is said to be a white crystalline substance, but our sample is a dark grey amorphous powder, interpersed with sparkling laminæ, not unlike powdered chocolate mixed with a small quantity of crushed mica. It is soluble in water only to the extent of eighteen grains to the ounce, and the solution is of a bright chlorophyl green.

The formula published by the importers when analyzed, gives

Eikonogen	... 12 grains
Sodium sulphite	... 24 „
Sodium carbonate	... 18 „
Water	... 1 ounce

But as we know from experience that manufacturers generally recommend solutions of much too great a strength, we decided to start with only half those quantites.

We exposed a series of plates, bearing the sensitometer number of 23, on a suitable subject; and as it was in diffused light and completely surrounded with trees, gave an exposure of one second with $\frac{1}{25}$. Side by side we placed two trays, and in one put our ordinary pyrogallol developer, consisting of pyrogallol 2 grains, sodium sulphite 8 grains, sodium carbonate 4 grains, water 1 ounce, and in the other the eikonogen solution. Within five seconds the image in the latter flashed out, and in less than a minute developed to full printing density; while the image in the pyrogallol did not appear for over two minutes, and did not acquire the desired density until about ten minutes had elapsed.

Believing, in common with most of our brethren, in the virtue

of "going slow," the second pair of plates was placed in the same trays, and in the case of the pyrogallol, in the same solution, but the eikonogen was diluted with an equal quantity of water. The eikonogen image appeared almost as rapidly as before, and resulted in a first-class negative within three minutes, while the pyrogallol image was then just faintly visible. Its strength was then doubled, and at the end of ten minutes the image had acquired full printing density.

Thus far then it would seem that eikonogen is a much more active developer than pyrogallol, but there is somethiug more in its favour. Four plates were developed in each of the solutions, and we need not say that by the time that was accomplished the pyrogallol solution had become very dark, and evidently of little further use. But not so with the eikonogen. It had lost a little of its green colour—had, in fact, become of a greenish straw—and therefore looked a shade lighter than it was at first. Whether it had lost any of its developing power we are not in a position to say, but it seems just as ready to work, and to work as well as when first mixed.

Of course, it is too soon to dogmatize, but as a tentative experiment we would recommend the following formula as being both simple and practical:—

A.—Eikonogen	... ...	1 ounce, av.
Sodium sulphite	... ...	2 ounces, av.
Water	... ...	36 ounces, fluid.
B.—Sodium carbonate	... ...	1½ ounces, av.
Water	... ...	36 ounces, fluid.

To make the developing solution, take one ounce each of A and B, and add two ounces of water.

These proportions may be modified to suit over and under exposure, and one quantity of developer may be employed to develop, probably, half-a-dozen plates, with perhaps a few drops of each of the two solutions to refresh it toward the last two or three.

The instructions issued by the importer include a recommendation to add in the course of development a few drops of a solution of sodium hyposulphite and sodium bromide; but we look upon this as not only unnecessary, but positively injurious.

The claim on behalf of the new developing agent, of being more economical than pyrogallol, seems fully sustained, as while the advertised price is only 40 cents per ounce, it is not only a more active developer, but the same solution, as we have already said, may be employed to develop several plates.—*The Beacon.*

NOTES ON THE PHOTOGRAPHIC EXHIBITION.

Second Notice.

One of the most earnest workers of the day is Mr. George Davison. He has a valuable characteristic, discretion—a quality which photographers too frequently lack. Ambition does not o'erleap itself in Mr. Davison's case, as all that he aims at is within simple bounds, and he rarely fails in anything he attempts. The series of seven pictures (Nos. 7 to 13) shows Mr. Davison to very great advantage. "By the Colne," "Albury Heath," Low water at Wivenhoe," and "A Breezy Corner" are particularly noticeable for the feeling they display, and the suitability of the treatment to the subject. In the first and third the sadness peculiar to this part of the Essex coast is admirably rendered. Mr. Davison has commendably abstained from putting any fancy name to his picture of Albury Heath. Two carts and horses with their drivers occupy the centre of the picture, and one can well imagine that the horses have paused to recover their wind on arriving at the top of rather a stiffish hill. There is no attempt to bring the objects into undue prominence; the spectator accepts them as natural, and the idea of the heath is assisted rather than retarded. The same may be said of the boy who is lying on the grass in "A Breezy Corner." In all Mr. Davison's pictures the distance is cleverly managed. Nos. 234 to 237 will attract a considerable amount of attention. They are prints from pinhole negatives, and one would certainly like to have full particulars from Mr. Davison of their production. They rather upset the generally believed-in theory that a pinhole can only be employed on inanimate objects on account of the lengthened exposure. Mr. Davison has boldly attempted river scenes, and the running water and the foliage of the trees do not appear to have offered any particular difficulty. The exposure given is ample to produce the proper amount of detail; and the effect of entire absence of sharpness, and yet with no approach to woolly indistinctness, is very remarkable. Of these four photographs it may be said that they are more suggestive of the pencil of the artist than of the camera.

Returning to the earlier numbers of the catalogue, the Rev. G. W. Allen's four studies, Nos. 14 to 17, deserve notice; the subjects are fairly unconventional, and the manipulation excellent. Mr. H. Trueman Wood's "Mont Blanc from Summit of Mont Buet" (No. 31, Eastman stripping film) is a clever piece of photography, but I confess to a failure to appreciate adequately the charms of snow-clad mountains. No doubt the dragging of a huge camera and accessories up a semi-perpendicular road affords a pleasant athletic exercise, while the successful accomplishment of a large size photograph under adverse circumstances must give a peculiar sense of triumph to the photographer; but here the thing begins and ends. However, those who like chilly mountain tops will find much to admire in Mr. Trueman Wood's picture.

Lieut. R. B. Croft's "Jack and Jill" (No. 37) can scarcely be said to carry out the idea of the old nursery rhyme. It is true that in one picture Jack and Jill—a very pretty little Jill, by the way—are struggling up a very rocky hill side with the traditional pail; and that in one other the pail is overturned, with Jill sitting in a supposed disconsolate attitude, and Jack sprawling on the ground rubbing his head; but No. 2 picture is so obviously arranged that all spontaneity is lost. There is also no connection between the two pictures in regard to the surroundings. One might be somewhere in the pass of Glencoe, and the other on Salisbury Plain, for anything anybody can tell. As a piece of photographic work, Jack and Jill is commendable; as a story it narrowly approaches a failure.

Of Mr. J. Gale's pictures it is difficult to say more than has been said scores of times—that they are types of delicacy, admirable balance, and manipulative skill. He perhaps has excelled himself in "Homewards," which is simply a gem. As an example of the value of a suitable sky, "Homewards" is especially worthy of study. The rolling bales of wool which do duty for clouds in too many photographs are never to be found in Mr. Gale's work. Over Mr. Gale's sheep in "The Monk's Walk at Chenies," Mr. Sydney Cooper would go into raptures.

Mr. T. M. Brownrigg has been seen to better advantage, I fancy, than in his two pictures of scenery on the Dart. They have a tendency to flatness, but this may be due to the printing. There is, be it said, a great variety of platinotypes in the gallery, and Mr. Brownrigg's may not be of the best.

Mr. F. Whaley has carried out a very ambitious idea in "Your turn next." The picture is of large size; there are a dozen figures or so in it; everything is in keeping, and the composition is marked by much skill, but—that uncomfortable but—the perseverance of the artist extorts more admiration than does the picture itself. Only pronounced humour could make such a picture interesting: and humour is just the quality which is absent. There is nothing particularly striking *per se* in the interior of a barber's shop with the barber at work and half-a-dozen customers waiting to be shaved, while one, more important than the rest, is looking at his watch. It would almost seem as if Mr. Whaley had wasted much talent and time by the selection of an unfortunate subject. There is also the drawback that over all pictures, from those of Millais downward through Frith, where soap is introduced, hovers the shadow of a certain advertisement—Messrs. Pears have made all soap pictures insupportable.

Mr. Lyddel Sawyer's medal picture has already been touched upon. Other specimens of his work only less excellent are to be found in 54, "On the River Tyne," No. 54, "Foggy Weather," No. 55, "The Penny Ferry, North Shields," No. 82, "At the Fish Quay, North Shields," No. 83. Mr. Sawyer also shows other good pictures, but I mention these four as examples of a particular line of study which Mr. Sawyer would do well to pursue. Whether by accident or design, he has caught the spirit of Mr. W. Wyllie's pictures of Thames scenery. Mr. Wyllie delights not in the sylvan pastoral lazy aspect of the river, but in its busy, smoky, grimy, work-a-day life. Mr. Sawyer has shown what he can do in this direction, and, if I am not mistaken, he will earn fame and distinction by following up his extremely promising beginning.

Messrs. West and Sons' studies of yachts are as admirable as of yore, but one begins to tire a little of their prettiness. The cleanliness of the canvas, and the spick and span appearance of the boats generally, are almost painful. If Messrs. West could only give us a photograph or two of a Medway sailing barge with a patched sail, and having on board somebody clad in attire a little dirtier and more picturesque than the Bond Street yachting suit, what a relief it would be!

Mr. H. P. Robinson will, I trust, forgive me for thinking that he has been happier, both as regards choice of subject and treatment, than in his "Merry Fisher Maidens." His fisher maidens are merry certainly, but, unfortunately, their merriment has not added to their beauty. There is almost too much in the picture. The pose of the central figure is very fine. It would have contented me alone, and the loss of the children, with the sun dazzling their eyes and distorting their features, I could bear with equanimity. Is not the effect of the shingle, too, a little distressing to the eye?

Mr. Bracebridge Hilditch's studies of swans (Nos. 59 and 78) are more noticeable as examples of dexterity than of art—inevitable, perhaps, from the nature of the subjects. Mr. Tyser's "Fishmarket, St. Ives, Cornwall," and "The Lands End" (Nos. 89 and 90), show good manipulation. Mr. W. T. Goodhew's two pictures of Virginia Water (Nos. 94 and 95) are also excellent, though of the conventional order. Mr. David R. Clarke's "The Way of the World," I confess I do not understand. The title is an irritating one, and one has a right to protest against conundrums being sprung upon one in this manner. Mr. Horsley Hinton shows a very excellent series of landscapes, of which the best is "Watching the Dragon Flies." To hear the comments of the spectators, though, one is reminded of an old Scotchman who, when told by his minister to take a pinch of snuff to keep himself awake, asked why the snuff was not put in the sermon. The spectators want to know why Mr. Hinton did not put the dragon flies in the picture; to which the obvious reply is, that if he had they would not have been "watching" for them. But to touch upon the criticisms of the visitors is to venture upon limitless ground, and I forbear.

The School of Military Engineering is represented by a couple of pictures in their usual style (No. 120). The military engineers do not favour mistiness or atmospheric effect, or scantiness of detail. They are rather diffident in the matter of skies, and prefer to take a lump—the word, I grant is not elegant, but it is suitable—of forest with foliage reaching to the frame on three sides, and a well filled foreground on the fourth. There is not the slightest objection to their choice of subject; at the same time one would like to know how it is the river in one of the pictures is situated on an inclined plane? Had Mr. David R. Clark, M.A., in his "Wives and Weans Ashore" (No. 123) been contented with a less number of figures, his success, I think, would have been more pronounced. As it is, his wives and weans, all staring hard at the camera, are scattered over the picture in a somewhat exasperating fashion.

Dignified and full of repose are Mr. W. J. Stillman's "The Temple of Concord at Girgenti" and "Interior of Temple at Segesta." The treatment is quite in keeping with the subject, and the pictures worthily sustain Mr. Stillman's reputation. Mr. F. Beasley's standard is not quite reached by his scenes near Pangbourne (Nos. 132 and 133). In a third view (No. 165), in the same neighbourhood, he shows to better advantage. Mr. Francis Cobb may be complimented on a thorough success in "Down by the Old Mill Stream" (No. 133) and "The Miller's Home" (No. 134). They are both very sunny, and thoroughly artistic in composition. A clever piece of photography of its kind is Mr. Frank Hopps's "Bunch of Grapes," and so, in another direction, is Mr. W. Dillworth Howard's "A Street in Mergozzo." Mr. Richard Keene's superb views of Moreton Hall, Cheshire, are delightful to look upon; at the same time, with such an exquisite subject for photography, it would be strange indeed if the result were not good. This, however, does not lessen the credit due to Mr. Keene for his fine work. Some views of Nuremburg, by Mr. J. J. Ackworth, are exceedingly good, their brilliancy being particularly noticeable.

The Autotype Company show a fine enlargement from a negative by Mr. F. M. Sutcliffe, "The Evening Hour—Whitby," but the most interesting pictures of size at this end of the room are comprised in Mr. Van der Weyde's series of three which he entitles "The Adoration of a Doll." Neither the doll nor the adoration need trouble the spectator much, since the scheme of the series is to show the artist's skill in the treatment of the nude. The effort is as ambitious as it is unconventional, and cannot be overlooked. The pictures are certainly a remarkable achievement. Col. W. L. Noverre's three studies, "Penzance Harbour," "Sunset on the East Coast," and "Torbay," printed on rough drawing paper, are also out of the beaten track. They are very warm in tone, of wonderful vigour, and broad and massive. The defect is the artificial look of the skies. Probably this militated against their chance of a prize, for the pictures are most striking and original. Mr. S. Bourne is an old exhibitor, and in the dozen or so of studies he contributes he exhibits all his own skill. "A Grove in June" (No. 184), "By Leafy Ways" (No. 186), and "The Edge of the Forest" (No. 187), are particularly excellent. A certain neatness and unpretentiousness mark Mr. Bourne's work. It is not very easy to say why Mr. G. Balfour has named his picture (No. 199) "A Spring Evening." A November morning would describe it equally well. It is unpleasantly inky in tone, the line of the hills cuts harshly against the sky, and there is a singular patch on the ground which, on examination, appears to be meant for water. Altogether, it is a curious production.

Wide Angle.

Photographic Club.—The subject for discussion on the 16th inst. will be "Platinotype Printing," Anderton's Hotel at 8 p.m. Last outing of the season to Hampstead, on Saturday, 12th. Meet for tea at the "Bull and Bush" at 5 p.m.

A funny story related by the *South London Press* shadows forth what at no distant date may be common enough considering how the ranks of amateur photographers have of late increased and multiplied. A bazaar on a very large scale has been held at Bramblebury, near Wandsworth Common, and previous to the opening it occurred to an amateur photographer that the bazaar committee ought to be photographed. Accordingly he got them into a suitable spot, and posed his group with a beautiful background of woodland scenery. Unfortunately it never occurred to him that there might be other amateurs going about seeking whom they might devour, and scarcely had he began to focus, when from behind the Bramblebury oaks two conspirators sprang, each armed with the deadly camera. Each photographer wanting a different arrangement a dreadful altercation ensued, the committee meanwhile watching, half in terror and half in amusement, the rivals, and waiting for the dispute to end. How the matter was settled our contemporary does not expressly state, but as we read that a "waggon load of dry plates" was sent off, it may be assumed that every man had a shot. But what an ordeal for the group!

Notes.

This day fortnight a portrait by Messrs. Boussod, Valadon, and Co. (Goupil and Co.), Paris, of Mr. Andrew Pringle, will be issued with this journal, and some improvements will be made in the newspaper itself.

Photography has now a recognised place in the sciences. In one of those exact and ample encyclopædias in which the French delight—the *Encyclopœdie Chemique*—photography, dealt with by M. Pabst, occupies an entire volume of 460 pages octavo. Full as the details are, they are not sufficient for the *Revue Scientifique*, which points out that giving only a page and a-half to the history of photography is not doing justice to the subject. The critic also complains that instantaneous photography, to which so much attention is now paid, has been neglected by M. Pabst, and that he has overlooked the application of photography to astronomy, physiology, the physical sciences, histiology, and general anatomy. In other respects, the book in relation to formulæ, light, photometry, actinism, and optics, is an absolutely exhaustive one. It is clear, however, that what M. Pabst has omitted would of itself be sufficient for another volume—a sufficient proof of the formidable task a writer undertakes when he endeavours to grasp the subject of photography as a whole.

Attempts to work photographic limited liability companies have so often turned out dismal failures, that it is not surprising that the financial press looks upon the registration of a company in connection with photography as a proper subject for "chaff." The latest effort in this direction is certainly rather funny. A photographer who owns three portrait galleries, which, he says, have brought him in £400 profit per annum for the last two years, has conceived the idea of selling his business to a company. The capital is to be £3,000, and only half of it is to be called up. The vendor is to take 500 shares in part payment; but, says one financial organ, sagely, "before anybody walks into this photographic dark room, he should take care to discover how much hard cash Mr. —— is to take." Another financial authority also makes a thrust, asserting that one of the "saloons" has passed into the hands of somebody else, so that this part of the "stupendous business" could scarcely be sold over again. Altogether, the scheme of the enterprising photographer has not met with much encouragement from financial circles.

The Photographic Exhibition this year bids fair to be an unqualified success. Last year, it will be remembered, the meetings of the unemployed prevented a host of timid persons enturing into the neighbourhood of Trafalgar Square, and the receipts suffered in consequence. Judging from last week, the visitors should exceed the numbers of any previous season. We believe that the turnstiles last Saturday recorded an attendance which "cut" the record. This is very gratifying, not only for the sake of the coffers of the Parent Society, but also as showing the increased interest in the exhibition. Some of the daily papers on former occasions generally managed to overlook the exhibition, but it is not so this year.

A novel mode of obtaining evideuce of the social condition of the lower classes has been instituted in New York. In order to ascertain where overcrowding exists, it has been decided that a staff of photographers shall, in company with the proper authorities, make domiciliary visits, and photograph the interiors of dwellings. It is not so stated, but we presume the flash light will be made use of. The adoption of this plan would in London and Liverpool result in some startling revelations. There is no technical difficulty save that no interior of the size usually found in squalid neighbourhoods could be photographed in its entirety. Still enough, of course, for the purpose could be secured.

The great Photographic Beauty show, founded on soap, is over, and fifty-four ladies are rejoicing more or less over their victory, while thousands, if we may believe the "Bit" paper which organized the competition, are sorrowing and, possibly, tearing their hair. It is clear that the judges had a terribly onerous task. Beauty, as the paper very properly remarks, has no precise standard, and it is interesting to know upon what rules the judges proceeded. We are informed that all the photographs were first numbered from one upwards, and the same figures were placed on the respective sealed envelopes containing the names of the senders. The sealed envelopes were laid aside in their order, and the photographs mounted on large sheets of cardboard to facilitate examination. The judges then commenced the process of elimination, and reduced the number down to 130. Further selections resulted in a decision as regards the four chief prizes—a matter which required considerable consultation before an agreement was arrived at. Then came the task of awarding the fifty minor prizes, which was decided by voting in much the same manner as the medals are awarded in the Photographic Society's Exhibition.

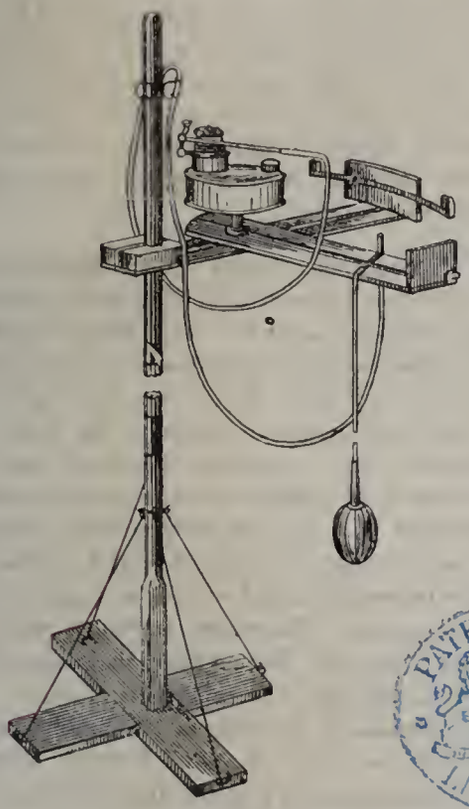
But what must have been the pleasantest part of the duty, were the interviews with the various ladies for the purposes of identification. Only one thing appears to have been omitted, the mention of the photographers to whose efforts the prize winners were so much indebted. Surely they deserve recognition, if not from the judges, at least from the successful competitors. But, perhaps, they have been remembered both by the four winners of the money prizes, and by the fifty ladies who secured each a box of the invaluable soap.

The Turkish authorities appear to attach a vast importance to the influence of photographs as a piece of political machinery. Some time ago the Sultan had all the photographic print shops in Pera overhauled, and seized and confiscated all the portraits found of his eldest brother, the Crown Prince, whom he suspected of conspiring against him. This, however, is a small matter compared with what has happened in Armenia. Here a young photographer was thrust into prison for no other crime than having photographed pictures of the old Armenian kings. After remaining in prison for two years without trial, the poor fellow died last week of typhoid fever. Photography in Turkey is evidently not unattended by danger.

APPARATUS AT THE PHOTOGRAPHIC EXHIBITION.

No. I.

Fig. 1 represents Schirm's magnesium lamp and stand, exhibited by Herr Julius Mayer. This lamp is of interest from having formed the subject of some contention in this



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Fig. 1.

country at photographic meetings, from the abnormally small quuantity of magnesium which Herr Mayer says can be used with it for the obtaining of a powerful light. The diagram of the portable stand of the apparatus explains itself. The magnesium is carried in a little metal cup at the end of a lever arm. When this cup is charged, it can be turned into the centre of the burner, which, in fig. 2, is depicted its actual size. The cup can be turned

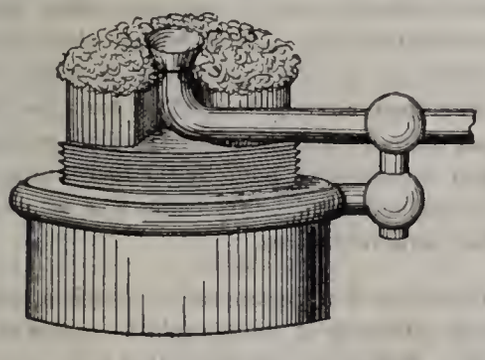


Fig. 2.

into the centre of the lower part of the spirit-flame, where it and its charge get exceedingly hot, but the magnesium then does not readily catch fire because of the small supply of oxygen at that part of the vertical flame; when, however, it is blown upwards, it catches fire near the exterior of the flame as soon as it can get a sufficient supply of air. The adjustable wooden arms on the stand are to hold screens, either for shading the lens of the camera, or for diffusing the light by translucency, or for both. Doubtless the Photographic Society will test the powers of this lamp some evening. In Mr. Wm. England's lamp exhibited some months ago before the Society, the magnesium was in a position to get somewhat hot before being blown into the flame, and when flashed off it seemed to give less smoke than usual.

Fig. 3 represents, with the case removed, a refreshing novelty in detective cameras, invented by Mr. C. Winter, and exhibited by Messrs Mawson and Swan. It takes twelve plates of lantern size, and, being all made of metal,

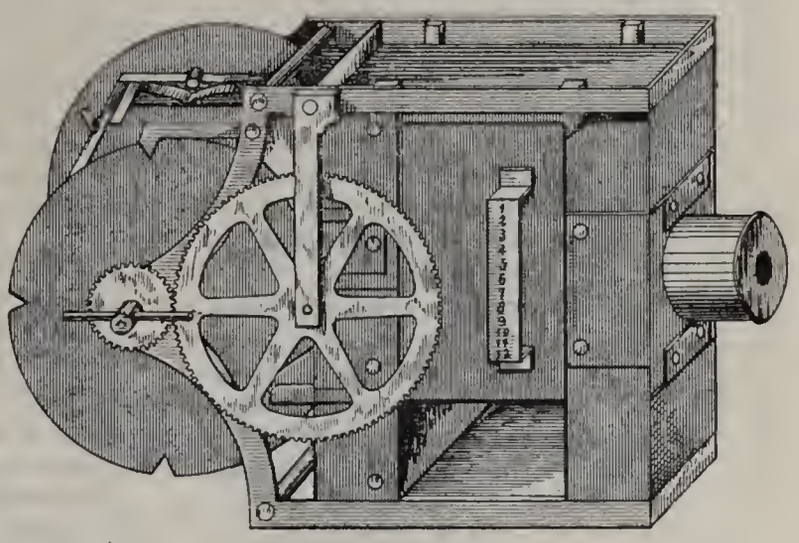


Fig. 3.

would be unusually heavy in larger dimensions; brass has, however, the advantage of not being liable to warp like wood. The principle of the apparatus can better be explained by Fig. 4. The plates are stowed away in the

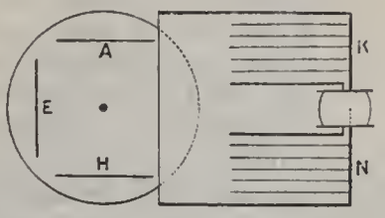


Fig. 4.

compartment K, above the lens; when a plate is wanted, it first reaches by means of suitable mechanism the position A; by partial revolution of the wheel it next comes to E, where it is in the position for exposure; next it passes to H, and finally is stored away in the compartment N. There are suitable devices for screening the plates from light, except during exposure. The case is cleverly made, so that an observer can look at it at the time of exposure, yet not know that his likeness is being taken. A detached part of the carrying strap which comes over the end of the camera is carried by the same axis as the wheel shutter within, and flies round with such rapidity during exposure that its motion is little likely to be detected by the casual observer. The instrument is called "The Giah" camera—"giah" being the Welsh name for winter. Mr. Winter is a Welshman, and a native of Narberth, a little town in Pembrokeshire, noted several miles round for its cheeses, which once were wickedly said by the country people to make excellent leather for the soles of boots; our experience of it in the locality tended to support this view of its quality.

Fig. 5 represents a camera which Mr. Thomas Samuels has long had in home use; it is one of his own numerous inventions. Two brass rods, moving on a hinge at the end, lie along part of the top of the camera, and project beyond its back, where they carry the dark tunnel of black cloth represented in the cut, so that all is ready for focussing without any focussing cloth being thrown over the head. After focussing, all this arrangement, and the focussing screen, are turned upwards, and lie upon the top

of the camera; the plate-changing back is then swung round into position, as represented in fig. 6, and all is ready

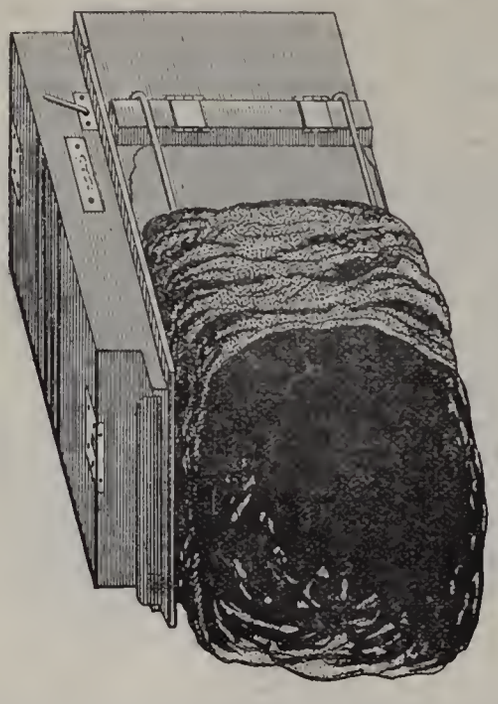


Fig. 5.

for exposure. The camera and its adjuncts on view at the Exhibition work with ease and rapidity.

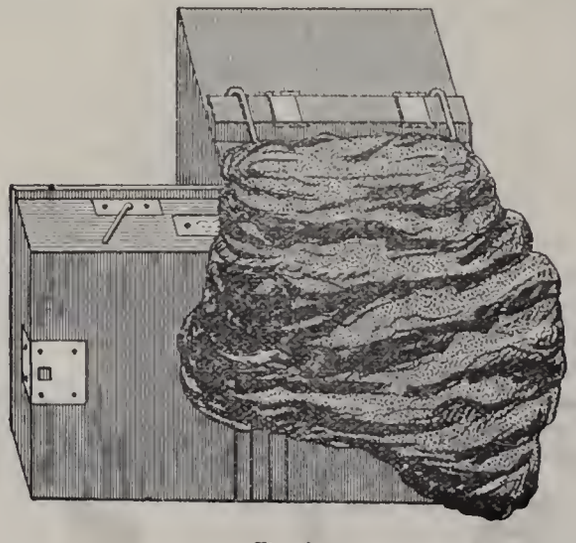


Fig. 6.

Among the other exhibits of Mr. Samuels is a camera with conical bellows, which shuts up compactly so as to form nearly everywhere a rectangular box, and then seems as if it would bear much knocking about without injury, except where a part of the lens-mount projects. Screws and springs have been largely abolished in this instrument; its focussing is effected by a lever motion.

Dr. A. Miethe has commenced his duties as editor of the *Photographisches Wochenblatt* with the October number; and in a long list of promised contributors to its pages occur the names of Drs. Cohn, Eder, Lohse, Schnauss, Stein, and H. W. Vogel.

From experiments described in *The American Journal of Science* for September, Messrs. A. A. Michelson and E. W. Morley infer the possibility of establishing a material standard a metre long, whose length in light-waves is known to within one part in one million, and perhaps one in ten millions.

PHOTOGRAPHIC OPTICS.

BY W. K. BURTON.

Chapter X.—The Optics of Stereoscopic Photography.

Of late years the stereoscope has gone comparatively out of repute, and is but little heard of. We hear regrets on all sides that it has fallen in public estimation, but at the same time, those who are loudest in their regrets have done but little to set their old friend on his legs again. We hear almost all landscape photographers, especially amateurs, regretting the decline in public favour of the stereoscope, yet we never see them hoisting a stereoscopic camera and showing the results to their friends, a procedure which, if carried out by any large number of amateurs, would almost certainly raise the instrument, if not to its old proud position, at least to one of dignity.

Theories are often advanced as to why the stereoscope has fallen so completely out of fashion, but none of them seem to be very satisfactory. The probability is that it fell because it had, some twenty years or so ago, reached a height of popularity which its merits did not justify. There was, as was natural, a reaction, and it took too low a place. There are, however, signs now that the reaction may be over, and that the stereoscope may once more receive a fair share of popular favour. We shall hope so, for it is a very scientific and a very beautiful instrument.

The optical principles of stereoscopy are by no means complicated. They depend simply on the fact that, in the case of naturally looking at an object, the impression is really made up of two images, one received on each eye, *and each slightly differing from the other*, and that, if we can make two *pictures* of the object, differing just in the same way, and can arrange that each of them is seen by one eye only, we can reproduce faithfully the result of natural sight with two eyes, and will see objects *as if they were actually solid.*

If anyone doubts that we see two different images with the two eyes, let him look at a landscape through a window, standing some eight or ten feet behind the latter. In this case, of course, the window frame forms part of the image. If now he look at the scene, first with one eye, then with the other, he will see that in one case he sees more of the landscape at one side; in the other case more of the landscape at the other side. Farther, if there is, for example, a lamp-post in front of the middle of the window, he will find that it hides a slightly different part of the landscape according to which eye is used. We gain our idea of *solidity* of objects almost entirely on account of these two different images. We may, however, give an idea of *distance*, in the case of comparatively near objects, without seeing two different images, and this also on account of binocular vision. Thus, if a small, uniformly coloured sphere be hung by a thread with a perfectly plane background behind it, we receive precisely the same image in each eye, yet we know that we can estimate with a fair amount of precision the distance of this sphere. This is because the axes of the eyes in all cases pass through the object looked at, necessitating less or more convergence, according as the object is far or near, and that a judgment of the amount of convergence, and hence of the distance, is automatically made from this datum.

We borrow an illustration from the "British Journal Almanac" of 1887 to illustrate this. In fig. 48 objects A, B, and C are supposed to be at different distances from the eyes—shown as small circles—and it is seen how the axes converge more for the near than for the far objects.

It may not be granted at first that the appearance of solidity and the judgment of the distance of objects are due to binocular vision. It may be argued that if we close one eye we still see objects solid, and that we can still judge of distances to a certain extent. This is true, but is less true than at first appears. Familiar objects certainly appear quite solid, but that is greatly because we know so well that they are solid. If we view, for the first

time, some object of complicated form with which we are qnite nnfamiliar, with one eye only, we will often be sorely puzzled to make out its form. The judgment of distances by one eye only is more difficult than is imagined, as will be evident by the astonishment generally

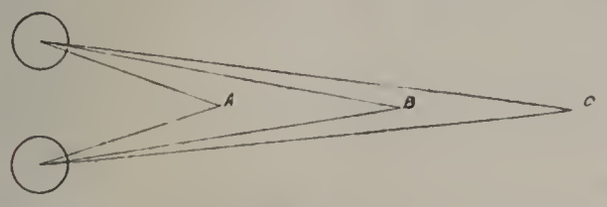


Fig. 48.

exhibited by the individual who is persuaded to let one eye be bandaged up, and to attempt to snuff a candle immediately that it is brought into the room, when he repeatedly snaps the snuffers some inches in front of or beyond the candle.

The writer remembers the case of a lady who very frequently poured the milk or tea on to the table cloth rather nearer her, or rather farther from her than the cup into which it was intended to go. On an investigation it was found that, although she herself had not previously been conscious of it, the sight of one eye was so defective that she could scarcely be said to have binocular vision at all. But the most convincing experiment is that with the stereoscope itself. We take a common stereoscopic photograph and view it through a good stereoscope, when the moment the two images are combined, the picture appears to start at once into a solid object.

The Stereoscopic Camera.—The method of getting the two pictures, differing as do the images received on the two eyes, is simply to take two photographs from slightly different points of view. These points of view should, strictly speaking, be just as far apart as the two eyes, and very little more than that is permissible in the case of very near objects—portraits, for example—but for more distant objects there is no appreciable departure from truth by making the distance apart of the two points of view somewhat greater than that of the eye—say four or even five inches, for example—and the result is a more convenient size of plate, and several other conveniences. By greatly increasing the distance between the two points of view an idea of solidity and relief may be given to objects so far away that unaided vision really shows no relief. These effects can scarcely be called natural, but they are sometimes highly useful. Thus an idea of the shape and formation of distant and inaccessible mountain peaks and coast lines may sometimes be thus got which could be obtained in no other way.

When stereoscopic photography first came into fashion, it was customary to make two exposures on two separate plates with the same camera, the lateral position being slightly changed between the two exposures. This custom has now so completely gone out of use that a bare mention of it is sufficient. A "stereoscopic camera" is now always used. This is in reality two small cameras, each fitted with a lens, fixed side by side, and so arranged that the lenses may be uncovered at the same time, giving at the same time two exposures, one on each half of a plate. The size of plate adopted is anything from $6\frac{1}{2}$ by $4\frac{1}{4}$ to 8 by 5. The latter size is strongly recommended by J. Traill Taylor, whose authority on the subject cannot be disputed.

The Lenses.—Any kind of lenses suited to landscape work may be used with the sterescopic camera, or for portrait work the portrait lens may be used. All that is said about angle of view, &c., in the chapters on lenses applies in the case of stereoscopic work; there is this difference, however, that the common form of stereoscope slightly *distorts* the image given with a rectilinear lens, whilst it *corrects* the distortion given by a single lens. The latter form is therefore peculiarly advantageous for stereoscopic work. The great thing, however, to secure is that the two lenses are of precisely the same focal length. Almost all opticians issue lenses "paired" for stereoscopic work, and these will generally be found to be of the same focal length; but they should be examined by accurately focussing a distant subject on the ground glass, and by measuring with a pair of dividers the distance between the same pair of points near the ends of the images given by the two lenses.

The Stereoscope.—The stereoscope is the instrument whereby it is contrived that each eye views only one of the two small pictures made of the subject, and that the two images are combined.

A little consideration will show that if we print our two views from the two negatives which are on the same piece of glass, or one piece of paper, and place the resulting print opposite to our eyes, the wrong picture will be opposite to each eye. The picture which should be opposite to the left eye will be opposite to the right, and *vice versa*. If, however, we cut the print in two and reverse the position of the two halves, we will have the right picture opposite each eye. If, now, we have the power of causing the axes of our eyes to change slightly—or in the case of very small stereo pictures merely to become parallel—whilst looking at the print held only about a foot away, we can look at one image exclusively with each eye, and will immediately see the object stereoscopically—as if it were solid. Some have this power, most can train themselves till they acquire it; but it is convenient to use an instrument whereby the strain always produced by giving a parallel or diverging direction to the axis of our eyes whilst they are focussed on a near object is avoided. In the older forms of stereoscopes, reflecting mirrors were used. Fig. 49 will illustrate the action of them.

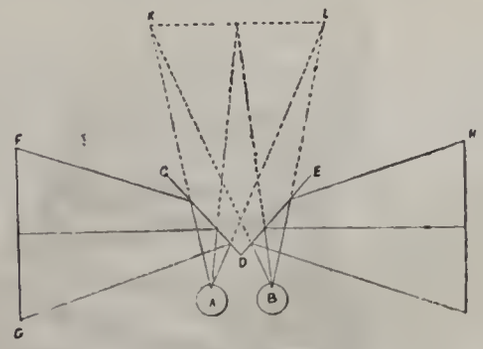


Fig. 49.

Here A B are supposed to be the eyes of the observre The two photographs—slightly differing as already explained—are shown at F G, H I. The images of these are

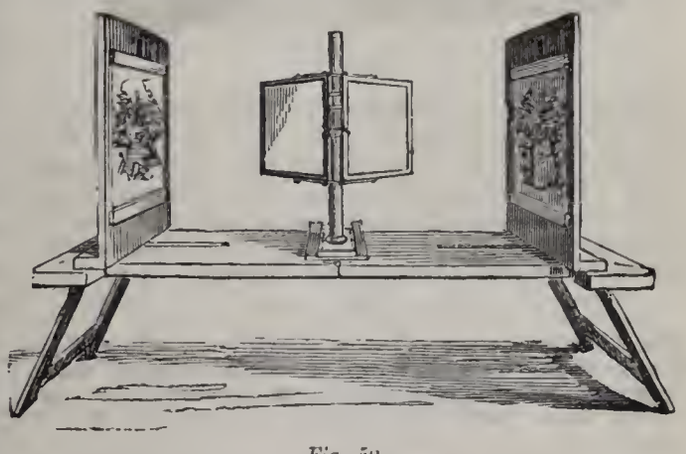


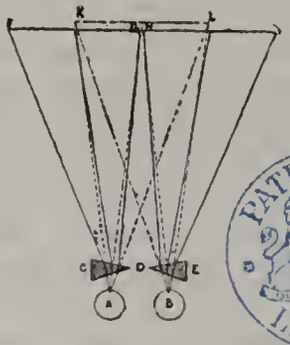
Fig. 50.

reflected by the mirrors C D, D E. These are arranged so that the angle between them can be slightly varied, and it will readily be understood how it may be adjusted so as to make the two images overlap and form a stereograph at

K L. I borrow fig. 50 from a communication to the Year-Book of 1886, by W. M. Ashman, which shows the reflecting stereoscope in perspective.

The reflecting stereoscope has certain advantages which have caused its revival to be strongly advocated quite recently, but its comparative cumbrousness is so much against it that it seems doubtful if it will ever come at all into general use again. The prismatic stereoscope has practically entirely ousted all other forms.

To explain elaborately this form of stereoscope would need too much space, but it is briefly illustrated here. If the reader does not understand from fig. 51 the manner in which the two prisms C D, D E, cause the two



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Fig. 51.

images F G, H I, to combine and form a single image at K L, he is referred to Chapter III., where the prism is treated of. He will there find a description of the manner in which rays of light are caused to *bend* in passing through a prism.

(*To be continued.*)

PRESIDENTAL ADDRESS BY J. K. TULLOCH, M.B.*

In a subject such as photography, dealing as it does so much with individual taste, there must constantly be much difference of opinion, but if criticism, however hostile, be made in a kindly way, our meetings will be a source of more than pleasure to every one, and a cause of annoyance to none. The search for a suitable subject upon which to address to you a few lines has been a difficult one. The mere mention of such well-worn subjects as developers, toning baths, and such like, cause a thrill of wearied disgust to any but the veriest beginner.

Optics, a fascinating study when once fairly tackled, somehow shows a most repellant front with its seemingly intricate and confusing diagrams. The cry generally is, keep all theoretical matters to yourself, and say in a word how we are to make better photographs, or how to get equally good results by a quicker and simpler method. I have chosen to-night a subject which, while we must dip a little into the theoretical, has for its aim and object a purely utilitarian purpose. It is, in short, a way by which you may vastly improve your photographs, simplify the process, aid permanency, and at the same time reserve a power over the finished result which is impossible in any but this one way.

Without further mystification I would ask whether you have ever noticed how much more true to nature a photographic transparency is than a print upon paper or other opaque base. For a long time a war was waged as to whether the modern dry or the old wet gave the finer result. Now it is almost universally admitted that, except under certain conditions, the advantage is all on the side of wet collodion, and plate makers do not hesitate to make this wet plate quality an advertisement cry for their own special production. I have all along held the opinion that *prints* from wet collodion negatives were far finer than from gelatino-bromide dry plates, but I deny that the same holds good with *transparencies* from the same negatives.

Gelatino-bromide negatives, intensely beautiful in their delicate gradations, seem to me to be altogether unsuited for printing from upon an opaque base, but when used to produce a transparency from them, the case is altered, and an average wet plate negative will fall far short of the gelatino-bromide for this purpose. I do not say that the best productions of wet collodion are not up to the best dry plate even in transparency work, but what I do say is that the average of good work is far higher from gelatino-bromide than from wet plates. But you will wonder what all this has to do with the subject in hand. Surely a return to wet collodion is not to be suggested? No, certainly not; but it is to be suggested that for the highest efforts of the photographer, printing from gelatino-bromide negatives upon an opaque base be discontinued. This does not necessarily imply that all the best pictures are to be put up as transparencies. Although nothing could be more beautiful, it would be highly inconvenient; but, in short, my suggestion is that a transparency thin and delicate be made from a negative either the same size or enlarged, and this to be superimposed upon an opaque base.

At first sight this proposal seems to offer no advantage, but consideration for a moment will show that it has many. Let me enumerate some of them. First, then, the gradations are far finer in gelatino-bromide than in any printing process upon paper. Whatever there is in the negative will be found in the transparency. Especially is this true as to detail in the dark parts of the picture—a vital point—as this is just where gelatino-bromide fails when printed from in the ordinary way. Secondly, by placing this transparency upon slightly tinted paper, different effects may be produced. Thirdly, by roughly rubbing in with a stump upon the paper base a lighter or darker ground, the light and shade of the picture as a whole is thoroughly under the control of the operator. Fourthly, the transparency may, with the same trouble, be any reasonable size. Fifthly, a carefully made and well-washed transparency upon glass is, in all likelihood, quite permanent. And, sixthly, the whole process is quite within the powers of the average operator, and opens up a vast field for the exhibition of individual taste. By working roughly, but with correct intention, upon the paper background, high lights may be subdued, or dark parts lightened; clouds may be strengthened, or altogether put in, and, in short, one has a reasonable control over what he intends to produce.

But there may be objections to this idea upon certain grounds, and first, it is not a new idea. Granted; but when introduced many years ago the wet process was in vogue, transparencies infinitely more difficult to produce, and, consequently, the game not so much worth the candle; besides, I do not think that it was ever suggested to work upon the light and shade as I suggest, but only to add a few pencil hatchings to simulate a pencil sketch.

But, it may be argued, if so much is to be done by hand, is there not the old objection to retouching in a doubly aggravated form? If it be objectionable to obliterate by means of the hand almost invisible defects, how much more so to boldly model the whole light and shade of a picture, and, indeed, almost strive to rob it even of the semblance of a photograph? I reply to that, that from the overwhelming number of those who use retouching, it is plain that the consensus of opinion is in favour of its legitimacy, nay, of its necessity, at least in the meantime.

Granted, then, that it be allowable to remove by hand the almost invisible defect, I hold that the only limit to the practice is the limit of necessity, and if it be proper to add *anything* by hand, the amount to be added must be settled by what is required. Tried by this test, the plan of altering boldly the whole light and shade of a photograph is perfectly legitimate, for the principle involved is the very same, whether you remove a freckle or illuminate a whole hillside.

But is there any advantage in this plan over, say, printing in platinum or gelatino-bromide paper and working upon that? There is a very great advantage, in so far as the artist is unhampered by the fear of spoiling his picture after having brought it so far. He works upon a piece of plain paper which is to be placed behind his picture, but which if it be not quite to his taste, may be destroyed and another made in a few minutes, leaving his transparency as good as ever; besides, not nearly the same skill is required, for the work is only to show through from behind, and may be broadly put on. The objection, that even this requires some little artistic ability on the part of the operator, I hold to be no objection at all, for a photographer without some little artistic ability is not worthy the name, while those who sigh for a method whereby their taste may have freer scope, will think this requirement a recommendation in place of an objection.

There is one other point which I fancy may be objected to by some, and that is, that by this method, while it may give a very good result, it is a result which cannot, without the very same

* Abstract of Presidential Address to the Dundee and East of Scotland Photographic Association.

amount of trouble, be reduplicated. After all your trouble you cannot throw off half-a-dozen copies even, but must content yourself with a single picture. From a commercial point of view I admit the objection, unless, indeed, the lithographer be called in to produce your backgrounds by the hundred; but for the amateur this is no objection, for he generally wants only one copy, and it must not be forgotten that difficulty in producing a certain article adds immensely to the value of the original. I am convinced that those who give this method a trial will very much enjoy the power which its puts into their hands, and although the first attempt may not be entirely successful, I am sure that they will immediately feel that the process is capable of great things through practice.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY.

BY W. M. ASHMAN.

Very closely allied to the photographic method of printing dealt with under the heading of carbon is that system known as Woodburytype; and the same may also be said of collotype, photolithography, and etching processes generally up to a certain point, when pure photography ends, and chemical or mechanical means are introduced to carry on the work commenced by light.

In Woodburytype a thick layer of gelatine, with or without lamp-black, is sensitized with potassium dichromate, and dried on a glass plate support which has previously been rubbed with tale and coated with a tough normal collodion. A drying cupboard containing calcium chloride is used. The sensitive film, when dry, is stripped from the glass, and placed collodion side in contact with a negative in an ordinary printing frame, and exposed to light. The negative should be provided with a safe edge, as pointed out in the twenty-seventh article of this series, and the time of exposure guided by means of an actinometer. The exposed tissue, upon removal from the frame, is mounted collodion side down on a rigid support: glass plates levelled, and coated with a solution of india-rubber in benzole are generally employed for this purpose, and when the india-rubber has set, the tissue can be attached by gentle pressure. Transference to a tank of water heated to 100° F. starts development, and the heat is gradually increased to 165° F. in order to dissolve all soluble gelatine and leave the image in relief, the highest lights being represented by the deepest depression or intaglio. This is then hardened with chrome alum, washed, and dried; then stripped from the support, cleansed of india-rubber, and put down on a suitably prepared block of planed hard steel. Upon the relief a stout sheet of some soft metal—such as lead or its alloys—is laid. Pressure is then brought to bear upon the arrangement, and an intaglio in the soft metal is the result. In practice, lead is found to be the best, on account of its extreme softness, and the requisite pressure for the work is exerted by the hydraulic press, working, according to size of plate, from 50 to 200 tons. Curiously, the alum-hardened gelatine bearing the image in relief is not flattened or destroyed as to its details, but with skilful treatment yields a perfect replica in the soft metal; consequently, a large number of leaden blocks can be produced quickly, and the process of printing therefrom can be hastened when many copies are wanted. Here we have the mechanical intervention which completes the remainder of the work, and it is only requisite, after pulling off the gelatine relief, to secure the lead block or mould in a block of wood, and in a simple sort of press, by means of liquid plaster of Paris to keep it in position, and when slightly oiled it is ready for the production of prints. An ink is prepared by dissolving gelatine with some colouring matter, and while still warm, a little is poured upon the block, which is immediately covered with a piece of heavy calendered paper, and by means of a thick glass slab, and strong springs, the superfluous ink is pressed out. The ink soon sets, and the paper is removed, bringing with it a mechanical print which is more or less a perfect reproduction of the negative used, the colour being of course governed by the tint of the pigments mixed with the gelatine. The print really consists of various thicknesses of this coloured gelatine, and the shadows in the lead block having held more of the warm solution, they are proportionately darker upon the paper. After the edges are scraped of the superfluous ink which exudes, and the margins cleaned, the print is soaked in alum solution for ten minutes, then washed and dried. Reversal or otherwise of a picture depends upon which side of the relief is placed next to the lead in the press, and the depth of tone pervading the lights is regulated by the composition of the ink, and pressure in printing the paper. Dense negatives yield the best Woodburytypes.

Stannotype is a modification of the foregoing, which renders the process more simple and less expensive, because the hydraulic press is dispensed with, and the first gelatine relief forms the mould from which the prints are taken. It follows, therefore, that a positive picture, a transparency and not a negative, must be used to produce the gelatine print, which will then be an intaglio of the subject, and this will need some protection from the action of the heated pigmented ink. The late Walter B. Woodbury designed the ingenious method of covering the matrix with a sheet of pure tin foil without holes in it, and pressing this into perfect contact with the hardened gelatine by subjecting it to pressure between two india-rubber rollers, arranged as in a wringing machine. Thus a metal-faced mould is obtained with little or no sacrifice of the sharpness of the original, and with less trouble and cost of apparatus than in the former case. The surface is then oiled, and printed from, as in the original process, with metal moulds. Stannotype blocks are very little used for the purposes of illustration, although eminently suitable for many subjects. Resistance to wear is effected by facing the tin foil with steel or other hard metal.

The subject of transparencies by the Woodburytype process has been alluded to, and it may be asserted with confidence that, with skilful manipulation, the beauty and transparency of shadows are unsurpassed by any other known method. Either a metal mould produced by pressure or a stannotype relief is first produced; pigmented gelatine is poured thereon, and the glass, whether lantern slide or larger size, laid upon the top. When judged that the ink has set, the plate is removed bearing the image. Any coloured ink may be compounded, but for lantern slides finely divided lampblack in gelatine is very suitable. Such transparencies require protection from the possible injury of damp and dust. A coating of hard spirit varnish or collodion should be given.

We now come to those methods of producing prints which involve the use of ordinary printing presses and some kind of printing ink as used for type, engravings, or lithographs. Collotype is generally understood to mean a process in which the photographic part consists of sensitive gelatine spread upon plate glass, and printed upon by light through a negative. Heliotype is the name formerly given to a similar process, where metal plates are used instead of glass. In the former case a thick plate of glass receives a coating of albumen and silicate of potash or soda, which, after drying, is treated with a film of dichromated gelatine, levelled, and dried at a moderately high but even temperature. If the negative to be employed consists only of lines of equal clearness, there is no need to do more than take a print from it at once on the gelatine, but, as the majority of subjects possess half tones or their equivalent, some grain is required which, in the ultimate printing plate, shall hold the ink in a variety of proportions to produce light and shade.

The plans devised for effecting this object are very numerous. Some produce a granular surface on the gelatine itself by adding to it tannin or zinc oxide, or by the admixture of some partly decomposed gelatine, and variations in the temperature at which it is dried. Some

effect the object by treatment with alcohol, while others prepare a negative by photographing a stippled, dotted, or lined surface, before, at the time, or after the subject itself is taken. One of the most recent and very simple methods is by sprinkling over the surface of the wet gelatine some emery powder of selected fineness or coarseness which has been previously warmed and mixed with a trace of some wax, such as stearine. After the plate has dried the waxed emery can be brushed off, leaving a grain of a suitable character for the purposes designed.

Printing in diffused daylight occupies about twenty minutes as an average. Margins may be preserved by interposing an opaque mask of thin paper around them during exposure. After printing, the excess of potassium dichromate must be thoroughly washed away, but, in order to prevent undue swelling of the gelatine, it is customary to first expose the back of the plate to diffused daylight for a few minutes to render it partly insoluble, and to tallow the edges to keep the water from finding its way underneath.

(*To be continued.*)

Patent Intelligence.

Applications for Letters Patent.

15,451. G. RENWICK, 128, Colmore Row, Birmingham, "Lock for Dark Slides."—Oct. 2nd.

15,478. F. COWLEY, 54, Fleet Street, London, "Means for Suspending Pictures."—Oct. 2nd.

15,530. R. W. BOYD, H. S. NOBLETT, and F. T. CANTLE, 28, Hatton Garden, London, "Camera Stands."—Oct. 3rd.

15,583. F. H. FROEDMAN, 23, Mary Street, Dublin, "Photographic Dishes."—Oct. 4th.

15,651. W. J. LANCASTER, 6, Livery Street, Birmingham, "Printing Frames."—Oct. 5th.

Specifications Published.

14,801.—*Oct. 15th*, 1888. "Stands for Photographic Cameras." GEORGE CHARLES INKPEN, Architect and Surveyor, 12, Havelock Road, Southsea.

A portable stand for holding a photographic camera, or similar instrument, in position, consisting of four parts, viz. :—

Part 1. Metal tripod, or base, with tension rod and screwed sockets.

Part 2. Principal support an ordinary walking-stick, having screwed sockets at both ends. The stick may be jointed.

Part 3. Ordinary parallel plates as usually applied to surveying levels, with socket to screw into the head of the walking-stick.

Part 4. Guy rods, stays, or tension bars, with screw adjustment for tightening and making the whole perfectly rigid when put up together.

15,376.—*25th October*, 1888. "Appliance for Vignetting Photographs." ARTHUR HAMMOND GOODALL, Rydal Cottage, Elms Road, Dulwich, Photographer.

In the method hitherto used for producing vignettes, an aperture is first cut of a suitable size and shape in a piece of card or other opaque material, and the edge of the aperture is then serrated with a pair of scissors.

The invention consists of an instrument, somewhat the shape of a pair of railway ticket clippers, by means of which the said serrating or notching is accomplished in a more convenient and satisfactory manner. The instrument, as above stated, is made on the principle of clippers, such as are used by railway companies to clip railway tickets.

The inventor says that :—

1. The time taken to produce a vignetting shape is reduced considerably less than a quarter, as compared with the present method. 2. The angle of serrates or notches formed by the instrument in the vignetting shape being regular, a practically perfect gradation is produced in the print. 3. Any sized vignette can be cut rapidly with equal perfection. 4. The original shape of the aperture of the vignetting shape is preserved. 5. Long or short serrates, or notches, can be cut regularly. 6. The handles being bent, additional serrating, if required, can be done without removing vignetting shape from printing frame. 7. In case any part of a negative is especially dense, one long cut or more can be made regularly or not, as required. 8. Two or more vignettes can be cut at the same time. 9. Never requires sharpening.

15,454.—*October 27th*, 1888. "Improvements in Photographic Cameras." SAMUEL DUNSEITH MCKELLEN, Photographic Engineer, 3, Chapman Street, Hulme, Manchester, and JOHN DUNSEITH MCKELLEN, Photographic Apparatus Maker, 3, Chapman Street, Hulme, Manchester.

Our invention is for improvements in detective and other cameras, and is intended to provide in a cheap form an instrument which will serve the purpose of those who are unable or unwilling to pay the high prices demanded for the more elaborate instruments.

The camera consists of a front which in itself forms a shutter of peculiar and novel construction, which is hereinafter described. The camera body in the cheaper form is a rectangular box, but may be made with bellows if desired. At the back of the box the plate-holder—carrying as many plates as may be desired—is hinged ; it is of the same sectional form as the camera, and when hinged to it and closed, the whole appears as one continuous box, the size being according to the size of the plates which are to be used. At the back of the plate-holder, and forming the back end of the camera, a lid is hinged ; strong springs are fixed on the inner surface of this lid, so that when the plates are in the holder, and the lid and holder closed up, the plates will be pressed home, the front one being in proper register, and bearing against the camera back. Before putting the plates in the holder they should be backed with opaque paper attached to the glass ; a slight touch of gum or paste at two corners is ample.

The changing is done in a dark bag. The operation is simple : the holder is released by lifting the catch so that it falls back on its hinges ; the exposed plate is taken out by catching it at two sides by the thumb and finger. The holder is closed and the lid opened, and the plate put in at back of the cardboard which is supplied with all of the holders. When all are exposed, the cardboard is at the front, and acts as a cover to the plates.

The front of the camera is itself a shutter, which may be made as a shutter separately, or in conjunction with a camera of any form. In using it here I mount the lens inside the box at back of shutter, but the construction is the same whether used as a shutter separately, or as part of this camera, and whether at front of or behind the lens.

The especial part of the shutter which we claim as our invention is the mode of applying the motive power by which the shutter is set ready for action without carrying the exposing aperture across the lens. This is done by reversing the action of the spring or springs which propel the shutter disc.

Suitable mechanism is arranged so that when in one position the springs will pull or push the shutter disc in one direction, and by moving the mechanism the springs will pull or push the shutter disc in the contrary direction. By the use of this shutter the plates do not need to have a dark shutter in front of them, and the only movement needed to expose, is to adjust the mechanism which propels the shutter disc, and then at the proper moment to press the spring or ball which releases it.

15,944.—*Nov. 5th*, 1888. "Apparatus for Imparting Surface Ornamentation to Glass." ANTHONY DIXON BROGAN and ANDREW MURRAY MALLOCH, both of Firhill, Glasgow, Glass Manufacturers.

This invention relates to improved apparatus for imparting to glass sheets, or plates, surface ornamentation such as patterns or designs in intaglio and relievo, the said ornamentation being under the invention imparted in the act of transferring the glass from the flattening, or heating kiln, to the annealing kiln, or leer, by running the waggon carrying the glass under an impressing roller or rollers with which the glass comes in contact.

The impressing roller is fitted adjustably in bearings, preferably within the mouth of the annealing kiln or leer, so that it may not be subjected to the high temperature of the hot kiln ; and when, after the glass has been flattened in the process of manufacture, or re-heated after having been manufactured, the carriage or table bearing the sheet or plate is being transferred from the flattening or heating kiln or leer, the said roller bears upon the surface of the glass, which is impressed with the pattern or design on it.

Correspondence.

LEEDS PHOTOGRAPHIC SOCIETY'S EXHIBITION.

Sir,—Will you kindly grant me a small space in your journal to reply to a large number of correspondents who ask me for particulars of the above.

Exhibits are confined to pictures by members of the Leeds Photographic Society, and no prizes are offered. The exhibition was opened on the 1st inst., in one of the rooms of the Leeds Fine Art Gallery, and will remain open until January 2nd.

By inserting this letter in your next issue, you will save photographers the trouble of applying for space to exhibit, and greatly oblige,

Leeds, Oct. 8th. S. A. Warburton, Hon. Sec.

PHOTOGRAPHIC COPYRIGHT.

Sir,—Among the leading articles in the *New York Herald* of October 1st last, the following apology was inserted, owing to the infringement of copyright of one of Messrs. Byrne and Co.'s royal photographs, by the above newspaper. "In the *Herald* of August 25th appeared an electro of the family of the Prince of Wales, which was inadvertently imitated from a copyright photograph which, as it now appears, was originally and exclusively taken by Royal permission by Messrs. Byrne and Co., the eminent photographers, whose studios at Richmond are so well known to Londoners and tourists. The *Herald* picture was necessarily much reduced, but the original photo and its copies are of imperial size. The likenesses are, of course, perfect, as taken from life under peculiarly valuable circumstances, and differ artistically from the flood of photos of the Marlborough House family, which are made up in groups from single photos, often of them selves copies. The plate is peculiarly valuable as presenting the Duchess of Fife in the very last photo of her as the maiden Princess."

I send you this, thinking that you might consider it worth giving a place in your valued paper. The evasion of copyright is giving me—as I presume other professional photographers—much trouble, and I think this might, if even in a small way, act as a deterrent. W. J. Byrne.

Hill Street, Richmond, Surrey, October 7th.

EIKONOGEN.

Sir,—As some correspondence has taken place with reference to our note to Messrs. Marion *re* the above developer, we think some explanation is due. At the time we wrote the letter, we did not in the least anticipate that it would be used for publication, and therefore it was greatly deficient in detail. For many years we have prepared most of our solutions on the rational 10 per cent. system, and, therefore, when the new developer was brought before our notice, we naturally made it up on the same principle. The proportions we mentioned answered perfectly in our own practice, as the whole amount of stock eikonogen was usually diluted at one time, and, therefore, if any portion was undissolved it was immediately taken up when the full bulk of water was added. The publication of the letter was in fact premature, as we very shortly found that "eikonogen" was not soluble to the same extent as most other chemicals, and, therefore, unsuitable for 10 per cent. strength.

The weaker solution mentioned by us to be used for developing—viz., 1 in 100—should therefore be prepared in the first instance. In all the correspondence on the subject, the principal point of our letter appears to be entirely ignored, viz., a simpler method of preparing the developer than the complicated instructions sent out by the makers.

The developer is undoubtedly very powerful, as with the sole addition of sulphite of soda it is capable of producing most excellent negatives, but at a slower rate than when used with washing soda. A longer experience with it has proved to us that the most suitable solutions for developing in order to secure the finest effect of detail and density are eikonogen 1 ounce in 100 ounces of water, plus 4 ounces sulphite of soda, and washing soda 1 ounce in 100 of water.

For normal exposures, equal quantities of each, but varied at discretion, in the same manner as solution of pyro and ammonia according to exposure. For instantaneous work, and some effects of lighting, stronger solutions of both are advisable, say 1 in 50. In ordinary everyday use this method of preparing the developer would be found to possess extreme simplicity, of which we think any of your readers who may have seen the original formula sent out by Messrs. Marion will admit is not possessed in the complicated description of "parts," "grammes," "grains," and "drachms," appearing to be an imperfect, or possibly too literal, translation of the German formula. Solutions of bromide and soda at 10 per cent. strength can be kept in reserve for use if required, and we can personally vouch for the quality of the results obtained by the above-mentioned system.

Fradelle and Young.

246, *Regent Street, London, W., October 5th.*

Proceedings of Societies.

Photographers' Benevolent Association.

October 4th.—Committee meeting at 181, Aldersgate Street, Mr. W. Bedford in the chair.

The Photographic Society having granted the use of their Exhibition on Friday, November 8th, for the benefit of the P. B. A., it was decided to give a lantern display as hitherto. The gallery will be open from 7 till 10 p.m., and it is hoped will receive the support the object deserves. The charge for admission will be 6d, or tickets can be obtained of the secretary, H. Harland, 83, Hawksley Road, Stoke Newington, N.

East Dulwich and Peckham Photographic Society.

At a meeting on Oct. 4th, the President, Mr. F. W. Edwards, was in the chair.

Mr. Tollet was elected a member of the Society.

The Treasurer of the Society (Mr. Banks) placed at the disposal of the committee a silver medal for competition at their annual exhibition in January 1890; such competition to be confined to members only.

Seven candidates were proposed as members of the Society.

The President delivered an address on "Lenses," illustrating his remarks by lenses of various makers, from the single landscape lens to the latest form of doublets, among the latter being a magnificent specimen by Burr. A landscape (24 by 18) taken by this lens was handed round for the inspection of the members.

Lewes Photographic Society.

The first ordinary meeting of the new session was held at the "George and Dragon" Coffee Tavern, High Street, on the 1st inst. The President occupied the chair, and there was a good attendance of members. Messrs. S. Norman, A. Webling, and F. Tait were elected members of the Society.

The President read his annual address, which touched on various matters relating to photography, and the paper was supplemented by two very fine Daguerreotypes, produced by Daguerre himself, and a print, 19 by 7½, from a wet plate negative. The President remarked that those who were acquainted with the wet plate process would know what a difficult matter it would be to coat a plate this size with an even film.

Several specimens of work were shown, and the forthcoming exhibition formed a topic for conversation.

At the next meeting, which will be held on November 7th, Mr. P. Morris will open a discussion on "Developers."

Dundee and East of Scotland Photographic Association.

October 3rd.—Dr. J. K. Tulloch (president) in the chair.

Seven applications for membership were handed in.

The President then delivered his opening address—see page 668.

Dr. Tulloch exhibited a transparency, 8½ by 6½, enlarged from a quarter-plate negative, with a paper background worked upon as suggested in his address, and backed with a piece of plain glass, the whole being bound together with strips of paper. The result was artistic and much admired.

Several good negatives were shown which had been developed with eikonogen. So few of the members had tried this new developer that very little information was elicited as to its working capabilities.

Two negatives on Ilford plates were sent to the meeting by a beginner, and an explanation was asked of the cause of the colour of the deposit being similar to that of a wet plate negative. The developer used was ammonia-pyro procured from a dealer.

A member present knew the formula of the developer, and that it contained an excessive quantity of sulphite of soda; the developer had probably been made up for a considerable time, and the cause of the appearance of the negatives was assigned to the conversion of the sulphite into sulphate.

Notts Amateur Photographic Association.

The sixth annual meeting was held on the 7th inst., at the Rooms of the Association, Cavendish Chambers, Market Street, Mr. G. A. Bull in the chair.

The Committee's report, read by the Secretary, congratulated the members upon the success the Society had enjoyed. The Saturday night re-unions had been well attended during the winter months, much useful information being thereby brought before the notice of young beginners by means of the magnesium flash light experiments, demonstrations in development, and the exhibition of apparatus and novelties, and the meetings promise to be as interesting in the future. The appeals to members for exhibition of examples of their work upon the walls of the rooms had not been attended with the success wished, but it was trusted that during the coming winter session the walls would be adorned more fully with members' work. During the past year, seventeen new members had been enrolled, while five had withdrawn, leaving a total of sixty-eight. A lack of interest had been evinced by the members with regard to the summer excursions, but hopes are entertained of increased attendance in the future. The report was passed unanimously.

The following were elected officers for the ensuing year:—

President.—Mr. G. A. Bull.

Vice-Presidents.—Mr. S. Wells, Mr. Turley Lewis.

Hon. Treasurer.—Mr. B. Sturges Dodd.

Hon. Secretary.—Mr. P. E. Knight.

Committee.—Messrs. R. S. Armitage, F. Camell, Dr. W. T. Caw, Dr. Marriott, A. Pickard, T. S. Piggin, J. Spray, M. Tuquet, G. E. Smith, G. E. Williamson, H. A. A. Wigley, W. Towers.

Phrenology and Photography.—The ubiquitous "London Correspondent," when hard up for material with which to astonish his provincial readers, has a happy or unhappy knack of falling back upon photography for a topic. We have no objection, as the correspondent generally invests photography with some quality it does not possess, and, so far, he is to the initiated rather amusing. The latest absurdity is told by the gentleman who represents the *Birmingham Daily Post*, who gravely relates how an elderly gentleman, accompanied by a young lady, took a couple of "male photographs"—what on earth is a "male" photograph?—to a phrenologist for examination, so as to give advice as to which the lady should choose for her husband. They received the information that, while both were worthy, one was so distinctly possessed of the greater virtues and capacity for making a woman's life happy that, although the other promised, from his face and head, to be a divine of a high order, the former would prove the better choice. It so happened, however, that one of the photographs was that of an idiot, while the "promising divine" was hanged for murder, the photographs having been submitted out of pure curiosity. We have nothing to say against this; what we are anxious to know is, how the phrenologist managed to examine the bumps on the photographs?

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the Photographic News, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the Photographic News, Messrs. Piper and Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

M. E.—Following up the answer we gave you on the 23rd August last, you may be interested in knowing the specific dates of some of Mr. H. P. Robinson's chief works, as given by that gentleman last week at the meeting of the Camera Club. "Fading away" was the first picture produced in 1858, followed by "The Lady of Shalot" in 1861. "Bringing Home the May" was the grand effort of 1862. "Autumn" is dated 1864, and "Sleep" 1866; the last-named picture was collodionized according to the recommendation of Mr. Valentine Blanchard. "The Bleached Margent of the Sea," with the gulls, in 1870; "There is a Willow aslant the Brook," in 1873; and the numerous examples shown—seventy-four in all—occupy intermediate or later periods, ending with "The Merry Fisher Maidens" of the present year. "Dorothy," "Sea Gulls," "Over the Sea," and Mr. Robinson's fine portrait of M. Adam Salamon, about 1868, are not included in the Bedford Street display.

T. A. (Neath).—1. The price usually charged for the Meisenbach blocks is one shilling and sixpence per square inch. 2. There is no better process than mercury intensification for getting dense blacks with clear white lines in negatives intended for photo-lithography.

H. R.—At slight extra cost you can have patent plates coated for you, and these are absolutely flat. If you refer to the uneven nature of the coating itself, this can be remedied by going to the best makers, who all employ now the mechanical methods of spreading the emulsion.

S. S.—Since the receipt of your letter we have only found time to make a hurried search, and so far without finding any specification during the past two years. Look for a further report next week.

W. J. W. S.—The Photographic Company, opposite the Polytechnic, Regent Street, W.; another is the Artistic Photographic Company, Imperial Mansions, Oxford Street, W.

R. M.—Your request has been attended to, and you will probably hear from the secretary.

Magnesium.—The patent is dated 13th May, 1887, and taken out in the joint names of Johannes Gaedicke and Adolph Miethe.

D. O.—We called on Tuesday morning at the address given in your letter, and learned that serious illness had overtaken the gentleman to whom you sent your orders. There is no delay in the work of reproduction, but the finished colouring awaits the return to town, this week, of the artist himself. He is reported to be much better in health; and, having delivered your message, we must ask you to show a little forbearance under the circumstances. Later on we propose to enquire again, and hope to have news of the completion or forward state of your coloured enlargements.

H. M.—In seeking a new engagement it is not usual to demand a month's salary to be paid in advance; probably all would have been well if you had immediately entered upon your duties, and gone for a month on trial. Although telegraphed for, and offered the place, you by declining can hardly expect your expenses to be paid. It would have been better to have shown more confidence in the employer, and now you can only ask for some consideration as a matter of favour, not of right. You must remember at this season of the year good places are scarce.

Provincial.—When next you come to town, go and see Mr. J. J. Hick's Wind Dial in Hatton Garden. It appears to meet your requirements exactly, and would be an attractive display for a country optician and instrument maker. The anemometer is more difficult to register openly.

X. Y. Z.—Plant of this and similar nature is supplied by Messrs. Waterlow and Sons, Limited, Finsbury Works, E.C. But before ordering, have you fully satisfied yourself that the process in question is any better than the Calotype, Woodburytype, or even the bitumen process?

P. L.—The cards appear to be all right in quality, but when you use a black, olive, or chocolate mount, remember that the prints should not be upon too thin a paper, else any little inequalities are sure to be exaggerated, and so give a mottled effect.

H. B. H.—A stereoscopic camera with a single lens is not worth much now-a-days, and the mode of mounting it on the top of its packing box would not add to its stability.

M. & B.—Received your letter of the 8th instant, and we shall act upon it should occasion arise.

J. W. M.—Tannin will strike a black with any iron compound, but only in this sense do we know of a black vegetable colouring matter. Catechu is brown, and there are many vegetable reds. Alkalies will destroy Prussian blue, turning it over to brown peroxide of iron.

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THE PHOTOGRAPHIC NEWS.

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SETTLING PHOTOGRAPHIC TRADE DISPUTES BY ARBITRATION.

LAST week some details were published in these pages about the system adopted by the London Chamber of Commerce of settling commercial disputes by arbitration. Since its foundation the Chamber has done much work of that kind. Once Mr. John Macdonell, Barrister-at-Law, drafted for it a Parliamentary Bill for the codification of the law of arbitration; the Bill was introduced into the House of Lords about two years ago by Lord Bramwell, and was read a second time. The London Chamber of Commerce then realised that, in order that a measure shall speedily pass into the law of the land, it should be backed by the Government. The promoters of the measure accordingly applied to the Lord Chancellor on the subject, and the Bill introduced into the House of Lords last session was more or less the result of that application of the Chamber. This Bill passed the House of Lords, but was stopped by the block of business in the House of Commons.

When the Photographic Section of the London Chamber of Commerce is formed, it will be asked to nominate arbitrators, and will consequently select as such, men who are sure to possess the confidence of the public at large, on the ground both of character and competency; the number nominated is usually about a dozen. From these arbitrators, contending persons who want cases heard may make a selection to deal with their particular dispute, or, if they prefer it, they may let the Chamber make the selection for them. An arbitrator need not necessarily be a member of the London Chamber of Commerce, which exerts itself as much as possible to promote commercial interests where it can; in arbitration cases, the Chamber simply wishes the best men for the purpose to be nominated. Neither need the contending parties be members, but they ought certainly to wish to belong to a body which had rendered them such signal service.

The following is a copy of the agreement form which disputants have to sign before the London Chamber of Commerce will take the trouble to settle their divergence by arbitration, for all the work would be wasted if the opponents went to law afterwards.

AGREEMENT OF REFERENCE.

An agreement made this——day of————one thousand eight hundred and eighty——between————of the one part, and————of the other part.

Whereas differences have arisen and are still existing between the parties hereto, and they have sought the intervention of the London Chamber of Commerce Incorporated. Now it is hereby agreed by the parties hereto.

1. All matters in difference between the parties, including all such matters to the date hereof, and all actions between the parties are hereby referred to the award of such arbitrator, or arbitrators and umpire, as shall be agreed upon by the parties within fourteen days of the date hereof—the appointment of such arbitrator, or arbitrators and umpire, to be endorsed on this agreement, and signed by the parties and the umpire, if any to be so appointed before the arbitrators enter on the reference; and if no such arbitrator, or arbitrators and umpire, shall be appointed, then to the award of such one person as the arbitration committee for the time being of the London Chamber of Commerce Incorporated shall nominate, such nomination to be signified by a memorandum under the hand of the chairman for the time being of the said committee to be endorsed on this agreement, and such memorandum to be conclusive of the due and proper nomination.

2. The arbitrator, arbitrators, and umpire, shall make and publish his or their award in writing concerning the said matters ready to be delivered to the parties or any of them, or if they or any of them shall be dead before the making of the same, his or their respective personal representatives requiring the same on or before the——day of————one thousand eight hundred and eighty——, or before such further day as the arbitrator, arbitrators, or umpire, may from time to time fix for making his or their award by writing signed by him or them endorsed at any time on this agreement.

3. The arbitrator, arbitrators, or umpire may by his or their award order and determine what he or they shall think fit to be done by any of the parties respecting the matters in difference, or any of them, and the costs of the action (if any), reference, and award, shall be in the discretion of the arbitrator, arbitrators, or umpire, who may award by whom, to whom, and in what manner and proportions the same shall be paid.

4. Each of the parties hereby binds himself, his executors and administrators, subject to the right of appeal under Clause 14, to obey and abide by and perform the award when made and published.

5. The parties, if examined, and witnesses upon the reference, shall be examined upon oath or affirmation.

6. The parties respectively shall produce before the arbitrator, arbitrators, or umpire, all such books, deeds, papers, accounts, vouchers, writings, and documents in their custody, power, or control, as the arbitrator, arbitrators, or umpire, shall think fit to require as in his or their judgment relating to the matters in difference.

7. The parties shall do all other acts necessary to enable the arbitrator, arbitrators, or umpire, to make his or their award, and neither of them shall wilfully or wrongly do, or cause to be done, any act to delay or prevent the arbitrator, arbitrators, or umpire, from making his or their award, and if any of the said parties shall do any such act, he shall pay to the other such costs as the arbitrator, arbitrators, or umpire, may in writing declare to be reasonable.

8. The arbitrator, arbitrators, or umpire, may proceed in the said reference *ex parte* if any of the parties after notice refuse or neglect to attend before him or them without reasonable excuse.

9. The arbitrator, arbitrators, or umpire, may obtain information in respect of the said matters in difference, or any of them, by such ways and means as he or they shall, in his or their discretion, think most advisable and applicable to the case.

10. The said umpire, if any, may act upon the evidence taken before the said arbitrators, and, unless requested to hear evidence,

make his award without hearing any witness, or receiving any fresh evidence; but if any party request him to rehear the witnesses, or any of them, or tender any fresh evidence relative to the matters in difference, the said umpire shall rehear such witnesses and receive such evidence.

11. In the event of the parties disputing the validity of the award, and moving to set it aside or remit it, the court may, if it think fit, remit the award, or any part of it, to the reconsideration of the arbitrator, arbitrators, or umpire.

12. Neither of the parties shall bring or prosecute any action in any Court against the other or against the arbitrators, or umpire, or any member of the said arbitration committee, for, or in respect of, any of the matters in difference, or the award to be made in pursuance of this agreement.

13. On the signing of the agreement, any pending action between the parties hitherto shall be stayed without costs.

14. The said arbitration committee (a majority of whom shall be competent to act for all purposes) are hereby empowered to hear and determine any appeal from the award of the arbitrator, arbitrators, or umpire, and the parties hereby agree that they, their executors and administrators, shall be bound by the award of the said arbitration committee.

15. The apellant shall within day from the date of the award of the arbitrator or umpire, give to the secretary of the chamber notice in writing, stating the grounds of his intention to appeal, and no appeal to the said committee shall be brought after the expiration of days from the date of such award.

16. In case of an appeal, the said committee shall have all the powers of the arbitrator, arbitrators, or umpire, and the preceding provisions shall apply with any necessary modifications to the proceedings of the arbitration committee and their award.

17. This agreement shall be made a rule of the Queen's Bench Division of the High Court of Justice, if the said Court should so please.

18. The parties agree to be bound by the subjoined bye-laws of the London Chamber of Commerce Incorporated.

As witness the hands of the parties.

MR. H. P. ROBINSON'S PHOTOGRAPHS AT THE CAMERA CLUB.

Of the celebrated photographs by Mr. H. P. Robinson, now on view at the Camera Club, Bedford Street, Strand, London, "Fading Away," taken in 1858, is the first of any consequence; after its first public exhibition, Mr. Robinson woke up to find himself famous. Another 1858 picture on view is "She never told her love"; in the photograph she seems to be really dying. These pictures were taken in the old collodion days, when such work was more difficult than it is at present.

Of a photograph produced in 1861, "The Lady of Shalott," Mr. Robinson expressed his opinion in the letter to Mr. Davison we published last week. In 1862 he exhibited "Bringing Home the May," a picture nearly 40 inches long. It is a fine specimen of combination printing, and its object was to evolve by photography all the results which could be produced by the hand of an artist. "Autumn," first exhibited in 1864, represents gleaners at work. Mr. G. Wharton Simpson wrote three long leading articles on this picture when it first came out. "Sleep," 1866, is intended to illustrate a passage in one of Matthew Arnold's poems; it represents the effect of moonlight passing through a window and falling upon two sleeping girls; the landscape outside is visible.

"When the Day's Work is Done" (1875) represents a cottager reading the Bible to his wife. This is one of the last and finest pictures done by Mr. Robinson by the old collodion process; so also is "The Willow" (1873), with with may be contrasted "Dawn and Sunset" (1885), done by the gelatine process; the latter has a softness and transparency in the shadows, whilst there is something approaching hardness in the former. In the latter picture, the answering smile of the child to the mother, and the rendering of its small hand as compared with the large, yet beautiful, hand of the mother, deserve attention. An effect in one of Mr. Robinson's pictures, "Listening to the Cuckoo," is perhaps not quite what Mr. Robinson intended; we mean the one in which a little girl has a look of pain on her face, because her fingers are pinched in the wooden palings. Mr. George Davison, after having had to read Mr. Robinson's criticisms on himself to the Club the other night, will, perhaps, note this little circumstance with a friendly chuckle.

"A Portrait" (1863) is really a portrait of Mr. Robinson himself; the chamber in which he is seated has a background of fine old tapestry, and there is a striking effect of light falling upon the sitter. The negative of another —"She never told her love"—picture was done in four minutes from the time Mr. Robinson conceived the idea. At the time he took the picture, an English girl was "chaffing" the old Welshman represented in the photograph, but, as he did not understand the language, she did not give him much information; two little girls are standing near, smiling. "The Beached Margin of the Sea" is one of the mysterious gull pictures of 1870. "Pamela" is one of the finest interiors ever rendered by photography, and the figure has much beauty.

"Firelight," 1873, is specially interesting because it was done by the magnesium light and the wet collodion process, in days when magnesium was excessively costly; seven shillings worth of magnesium was thrown into the fire, and half killed with fright the old man represented in the picture. The model in "Who could have sent it?" has a statuesque beauty; the companion picture to this is interesting. Mr. Robinson's well-known "Wayside Gossip" and "Feeding the Calves" are on view, also many other pictures not herein mentioned. "Returning from the Hayfield," 1889, is the latest; the mackerel sky, and the light falling upon the grass from the glow in opening clouds, are of special beauty.

In short, at the Camera Club is a fine exhibition of what can be done by combination printing, and how it can be made to yield results unobtainable in any other way; the pictures also are specimens of the work of much of the lifetime of one of our most noted photographic artists. The newspapers and the public say now-a-days, "How much the art of photography has improved." In the production of that improvement, Mr. Robinson's pictures and writings have taken a great part, and most of his literary work appeared first in these pages. In his pictures he has specially succeeded in representing subtlety of expression; for example, in "Carolling," one of the girls is palpably thoughtless, and has no brains in her head, whilst the other is both serious and intelligent. The Exhibition is a rare treat to persons interested in photography, and anyone will be admitted on presentation of his card.

The Belgian Association of Photography obtained the *Grand Prix* at the Paris Exhibition, for the general good quality in all respects of its *Bulletin* and publications.

If the Camera Club could get up an Exhibition of Rejlander's now scattered photographs, it would be of great interest, especially to latter-day photographers.

At the reception given by the President and Council of the Photographic Society at the opening of the Exhibition in Pall Mall, Sir James Douglass and the President of the Chemical Society were among those present.

The *Bulletin Belge* says that at a meeting of the Antwerp Section of the Belgian Photographic Association, held on the 2nd September last, comparative experiments were made with the pyrogallol, ferrous oxalate, quinol, and eikonogen developers, and that the latter gave the most harmonious negative. At a meeting of the Ghent Section, held on the 5th September, M. Coupé said that he had found that eikonogen had no advantage over quinol; the former gave more or less veiled negatives.

Is it so?—M. Courtonne, a French savant, has just deposited with the Academy of Sciences a sealed communication containing a description of a machine of his invention for the transmission of luminous vibrations, to which he has given the name of "telephote," and by means of which it will be possible, he claims, to see objects hundreds and thousands of miles distant, in spite of any number of interveuing obstacles.—*Wilson's Photographic Magazine.*

INTERNATIONAL EXHIBITION OF FINE PRINTING.

An Exhibition of Fine Printing is now open at the Stationers' Hall, London ; it is rather small in the matter of quantity, and good in point of quality. Some of the best photo-mechanical printing of the leading nations of Europe is represented, and the show from Austria is particularly good. The Exhibition closes to-day (Friday) at 10 p.m. ; it opens at 10 a.m., and considering the strong interest of many photographers in such subjects, it seems to have been a mistake on the part of its originators not to have taken steps in time to make it known to them earlier. Among the curiosities at the Exhibition is a shaded and perspective picture representing the Sphynx and a group of buildings, made up and printed entirely from pieces of ordinary brass and metal rules of a printing office—it is the work of a French genius. If compositors take to setting pictures as well as type, what is to become of the engravers ? Stationers' Hall Court is reached down one of the courts leading from Ludgate Hill.

The Exhibition was opened on Monday by the Lord Mayor, accompanied by the Lady Mayoress and Mr. Alderman Tyler. The civic party came in semi-state.

The President of the British Typographia, in opening the proceedings, explained how the Exhibition, the first of its kind, owed its origin to the concern with which a few practical printers had observed the inferiority in techuical and artistic excellence of the printers of England as compared with those of the Continent, where for many years technical education had been fostered with great benefit to the nations which had adopted it. In all large German cities which were centres of the printing industry there were techuical schools maintained by contributions equally apportioned between employer and State. In Vienna there were 600 students in the printing classes, and £800 a year was expended in teaching. In Paris the expense of the well-known techuical school there was entirely borne by the municipality. But in England there was nothing of the sort ; on the whole there were not a score of teachers, and not more than 300 pupils. At the City and Guilds of London Institute 200 students went up for examination last year, and more than half of them failed for want of technical knowledge in the questions set. The society had been formed in the endeavour to improve the printing art of Great Britain, by improving the individual printer. It was proposed to give, by classes, all the instruction it was possible for him to receive ; to establish technical libraries, and to exchange specimens of the best printing work in all parts of the world. By such means, it was hoped to awaken in the priuter a spirit of enthusiasm for his art, and a love for it ; for, in the printing art, more than in most others, the individual workman was able to leave on the work that passed through his hands the impress of his individual skill and intelligence. The Exhibition had been opened there in the hope that as the cause had been taken up in the provinces, London would crown the edifice, and that his Lordship's presence that day would contribute to that result. He trusted that the Stationers' Company, whom he thanked for allowing the use of their hall, and who had placed memorials of Caxton and Tyndall in their windows, would be mindful of the art which had contributed so much to the civil and religious liberty of the country ; and would give to the movement not only moral but material sympathy.

The Lord Mayor said that judging from what was being done by other companies, he was fain to believe that the Stationers' Company were not behindhand in the promotion of their own trade. He was not surprised to see that it had been resolved to have an exhibition of printing in the City of London, because he, like many others, had for some time past been painfully conscious of the fact that this country was not equal to some others in the art of printing. If they looked to artistic printing in Austria, Germany, or America, he feared they must come to the conclusion that they were behind their printing brethren in those countries, but he was inclined to think that this did not arise from any failing as far as the printers, *per se*, were concerned. He did not want to say anything unkind to the type-founders of this country, but he feared that there were some in the trade who were not so desirous as the printers of meeting the requirements of the times ; and he was inclined to think from what he had seen, that there might possibly be a lack of enterprise on their part. He was inclined to think, from what he had seen, that there was not that disposition to produce improvements in their plant, and to provide such novelties as their customers required. He was astounded to learn from Mr. Drummond that the invitation card which he held in his hand was, as far as its type was concerned, entirely American, with the exception of the initial letter, which was German. He should be within the mark if he said that seven-eighths of the whole production of the other papers issued in connection with the exhibition was of foreign origin. He said this was a disgrace to England, but if those who were present—those who were at the back of the exhibition, and those enterprising tradesman who were at the back of the printers—did not resolve at once that, so far as printing was concerned, Great Britain should at least be put upon an equality with other nations, all he could say was that they were unworthy of their country. He hoped that the result of this Exhibition would be to make apparent to them their deficiencies.

PRINTING ROOM DEVICES.

BY C. BRANGWIN BARNES.

Having treated in these pages some months ago of the various methods of dodging or doctoring a negative before and during the operation of printing, I shall now proceed to offer a few hints as to the after-treatment of prints from defective negatives, so as to ameliorate or avoid such defects in the finished production. Among photographers in general there is far too much of conservatism or following in the old beaten tracks as regards sizes and shapes. Many and many a photograph that we see, not only in private albums, in shop windows, or in the showcases of the photographers themselves, but even in the very exhibitions, where we expect to discover only the best and most careful work, even there we find many a picture which would have been materially improved had the old set size or the old set shape have been altered. Why in the name of goodness should photographs always be fifteen by twelve, ten by eight, or eight by six ? Is it because the plates are made that size, and photographers cut their prints as large as the plate will allow, without any thoughts as to whether this subject or that would not look better cut much smaller ? I opine that such is the case, for seek as I will I can find no other reason. If we look through our stock of negatives—of course I am now referring to out-of-door subjects—it is astonishing how few we shall find that would not be materially improved by cutting down ; by cutting down I do not mean making a ten by eight of a twelve by ten, but by breaking through the unwritten law that binds us to an absurd set of shapes and sizes, and cutting our prints the shape and size that suits them best. If a picture looks best when cut down ten by five, or by four and seven-eighths, cut it down, even though the plate be twice that size and an entirely different shape. Strike out a path for yourself, and, depend upon it, others will follow.

Where studio portraits are to be considered, we have not so much latitude at our disposal, for cartes-de-visite and cabinets have held their sway so long, added to which the mounts and the albums have to be accommodated, and the indoor operator or portraitist can make his picture the proper size to accommodate them, whereas the landscape photographer has very rarely the accessories at hand to so accommodate plates, and even had he, they would mostly be of little use.

In some negatives of architectural subjects it will be found that the subject occupies all, or very nearly all, the plate, leaving insufficient sky room. When such is the case, the negative should be printed in a large frame, and on a larger piece of paper, leaving a white sky, on which clouds may be printed after. Sometimes the reverse of this is the case, and, instead of sky, it is the foreground that is lacking ; in the event of such being the case, the negative should be, as in the preceding instance, printed on a larger piece of paper, and *vignetted* to show to the edge ; this will be found to atone in a very great measure for a defect which would otherwise be irremediable.

In some instances the main subject of the picture occupies only a part of the plate, and approaches very much closer to one side than the other. If it will cut a

suitable shape it will not be of any consequence; but in the event of its making too square a picture, it should be vignetted so as to allow a fair margin, by means of which it can be cut to the most suitable shape and size. Many landscape negatives, especially instantaneous ones, have very nice natural skies, which will not show without very much overprinting the subject; when such is the case, the subject proper should be masked, and the sky printed out to the requisite depth, which will give a more harmonious picture than would be the case if another sky were printed in. Whenever it is possible to print out the clouds that were present when the picture was taken, that course should always be adopted.

Now as to toning: and it will be found here, as in every other operation throughout the piece, that various subjects require varying treatment. To tone all of a batch of prints to one uniform tint, and to perpetuate that tint in every succeeding batch, may be, mechanically, very clever, but at the same it must be borne in mind that it is not artistic. To tone a sunshiny piece of landscape to a cool grey is to murder it, and a snow or winter picture has all its effect equally destroyed if it be toned brown or any colour but the cool grey that in the other case was the least suitable of any. The artistic toner will in every case suit the tone to the subject, and if he be at all in doubt, few employers would be displeased at their opinion and advice being asked upon the subject. While on the subject of toning it will be advisable to say a few words as to the albumenized paper, and it is a matter of great regret to me that I have been compelled to discard home albumenized papers, obtaining much brighter, clearer, and in every way better tones with those of foreign manufacture. If there is a really good make of English albumenized paper, I should much like to procure it; but to obtain rich tones the albumen must be rich, so that this being the case, I do not care a jot whether it be obtained from fresh eggs, from bad ones, or from blood. It is now three or four years since I advocated the addition of a few grains of chloride of sodium to the toning bath, but I note that it is again being brought forward as a novelty.

The print having been exposed, cut, toned, fixed, and washed, the next point is the mounting, and here again is room for a little variety. It has become the fashion of late to mount large work on a shade of board known as Silurian, granite grey, or Kensington blue; some photographs are improved by the juxtaposition of this particular shade, but by far the largest majority are degraded thereby. If only one shade of card is to be used in the establishment, that shade should be a pale cream, which suits the majority of photographs, but I would advise that there be no restriction as to tint at all, but that each particular subject be mounted on just that particular shade of board that suits it the best. If an Oxford line must be introduced, let it be of the narrowest, and of a brown colour in preference to the crude and brilliant red one so often seen; let it be a plain line without any florid ornamentation at the corners; and if you wish the picture to be looked upon as an art production, keep the advertisement portion in narrow limits. A name and address in small type is just as likely to be read and remembered as one that is so prominent as to approach vulgarity. I would advise that no advertisement appear upon the front of the mount at all, except in cases where the pictures are likely to be framed, and even then most persons of taste prefer going to the additional expense of a cut mount, rather than hang an advertisement upon their walls.

Photographic Society of Great Britain. — Technical meeting Tuesday next, October 22nd, at 8 p.m., at the Gallery, 5a, Pall Mall East, when the apparatus now on view at the Exhibition will be explained.

Saturday, the 26th inst., has been appointed for the private view of the Autumn Exhibition (the nineteenth) of the 19th Century Art Society, at the Conduit Street Galleries, and the Exhibition will open to the public on Monday, the 28th inst.

NOTES ON THE PHOTOGRAPHIC EXHIBITION.

Third Notice.

Some of the pictures of Mr. J. P. Gibson are puzzling. It is difficult to know whether you are expected to look at the figure by which the landscape is surrounded, or at the landscape which surrounds the figure. "Divided" (No. 203), to which is appended a somewhat incoherent couplet by Miss Jean Ingelow, and "Weary" (No. 204), are cases in point. "Divided" represents a young lady sitting—or, to adopt Mr. W. S. Gilbert's words in the Yeoman of the Guard, "I should rather call it squattiug"—on some exceedingly uncomfortable-looking boulders which border a stream. The figure is small, and the landscape in comparison is vast, yet it may be supposed that Mr. Gibson attaches much importance to the first, as it is only fair to assume that Miss Ingelow's supplication, "Come to me, now, for the West is burning," &c., applies to her. It would be too much to say that the burden of the couplet is exactly reproduced by the young lady's face, which is more expressive of personal discomfort than anything else. Still there is no knowing how a lady would look when she is yearning while the west is burning, and it may be strictly accurate.

Mr. Gibson's "Weary" shows a long hilly road stretching away a mile up the centre of the picture, with a woman reclining in the foreground. There is nothing to be said against the idea, but Mr. Gibson has, unfortunately, failed to introduce the least interest in it. The woman is respectably dressed, her clothes are speckless, there is not a tatter to be seen. She looks like a respectable tradesman's wife who has sat down to take a rest, but who, nevertheless, will get home perfectly safe. Had Mr. Gibson's "weary" subject been a forlorn tramp or a footsore cur in search of his master, the necessary touch of pathos would have been infused. It is also curious that Mr. Gibson should have placed his figure so near the frame. As it is, it is clearly out of harmony with the composition, as anyone can see, by hiding that part of the picture containing the woman, and looking at the rest of the landscape. Mr. Gibson's work, represented by landscape pure and simple, such as "The Barren Oak" (No. 205), "By Quiet Waters" (No. 206), and a "River Study" (No. 208), is good, though heavy; it is only where he had attempted to "make" pictures that he has failed.

Mr. H. B. Berkeley's views of Venice (Nos. 227 to 231) are full of merit, the effect of evening mist in No. 229, "At Nerei," being particularly charming. Capt. Abney has a series of photographs of Alpine scenery of much delicacy and beauty, though the subjects are not all of equal interest. Mr. Henry Stevens' studies of flowers are delightful in management and manipulation, and of the kind nothing finer has been done. The same manipulative skill is shown in a series of figure subjects, but in other respects Mr. Stevens is less happy than in his flower photographs. The pattern of his background, though subdued in tone, is obtrusive. Miss Florence A. Harvey has gone out of the beaten track in her studies of stags. In this, if for no other reason, she is to be commended. Her work, however, is extremely good. Mr. W. Bedford, in his "Ludlow Castle" (No. 284), is Mr. W. Bedford. Mr. Bedford does not astonish one, but he always commands admiration. It is sufficient to say that he has reached his standard in "Ludlow Castle." I cannot say that Mr. A. Keighley's "The Children of the City" fully realises the notion of weary feet and "hearts with toil oppressed." Mr. Keighley's children are fairly well fed, and they do not look particularly miserable. The late Mr. Rejlander's inimitable picture, "Homeless," makes all competition in this direction very difficult.

Mr. H. Bedford Lemere's interiors of Sandringham are sure to excite much attention from the visitors, apart from their excellence as photographs. Mr. J. J. Thornton has narrowly escaped producing a very capital little picture of children in his "Sea Urchins" (No. 303). Unfortunately,

one of the urchins, both in expression and pose, is so obviously being photographed, that the source of spontaneity is injured. Mr. Ralph W. Robinson, it is to be feared, has attempted too many studies. They do not go beyond the common-place, with the exception of "Suspicious" (No. 334), where he has happily caught a number of startled cattle. It is a pity Mr. Robinson exhibited No. 316, as he can do so much better. One can only hurry by quickly, and think of his series of medal portraits already mentioned. Mr. D. R. Clark's "Mosque of Sultan Achmet, Constantinople" (No. 342), has many qualities deserving praise; the perpendicular lines, however, give one a peculiar sensation of squinting—due, no doubt, to the position, possibly unavoidable, of the camera.

Mr. W. W. Winter has achieved a success in his picture of a number of farm labourers dining (No. 343). The grouping is natural, and the positions unaffected. Mr. Gambier Bolton's capital "Lion Study" deserves a word of praise. The Rev. J. B. Hare's "The Young Fishermen" (No. 352) is really a capital picture, the pose of the two boys being very natural. Mr. G. F. Blackmore's "Eventide" (No. 353), and "The Silver Lining" (No. 354), are very effective; but what is the meaning of the darkened corners in the first? Did not the lens cover the plate? Mr. F. W. Edwards' large view of Lambeth Palace (No. 355) is rather tame; but Mr. Edwards is, of course, entitled to all the credit due to the fact that it is taken direct. The hayfield and farmyard have furnished a goodly number of pictures in this year's Exhibition, and Mr. Robert S. Redfield's contributions are not the least meritorious. Mr. J. Chester Jervis has been very happy in his attempts at suggestiveness. Of the four pictures he shows, "*Un Militaire en Retraite*" is the best, and exceedingly good it is. One can easily imagine that the surroundings chosen by Mr. Jervis are those which an old soldier would like to have about him in his last days. Mr. Jervis has also been fortunate in his model, who thoroughly embodies the idea to be conveyed. But was it not a mistake to put the same surroundings to three different pictures? This kind of thing is so like "manufacture," at the very suggestion of which art flies away.

Mr. Henry Tolley's medal picture, "Carting Hay," has already been mentioned. His other two, "Going out with the Tide," and "On a Sandy Beach," are also deserving of high praise—the first-named especially so. Mr. J. M. Nisbett has, in photographing the procession which attracted so much attention during the great strike, produced pictures which will be looked at with infinite interest fifty years hence. They are examples of the service which photographers render to history.

On the screens there is much excellent work of a miscellaneous character. A curiosity in these days of gelatine is a series of views in the Isle of Wight (Nos. 525 to 528), exhibited as examples of Blanchard's platinum black process from collodion negatives. Mr. D. H. Macfarlane shows a fine picture of Fingal's Cave, Staffa (No. 557), the only blemish in which is the presence of a small group of orthodox tourists on the rocks to the right. Tourists are harmless individuals enough, no doubt; but their introduction in a photograph which is to be judged by its artistic qualities—and I presume that photographs are sent to the Exhibition to be so judged—savours of an intrusion. They make the photograph look "shoppy," and suggest hotel bills, extortionate flymen, and all the ills of holiday making. No doubt Mr. Macfarlane would have been contented with the old boatman in his skiff, and that the tourists "forced themselves upon his observation." This, unfortunately, is a way that tourists have, especially when you are photographing, and they never forget to keep staring at the camera.

It is noticeable that the quality of the work exhibited by lady photographers is exceedingly good. Miss Florence Harvey's picture has already been mentioned, and on one of the screens Mrs. Main's "Views of the Engadine," taken in the winter (No. 615), stand out as conspicuous examples of photographic skill. Their combination of vigour and delicacy makes them very striking. Two views, "From Viz Cambrena" (No. 565), are also singularly beautiful. The Misses Mead show some commendable pictures, and Mrs. Edward Penton has boldly attempted characteristic portraiture in "A Cornish Fisherman" (No. 567), and "A Newlyn Fishwife." The tone of the prints, however, is not particularly pleasant. Miss Constance Francis shows some fairly good "Out-of-Door Studies" (No. 646). Other exhibits by ladies will best be dealt with later on in connection with portraiture. Keeping to the screens, one notices rather an ancient idea in "Where's my Specs?" (No. 571), by Mr. A. Donald, while in a "Stitch in Time" (No. 579) Mr. J. J. Thornton has made a replica of his picture No. 270. Mr. Henry C. Peabody, of Boston, U.S.A., shows some brilliant little studies of yachts, remarkable for their almost microscopic detail and clearness. Continental photography is but slightly represented, but what there is is good. The majority of the examples are on the screens. The architectural and country views (No. 546) of Anselm Schmitz, of Cologne, the portraits of J. Muller, of Munich, the landscape work of Alfred Steiglitz, of Berlin, are all fairly meritorious, but make one wish that more examples of foreign work could have been shown, as they can scarcely be considered exceptionally fine examples, the medal pictures of Anselm Schmitz of course excepted.

THE ART SIDE OF PHOTOGRAPHY.*

BY G. HANMER CROUGHTON.

The time was when it was considered a mark of good breeding to listen to a twice-told tale with all the interest and courtesy due to a first telling. This age has been aptly described as smart and slangy, and if one is unfortunate enough to commence the relation of a story to another who has heard it before, he is brought up very short by the single word *chestnuts*, or *rats*. This may be smart. It certainly is slangy, but I doubt if it is wise, and I know it is not courteous.

It is not wise, because the fear of ridicule would prevent many subjects being introduced into conversation which might be interesting or instructive. It is not courteous, because, although not new to you, it might be new to others.

So it is with something of this fear upon me that I open the subject of this paper for discussion. To many of the veterans of the profession it may be chestnuts, but there are others here that a few hints upon the art side of photography may benefit, and to such I offer them; asking the indulgence of the veterans who know all about it, for the sake of the younger members who do not.

What is art, and what are the rules that govern the production of pictures by photography? Practically speaking, there are no hard and fast rules in art. There are, more properly speaking, principles, which are more or less elastic, but those rules or principles have been formulated by men who have passed their lives in the study of nature, and its representations upon cameras, and these same rules or principles must be observed if your photograph is to deserve the name of picture.

The attempt to make pictures by photography dates back to the very early days, Reijlander and Robinson, Hubbard and Ristin, in England, having produced them twenty years ago under disadvantages that you younger generation of the craft know nothing of, as you will probably appreciate when I tell you that in one of Hubbard's compositions —"Stolen Moments"—he told me he made twenty-one exposures upon one model before he got one negative to satisfy him—the exposure being five minutes—to get the effect he wanted. The light had to fall upon the picture in such a manner that the shadow cast upon the wall behind her became a principal feature in the composition.

* Read at the Boston Convention.

Therefore the light had to be cut off, except through a very small aperture; hence the length of exposure.

No artist who is unacquainted with the difficulties which beset the photographer in the production of this plan of work can rightly judge of the results of his labour. Photography is certainly not a plastic art. The photographer must arrange his composition under his skylight complete in all its parts; he must enthuse his model with the sense of the part he or she has to play. He must pay attention at one and the same time to the linear composition, the composition of light and shade, and the pose and expression of his model. All this he must see is perfect before he uncaps his lens, and when the result is before him he has not the power of making corrections in part; he must reproduce the whole again with the defective part corrected, perhaps to find some other small defect overlooked in another part of the picture, and so to have the work to do all over again.

Of the linear composition there appears, from the glance I have had around the walls of our art exhibit, very little to say. There are some instances of too rigid adherence to the principle or rule of making the lines balance each other, the lines of the composition being so arranged that they should not be conspicuous reproductions on the right of the lines on the left of a composition.

Concentration of focus is the one quality which is defective in most photographers' productions. When I say focus, I do not mean optical focus, but artistic focus, which means the arrangement of the light and shade in a picture in such a manner that the eyes are compelled to look first at that part which is the centre of interest.

In a portrait this, of course, should be the face, and in a subject picture it should be the figure or figures upon whom the story to be told centres. How, then, is this to be done?

If I take a blackboard, and make a white spot in the centre, you will have focus or concentration in its crudest form. Also if you put a black spot on an expanse of white there is concentration; therefore, if the face is surrounded by background and drapery, there will be concentration of focus upon that face, but that is not all that is required. There must, to avoid crudeness, be present a quality called breadth, which is obtained by bringing into the shadow lights of lesser intensity than the principal light, thus distributing the light throughout the picture and bringing out the details, which should be kept lower in tone the more they recede from the central or dominant lights. This quality, which to an artist is the most essential to a picture, is the one which is most disregarded by the average photographer, and many good photographs, judged from a chemical and manipulative standpoint, are completely spoiled by the absence of this artistic quality. How often do you see a portrait, for instance, a white cup, or some ornament on a table, contending in intensity of light with the face, and so giving a spotty effect to the composition, with a very few exceptions. The composition of the pictures exhibited this year is defective in this particular; in some there are as many as four spots of light of equal intensity, all calling for attention at one time, thus destroying both concentration and breadth.

There are several examples to be seen of a style of picture which requires skill and judgment both in lighting and chemical manipulation. I allude to pictures where the face is in shadow against a lighted background. When managed properly they are among the most artistic effects which can be produced by photography. But it requires great care to keep the harmony of the composition there. In one which, as it is in the exhibit of one of the dry plate firms, it will not do the exhibitors any harm if I describe it, and point out where an otherwise good picture is spoiled artistically by neglect or want of knowledge, the face and figure are posed against an almost white background. The upper part of figure and face are splendid, but the lower limbs, cutting with a hard line against the background, cause the eye to fall on that point and follow down to the base of the picture, thus making the head of secondary importance.

This reminds me of an anecdote of the great critic Ruskin. He was asked by one of our eminent R.A.'s to criticise a portrait. The painter was one of the pre-Raphaelite school, and Ruskin, adjusting his glasses, commenced with the hunting boots and went upwards somewhat in this fashion: "Yes, the boots are well painted. The tops are quite good, and the texture of the cord breeches is perfectly rendered. That velvet coat, too, the material could not be mistaken." Then, after a slight pause of astonishment, as if it was the last thing he expected to see, he said: "Why, bless my soul! there is a head too!" That artist said after that he had learned a lesson he never forgot.

Now if in the picture I was describing, the background had been graduated so that, while the upper part was lighted, the lower part was shaded enough to prevent the hard cutting line, the head would have attracted the attention of the spectator first, and the concentration have been in the right place, for remember this, that wherever a dark line cuts against a light, there will good concentration or focus be; and if you will study the works of great artists, you will always find that the highest light and the deepest shadow are near together, and there is focus or concentration.

Another noticeable fault of those photographs which I find most praised by professional photographers for their brilliancy in texture is that, either by the method of lighting or by over-retouching, the real texture of the flesh is not seen, and a face, instead of appearing as if it would yield to the touch of the finger, has a stony shine, which is like something metallic rather than flesh.

Now, in my opinion, there is nothing so beautiful as the texture of a properly-exposed, well-developed negative, and I consider that in such a one only the defects caused by the colours in the flesh tints, which photography does not render properly, should be removed by the pencil of the retoucher, and that in such a manner he preserves the original photographic texture; but when, in his ignorance and conceit, he thinks he can work all over a face, and make a texture which is an improvement upon nature, a sort of Madam Rachel complexion in all alike—men, women, and children—I consider he has mistaken his vocation. If I had any influence, I would try to get the committee of this Association to give a prize to the retoucher who could do the best work upon a negative with a pencil, and yet do all that was wanted, and preserve the texture. I think one of the things which makes the exhibit of Mr. Muneler so admired is just this point: while all photographic defects are removed, there is an exquisite texture throughout the whole exhibit.

I could have said much more on this subject, but there are other things which will be brought before you this evening, so I will conclude by saying I hope you will not think I have been hypercritical; while there is much to criticise, there is much more to praise; but as we learn most by our failures, I thought these few hints might be of use to you.

Photo-Survey of Warwick.—We learn from the *Birmingham Daily Gazette*, that the visits of the Birmingham Photographic Society to the Vesey Club, reported under the Society's section this week, have resulted in an important step being taken towards carrying out a valuable project, which has for some time been under the consideration of the Birmingham Society, namely, to preserve by means of photographs, current records of everything throughout the county of Warwick, of archæological, ethnological, and scientific interest. The Vesey Club have consented to appoint a committee to act with the society in carrying out the proposal. It is intended that the county should be mapped out into areas, and amateur photographers throughout the county invited to take individually a small portion of country, and secure views of every object of interest within that area. It is contemplated taking the views in uniform sizes, and having them reproduced by processes of a permanent character.

PHOTOGRAPHIC OPTICS.*

BY W. K. BURTON.

CHAPTER X (*continued*).—THE OPTICS OF STEREOSCOPIC PHOTOGRAPHY.

THE arrangement just shown is really all that is necessary to give a stereoscopic effect, but the effect is greatly heightened if these be combined with the prism's magnifier so that the image is slightly magnified. In practice this is secured by using as prisms the edge portions of circular

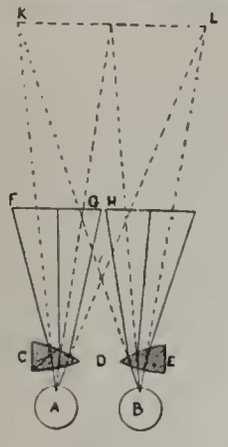


Fig. 53.

lenses. Fig. 53 illustrates the arrangement. The letters refer to the same parts as in the case of the last drawing.

The next cut shows what portion of an ordinary double convex lens is used for the stereoscope prisms. The full



Fig. 54.

lines show the part used, the dotted lines show the lens completed.

The reason why the use of a portion of a lens as the prism of a stereoscope heightens the effect is, that it prevents the divergence of the rays entering the eye from any point of one of the pictures. Such divergence indicates to the eye the *nearness* of the object, as, for example, when we look at any object only a few inches off with only one eye. With the ordinary prisms we have this divergence, and although we get all the idea of solidity, the objects look merely like minute models. The lens causes the rays to become parallel, and if all adjustments have been correctly made the objects look, if not of their actual size, at least comparatively large.

Mounting Stereoscopic Prints.—Some special precautions have to be taken in the mounting of stereoscopic prints. In the first place, as has been already said, they must be reversed. A print is made from the two negatives on one plate, but of the two images that which is on the right as the print comes from the frame must be mounted on the left, and *vice versa*. Other points besides this need special attention.

All the precautions that have to be taken in the trimming of ordinary prints must of course be taken in the case of stereoscopic prints. I here refer to the necessity that the edge of the print be made parallel with vertical lines of buildings. It is necessary to give another precaution, which would appear unnecessary, but that a mistake is often made in this respect. The images must be trimmed to precisely the same *height*; that is to say, the trimming must be so done that any object is precisely the same height from the bottom of the picture in the case of one print as in the case of the other.

All this is simple enough, and will be readily understood; but the trimming of the edges is more difficult because the very conditions which are so strictly observed in the case of top and bottom must be avoided in the case of the sides. Any given point of the image must *not* be equally near the right or left side of the picture in the case of the two prints. The reason for this is that the stereoscopic image—appearing solid—must be seen with a distinct boundary line, and, to get an idea of size, it is necessary to arrange that this boundary line should appear as a framing *through* which the image is seen, whereas, if we trim the prints similarly at the edges it will appear as if the whole image *stood out from* the framing.

We will see what is required if we look at a landscape through a window standing say some six or eight feet behind it. If we look at the landscape first with one eye then with the other, we will see that whilst we are looking with the *right* eye, we see more of the left hand side of the landscape, and less of the right hand side, than when looking with the left eye. We must then trim our prints so as to produce the same effect; that is to say, we must let a little more of the image be seen on the *left* side, a little less on the *right* side in the case of the *right* hand print than in that of the left hand. There is no rule as to the precise amount to be allowed, simply because there is no rule as to how near the "framing" of the picture should appear. It should, however, appear to be in front of the nearest part of the image, and to secure this it is necessary that in trimming the prints we should let a little more of the *foreground* be visible at the left side of the right hand print, a little less at the right hand side, than in the case of the left hand print. In this case the conditions will hold to a still greater degree for all prints representing more distant objects than the foreground.

When a great number of prints have to be done from one negative, or pair of negatives rather, it is advisable to reverse the two halves of the plate and to print from them at once, after which the double print may be pasted directly on the mount. This is done in the following manner. The precise parts of the negative to be printed from are marked out, due care being taken in this case to allow a little more of the image on that edge of the negative which will give the left-hand edge of the right-hand print than on the corresponding edge of the other print, and a little less on what will give the right-hand edge of the right-hand print. The negatives are then cut with a diamond, allowing everywhere $\frac{1}{10}$ of an inch outside the marked portion. They are then mounted in reversed positions—right for left—on a piece of clean glass by narrow strips of paper, all the same precautions as regards keeping them at the same height, &c., being taken, as in the case of prints. An opaque paper mask is cut, so as to shade all but the images that are to print. This new doublet negative is now used for direct printing, and the prints are mounted with no further precaution than has to be used in the case of mounting ordinary single prints.

* Continued from page 663.

THE HAVRE PHOTOGRAPHIC CLUB.—The Havre Photo-Club has a yacht, specially arranged for the use of the members, furnished with all the appliances for taking marine views. Corresponding members can enjoy the use of the yacht, together with all the advantages, for the trifling sum of fifteen francs.

THE last number of the photographic *Bulletin Belge* contains an exceptionally good picture by the heliogravure process, printed by Mr. J. Löwy, of Vienna, and the previous number contains the likeness of Dr. E. Candeze, President of the Belgian Photographic Association. Mr. W. K. Burton's articles on "Photographic Optics," in the PHOTOGRAPHIC NEWS, are in course of republication in French in the *Bulletin*.

Notes.

We have to acknowledge with thanks, receipt of articles for the Photographic News Year-Book from many of our contributors, and should feel glad if other friends, new and old, would forward their articles as soon as possible, in order to meet the desire of the publishers to go to press earlier than on former occasions, so that the Year-Book may be in the hands of booksellers in distant colonies by Christmas.

The tendency of iodide of ammonium to decompose is sometimes a source of trouble. Mr. J. C. Falk describes in this month's *American Journal of Pharmacy* a method of restoring it to its original state, which he says is quite new. The method consists simply of placing a lump of carbonate of ammonium in the bottle containing the iodide, and allowing it to remain there until the latter salt has regained its normal whiteness. This may require from several days to as many weeks, the time being dependent upon the amount of material and the degree of decomposition it has undergone. The ammonia that is constantly being disengaged from the unstable carbonate unites with the free iodine present to form iodide of ammonium, and, as the superfluous ammonia is subsequently allowed to escape, there is no resulting contamination with a foreign substance.

The well-known powder process of Obernetter and Liesegang, which was attempted to be introduced the other day as a new and original invention, is used largely in America in the production of watch dials, which are now made at a mere fraction of their former cost by hand. Now a hundred are made in the time formerly required to produce one, and each of the hundred is better than the one would have been. The dial is of copper covered with enamel. Upon that is laid a sensitised coating of gelatine and bichromate of potash. A large drawing, say twelve inches in diameter, of the design, figures, and dots that it is desired to put upon the dial, is photographed down to the required size, and this forms the negative. This is placed in contact with the gelatinised surface of the dial and developed and coloured in the usual way, and afterwards fired. The Waltham Watch Co. paid 2,000 dollars for the process, and by it they can turn out, for ten cents each, dials that, in the old way of making, would have cost one dollar apiece.

Some time ago we noted, on the authority of a society journal, that a fashion had been adopted at weddings of having the whole party, including the clergyman and clerk, photographed. The suggestion was then made jokingly that a camera might be set up somewhere in the church so that the bride and bridegroom might be photographed at the time of the ceremony, and thus carry away an interesting memento of what is usually a most important epoch in one's life. Whether due to our suggestion or not we cannot say, but we read in the *Photographic Tourist* that a Lebanon photographer is reported to have arranged his camera in such a way that his photograph was made during the wedding ceremony. This probably will be followed by some enterprising amateur having his detective camera ready to take the portrait of the lady when he asks her to be his wife. There is only one objection to this: supposing she refused him, would he then like to have her portrait?

Proficiency with the camera among ladies, however, suggests fearful possibilities. The gentleman who stays late at his club or Masonic lodge is likely to have a Nemesis awaiting him in the passage in the shape of his wife, armed with a camera and a flash-lamp. A succession of such portraits, with the date and the excuses of the gentleman carefully written underneath, would be such a deterrent that regular hours would be sure to ensue.

Some time ago Messrs. H. H. Turner and A. A. Common, the editors of *The Observatory*, commented in a criticising spirit not altogether devoid of severity on the fact that Professor Pickering, in sending out his circular for preparing a photographic chart of the heavens—which circular led to Miss Bruce presenting the professor with 50,000 dollars in aid of his scheme—had not mentioned the decision come to by the Paris Congress to prepare a similar chart. Naturally the comments elicited a reply, and in this month's number of *The Observatory*, Professor Pickering states that the reason for not mentioning the plans of the Paris Conference was to avoid an official criticism of the project considered by the Conference. Professor Pickering adds that "the preparation of a photographic map of the whole heavens" was proposed by him in conjunction with Professor W. H. Pickering in 1883, and again in 1885, while the work was begun, but delayed by a more urgent use of the instrument employed. In conclusion, Professor Pickering states his difficulty in believing that the editors of *The Observatory* introduce their remarks in anything but a friendly spirit—a sentiment which the editors reciprocate in an editorial note, and so all has ended happily. The fact, however, remains that Professor Pickering has to some extent pitted himself against the Congress, and it will be interst-ing to see who will make the more progress.

Candidates for Parliamentary honours in England have long made use of photography as an electioneering appliance in the way of distributing portraits of themselves. Transparencies by means of the lantern are also common enough, dating, we believe, from an early contest in Chelsea, where Sir Charles Dilke's committee set up a screen in front of a house in the King's Road, and attracted crowds nightly by an illuminated portrait of the popular candidate. The French, however, are nothing if not original, and one candidate during the recent elections, disdaining this commonplace method of advertising, reversed the process, and instead of presenting the electors with his own portrait, went about with a camera, and photographed the wives and children of the voters, handing over the photographs to the originals. Whether the plan was successful we are unable to say; it certainly entailed some risk, because if the portraits were not flattering the elector's vote might be transferred to the opposite candidate

APPARATUS AT THE PHOTOGRAPHIC EXHIBITION.

No. II.

A small but interesting loan collection of old photographic apparatus is now on view at the Exhibition of the Photographic Society at Pall Mall. The following is a list of the historical objects to be seen there :—

Loan Collection of Old Apparatus.

Lent by Mr. W. M. Ayres.

1. Pantascopic camera.
2. Microscopic camera and slide.

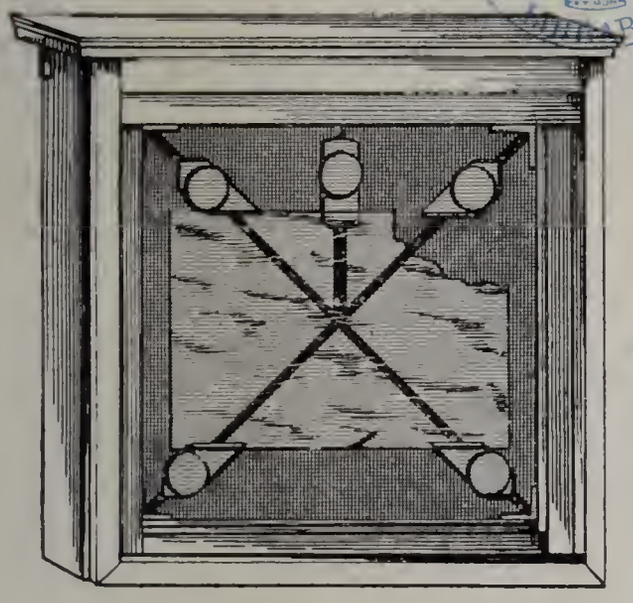


Fig. 1.

3. Camera stand with ball and socket head.
4. Box containing glass bath for bromide and chloride sensitisers, and fitted with reflectors to see when the plate is properly sensitised.
5. Developing box containing mercury to be evaporated by a small spirit lamp placed underneath. Thermometer attached to the side.
6. Pads and holders for polishing the plate.
7. Old slide to take any sized plate; it has revolving exposure slide.
8. Board for holding stereoscopic camera when using but one lens.

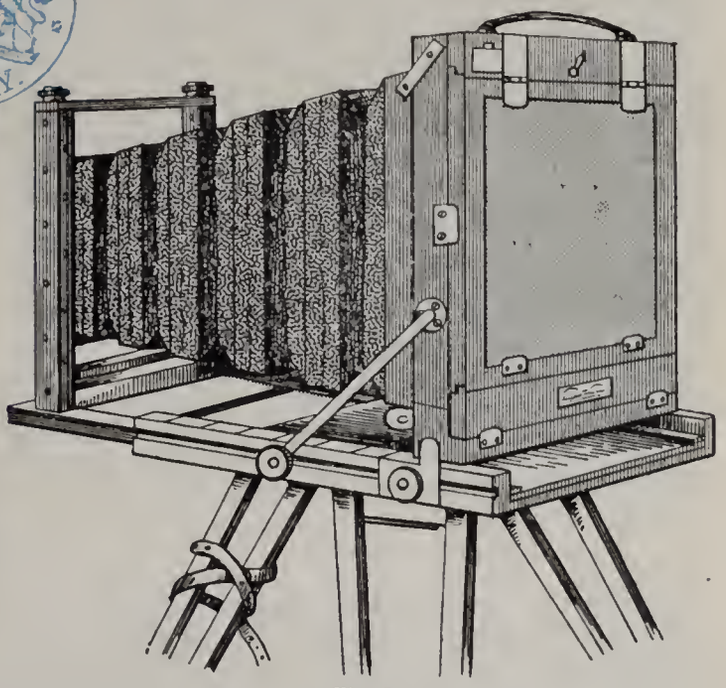


Fig. 2.

9. Square camera; the front arranged to take two stereoscopic pictures, or four separate negatives.
10. Stereoscopic drop shutter with pneumatic release.
11. Clamp for holding metal plate for polishing.
12. Frame, with an arrangement for copying any portion of a plate or picture, permitting the light to pass through that portion only.
13. Camera in which the plate was coated, sensitised, developed, and fixed by means of a ball and tube. Invented by Dubronie.

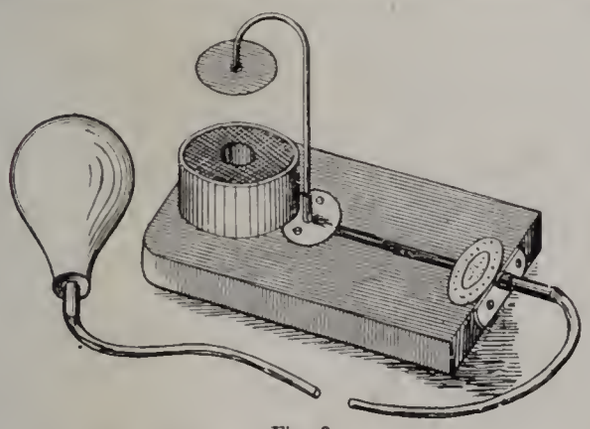


Fig. 3.

14. Printing-frame, with clamp-piece of metal at the back. Can be used for one or two negatives.

Lent by Mr. Thomas Samuels.

15. Pantascopic camera.
16. Sutton's panoramic camera, with globe, lens, dark slide, and printing frame for same.

Lent by Mr. Lyonel Clark.

17. Daguerreotype camera, used about 1841 by Mr. Latimer Clark. The lens is from an old opera-glass, uncorrected.

Lent by Mr. W. Newall.

18. The first Daguerreotypes taken of the Falls of Niagara.

Fig. 1 represents a carrier, invented by Mr. William Ayres, for use in the dark slide, which latter is also represented in the cut. Five screws have bearings which can be moved by sliding along slots, so that the carrier will take glass plates of many different sizes, and even hold in true position a broken plate, as represented in the engraving. The plate does not touch the thin black-board forming the carrier, but is separated from it a small fraction of an inch; thus, if desired, photographs may be taken by exposure of the film through the glass plate, and reversed negatives obtained with ease.

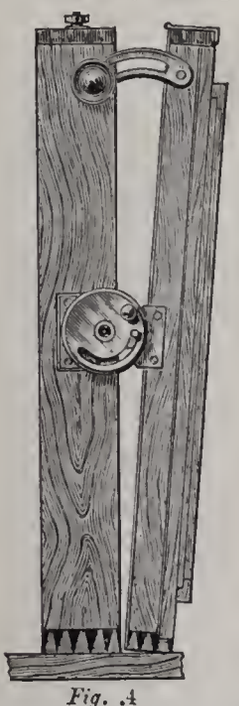


Fig. 4



Fig. 5.

Fig. 2 represents the recently introduced "gem" camera of Messrs. Sands and Hunter; it is lighter and thinner

than their "imperial" camera, to meet the requirements of those who wish to avoid weight as much as possible. A strong brass slot along each side of the base-board of the camera, to the sides of which slot the sliding parts can be clamped, tends to give firmness to the instrument when extended for use.

Fig. 3 is the magnesium flash lamp of the same firm; the cut almost explains itself. The magnesium powder is blown up through a vertical spirit flame; the horizontal disc above the lamp is to arrest the passage of any unburnt particles of the metal which may strike it, and to cause them to fall back into the flame. This disc may be removed from the lamp if the operator so desires.

Fig. 4 is Messrs. Sands and Hunter's swing, governing the adjustment of the swing-back; in this cut the swing-back is inclined, ready for use. In fig. 5 the swing-back is closed, and the means of adjustment are depicted on a larger scale. A brass disc, with a slot in it, moves eccentrically upon a pin; by merely turning the disc round by means of a knob the swing-back is placed ready for use; by turning the knob in the opposite direction the swing-back is brought close up to the camera again. Simplicity and quickness of adjustment are claimed as the merits of this invention, and, so far as we can tell by passing inspection, the claims are justified by the results.

The same firm exhibit their well-known instantaneous shutter, which opens and closes from the centre, and has adequate means of adjustment for speed. It is one of that class of shutters in which one lens of a rectilinear combination has to be screwed on the front of the shutter, and the other lens on the back.

CLEARING HYDROQUINONE NEGATIVES.

The *Boletin Fotografico*, of Havana, says that when plates are developed with hydroquinone, a slight yellow stain is sometimes produced, which may be due to either improper washing, insufficient fixation, or a prolonged development, or sometimes also to the action of sulphates. To remedy this evil, after fixing the plate properly, washing it thoroughly, and drying completely, it should be bathed in the following solution:—

Hyposulphite of soda... ...	10 to 20 grammes
Alum	5 „
Hydrochloric acid	2 to 5 c.c.
Water	100 c c.

This solution should be decantered and filtered before using. Should the hydrochloric acid not answer, oxalic acid should be used in its place.

The *Progrès Photographique* speaks of a method accidentally discovered in endeavouring to weaken a negative that had been forgotten for about thirty-five minutes in the developer; this negative was naturally very much over-developed, very yellow, and, moreover, incompletely fixed. This process has the advantage that it can be used immediately after fixing the negative; we no longer have to fear a precipitate on the detaching of the film, its use does not require more than five minutes, and no dangerous acid is required.

The process consists simply in plunging the negative, immediately after its fixing, and a washing of two or three minutes, into a quantity strictly sufficient for its complete immersion, of a bath composed as follows:—

Solution of red prussiate of potash at 5 per 1,000	1 part
Solution of hyposulphite of soda at 5 per cent.	1 „

The solution of red prussiate should be kept in obscurity in a yellow bottle, and the operation should be made in daylight, which alone by its whiteness allows us to judge of the clearness of the negative, but at some distance from the window, as too much light would give a blue tint to the bath, which, in this case, would have to be renewed. The two solutions should be kept separately, and only mixed at the time of using. This bath, thus prepared, may be used to remove the colour or weaken successively four or five negatives, but cannot be kept from one day to another. It is well to carefully watch the progress of the operation, as, in case the cliché is slightly lacking in development, this bath would still further weaken it if it were allowed to act too long a time. The duration of immersion necessary to remove the yellow fog varies from one to five minutes at most, according to the make of the plates and fixing. With some plates it is well to use a 10 per cent. solution of hyposulphite. If the negative be over-developed it is allowed to remain in the bath, even after it has lost its colour, until it has reached a suitable degree of transparency. This mode of weakening is even far preferable to the solution of perchloride of iron. The negative, when taken from the bath, is washed, as usual, under the tap for several hours.

STEREOSCOPIC PHOTOGRAPHY.

BY ELLERSLIE WALLACE.

Perhaps it may not be generally known among photographers of the present day, that a camera with two lenses—or a twin-lens camera, as the proper technical phrase goes—is not absolutely necessary for the making of stereoscopic photographs. Two pictures must indeed be made, and the two, moreover, must not be made from the same standpoint. It might be asked, then, whether a single lens could do the work, by throwing the image on the right and the left sides of an oblong plate in succession. We should answer, that this is not only possible, but that in many cases results superior to anything that the twin-lens camera could perform would be obtained. This is because the single-lens apparatus admits of any required interval of separation for the two halves of the picture; while in the twin-lens camera, as usually seen, the interval—represented, of course, by the centres of the lenses—is fixed, thereby necessitating that all subjects indiscriminately, whether distant or near, be photographed with the lenses standing at the same fixed distance from each other.

Before proceeding farther, let us say that a single-lens camera can never be used for making instantaneous views of moving bodies, inasmuch as the very nature of the work requires that the exposures of the twin pictures be made at the same moment of time.

It is true that single-lens stereoscopic cameras are now almost obsolete, but it is also true that views where much distance is included have not been improved by the use of the twin-lens camera, because the separation between the centres of the lenses is not sufficient to give effective relief in the finished picture. Just as the perception of solid objects and distances depends upon the conjoined action of our two eyes, which are separated by an interval of say two-and-a-half inches, so the apparent relief in the stereoscopic slide depends upon a proper interval of separation between the lenses. And practice has proven that the greater the distance at which the subject stands from the camera, the greater must be the distance between the lenses.

Ingenious theories have been advanced to prove that the lenses of a stereoscopic camera should be separated by the same distance as the human eyes, but the practical proof that these ideas are false will soon been seen by the following experiment. Photograph a large ball, say a foot in size, with a twin-lens camera, at a distance of four feet, with the lenses separated two and a half inches, which is a fair average for the separation of the eyes. Now photograph a range of mountains twelve or fifteen miles away with the same outfit, taking care not to include objects very close in the foreground. It will at once be seen, when the views are placed in the stereoscope, that the ball is distorted so as to look like a cylinder with its end towards the observer, while the mountain-view presents so little of the characteristic relief of the stereoscope that it might almost as well have been made with a single lens on a single plate.

In other words, then, the amount of stereoscopic relief in the stereoscopic picture depends partly upon the distance of the subject from the camera, and partly upon the separation-distance of the lenses. The greater the distance of the subject from the camera, the greater ought to be the interval of separation

between the lenses, or, what amounts to the same thing, between the points from which the twin views are taken.

In the earleir days of landscape photography, views were taken almost exclusively with the single-lens camera. An oblong plate-holder was used, and the camera was shifted from side to side between the two exposures. The top of the tripod was arranged like a small table, with a scale of inches marked off from left to right, and a thumb-screw attachmeut for clamping the camera firmly at any desired point of the table. The manipulations were quickly and easily done. The plate being prepared and the view focussed, the holder was set in the camera so that the *right* side of the plate was exposed, the camera being at the *left-hand* side of the table. The exposure being finished, the camera was shifted over to the right side, and the left side of the plate exposed by shifting the holder also. This gave a negative that needed no cutting apart and transposition of the two sides, but which, when finished, was ready for the printer.

In the course of our articles written in this journal for the improvement and entertainmeut of our readers, we have mentioned the albumen transparencies made by the late Mr. Ferrier, of Paris. We have always stated that their quality was unsurpassed ; indeed, that they might be called classical models of the photographer's art. We refer to them again, in order to say that the collection included a large number of stereoscopic transparencies of distant landscapes, which were made with the wide iuterval of separation just spoken of. No other arraugement of the apparatus could have given the fine relief and beautiful succession of receding planes of distance.

A point in favour of this single-lens apparatus is its cheapness and simplicity. The most modest 5 by 4 inch camera, with a cheap single meuiscus view-lens, could be made to do good work, and if an obloug plate-holder for the 8 by 5 inch plate could not be had, the two 5 by 4 inch plates, in an ordinary double holder, could be exposed iu succession. In selecting the view, the positiou of some prominent object at or near the centre of the plate should be noted, so that, when the camera is shifted to the other side, the same object shall come upon the same point of the plate.

Everybody who has worked stereoscopic photography knows that the print from the negative made by a twin-lens camera must be cut through the middle, and the sides transposed in mouuting. If this were not done, the picture would present the paradoxical appearance of the distant objects being nearer at hand than the near ones themselves. This curious effect has been called pseudo-scopic.

The labour involved in trimming aud mountiug stereoscopic prints is considerable, and if the work be done commercially, adds a good deal to the cost. It can be avoided by cutting the original negative and transposing the two halves, but great care must be taken to bring the centres of the twin pictures at the proper distance from each other laterally, as well as precisely equi-distant from the bottom or base line. For iustauce, if the centre point of one of the twin negatives were $\frac{1}{4}$ or $\frac{3}{8}$ iuch higher than the other, the pictures could not be made to combine well when viewed in the stereoscope. Complaints would then be made that it was a strain upon the eyes to look at them.

Now, supposing the negatives to be made on paper or on films, the accurate adjustment spoken of will be an easy matter. But if made on glass plates, where the diamond has to be used for cutting, the risk of damage to the negative is very great indeed. Not only is this true on account of the skill required in handling the diamond, but also because, when a finished negative is cut through the back, the gelatine film is very apt to tear or lift itself up from the glass at the line of incision. A gentleman of much experieuce informs us that it is uot his custom to cut original negatives in this manner, but to reproducc them on glass and cut the duplicates, if the number of prints desired makes it worth while. Amateurs would do well to observe the same caution with valuable negatives.— *American Journal of Photography.*

We are in receipt of Nos. 1 and 2 of the *Photographische Nachrichten*, the weekly organ of the Berlin Photographic Society, edited by Dr. F. Stolze, formerly editor of the *Photographisches Wochenblatt*. In his address to his readers the editor promises contributions of original articles by Profs. G. Fritsch, M. Husnik, Shellbach, Drs. Gunther, Hermann, Meydenbauer, Stinde, and other writers of repute. With the first number of the new publication is issued a supplement in the shape of a lichtdruck illustratiou, by G. Neumann, of a photograph by Anschutz of two bears in the Zoological Gardens of Breslau.

CHAPTERS ON ELEMENTARY PHOTOGRAPHY.*

BY W. M. ASHMAN.

After washing, the plate is rolled up with a lithographic roller charged with a stiff and greasy ink, which gives strength to the deep shadows, and then a thinner ink of the same class is used for the purpose of covering the half tints. The plate, after being adjusted in a press well bedded in india-rubber and properly inked, is ready for printing upon a smooth and glazed paper. Such a plate may be stored away for future use, provided it be washed with turpentine, the grease removed with dilute caustic potash solution, and then treated with a coating of glycerine and water. The prints obtained by this method being in printer's ink, require no further treatment beyond that of drying ; moreover any colour may be employed. Photo-lithography is generally understood to be a process in which, through the agency of photography, an image is prepared which can be transferred to stone, and taken therefrom like other lithographs. Photolithography is available for the rapid production of a good many subjects, especially of those in black-and-white. The first step is to produce a strong negative, sharp, clear in the shadows, and dense. The wet collodion process is eminently adapted for such work, as clear glass and great density are easily attainable by correct exposure and intensification by the lead nitrate method of Dr. Eder, followed by ammonium sulphide or potassium chromate. Having got a suitable negative, a transfer print is made on paper sensitised with a chromium salt. Bank post or wove paper is usually coated with an eight per cent. gelatine solution, to which about one-half per cent. of chrome alum in solution is added. When dry, this is sensitised on a saturated dichromate of potash solution for one minute, dried again, and printed under the negative. As soon as all the lines are visible, printing can be stopped. A lithographic stone is now rolled up with transfer ink, the wetted print laid face downwards thereon, and the whole passed through the press, which causes a thin layer of ink to adhere. The paper is next laid face upward in a vessel of cold water, whereby the excess of chromium salt is washed out. Removal to another vessel of clean water follows, and by careful rubbing with a soft sponge the greasy ink resting on those parts unacted upon by light becomes removed, leaving only the lines as in the negative, covered with ink. The work of transfer is one requiring considerable skill, and is usually done by an experienced lithographer, as so much of the ultimate success of the process depends upon details at this stage. Full practical instructions will be found in back volumes of the Photographic News, also in W. D. Richmond's "Grammar of Lithography." The ink-bearing image, well wetted, is laid on a clean lithographic stone or on a prepared zinc plate, and passed through the press. The paper support being then removed, printing can be proceeded with in the same manner as from an ordinary lithographic drawing by hand, the resulting prints being pulled in the usual way from the press. A further modification is often resorted to, especially when many copies are required. An impression in transfer ink upon paper is re-transferred to a prepared zinc plate, and the zinc is etched by means of nitric acid, so that the image is in faint relief upon the plate. According to W. T. Wilkinson, even a print of the subject with the grain-producing stipple or screen upon a thickly coated gelatine and silver bromide paper, developed with pyrogallol or hydroquinone, and treated to the alum bath, will answer the purpose if carefully inked up and transferred direct to the zinc.

The zinc, after receiving the image in greasy ink, is placed in very dilute nitric acid, so weak that it is merely sour to the palate ; the portions of the plate not protected by the ink are attached, and partial solution or etching of the uncovered surface takes place. The work must be

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* Continued from p. 670.

proceeded with slowly, as there is a tendency for the acid to go under the lines or dots forming the image, so very little etching can be effected at one attempt. The difficulty is met by stopping the action of the acid, washing the plate, drying, and then dusting it with finely powdered resin; upon heating the zinc carefully the resin melts, and runs down so as to cover the sides or walls of the etched indentations, and protect them from the further action of the acid. After inking up again the etching is continued for a little while longer, then the dusting, heating, and inking-up are repeated, followed by more etching until the required depth is produced. The acid, at first used very much diluted with water, has to be more concentrated as the work proceeds. When finished the edges of the plates are champered off; holes are bored where the highest lights will be, and also to admit of the plate being screwed firmly to a block of wood. In this condition it is ready for the printer.

Fox Talbot introduced a process he named "photoglyphy." In this case a gelatine transfer is prepared as above, placed face down on a polished steel plate, and the etching is carried on with an aqueous solution of ferric chloride. This agent possesses the property of acting upon the metal through the unaltered gelatine, but does not interfere with that portion where light has acted. Fox Talbot made several improvements after publishing his photoglyptic process, and photo-engravings of this investigator, produced by M. Dujardin, of Paris, leave little to be desired. The method forms the ground work of "photo-gravure" processes in general use, examples of which are very numerous.

Methods of utilizing photographs for block process work are by no means limited, the choice resting rather with the nature of the subject. Thus, if we were about to reproduce by photography a sheet of music where black and white are alone required, then a bitumen process would be used.

It is recorded that in 1827 M. Nicephore Niepce brought under notice of the Royal Society some pictures produced by the rendering of bitumen of Judea insoluble when exposed to light in the presence of certain essential oils. The action, however, is slow, but when purified by copious washing in ether, the sensitiveness is very much increased thereby, rendering this agent among the most useful for process work. Briefly, a smooth and polished sheet of zinc is slightly etched with nitric acid, dried, coated with a thin solution of purified bitumen, and evenly dried by means of centrifugal force in the dark room; it is then exposed under a dense negative for a few minutes to strong daylight, and developed with turpentine or a mixture of the latter with benzole, when an extremely delicate image may be seen. Upon this fine positive we build up our block, firstly rolling up with a lithographic roller, then by dusting on powdered resin, heating and etching as before described, repeating as often as necessary. This is termed a line subject. But if, instead of the sheet of music, it be a portrait or photographic view, or anything which requires half-tone for its proper representation, then some means of holding the ink must be resorted to. A plan shown to the writer by W. T. Wilkinson is simple, and upon the first trial a presentable block was produced. The subject, a cabinet bust portrait, was copied in the camera, and a partially transparent plate bearing an image of a closely ruled engraved steel plate, with very fine lines crossing each other at right angles, was superposed over the sensitive plate, so that the resulting negative, when developed, was interlaced with these lines. Considerable density and clearness of lines are requisite, and the negative so obtained is printed from by contact on to a zinc plate previously sensitized with potassium dichromate and albumen. The parts affected by light are rendered insoluble and impermeable, as we have already seen; and the other portions are amenable to the biting action of the acid as before. In this case gum-arabic solution was applied between the etching processes.

When the requisite relief has been obtained, the block will exhibit all the fine lines and gradations of the original, and the finished prints taken from the press will be more or less perfect according to the skill displayed in the several manipulations described. Those readers who desire to try this plan of printing should study the details set forth in Mr. Wilkinson's book. This, or some modification of it, is usually called zincography.

With this brief outline of the more simple means of printing by mechanical means, we bring this series of chapters on elementary photography to a close. Where brevity has been shown in the treatment of any particular process or section thereof, the reason is to be found in the desire to give more space to such matters as were deemed to be of greater importance, even to the exclusion of many interesting minutiæ.

The object has been to impart just so much information as would enable anyone commencing photography to understand, first, the ordinary tools which he would of necessity have to use, and secondly, the elementary principles underlying much of the work likely to be attempted.

Patent Intelligence.

Specifications Published.

12,913.—15*th August*, 1889. "Projecting Lanterns." HERBERT CHARLES NEWTON, Optician, 3, Fleet Street, London.

The object of the invention is to facilitate the projection on to an ordinary screen of objects which, from their nature, must lie in a horizontal position, and are incapable of occupying the ordinary position occupied by slides in projecting lanterns.

Hitherto, says the inventor, the projection of horizontally placed objects has been effected in the following manner:—The beam of light from the lantern is received upon a mirror placed at an angle, so as to reflect the beam vertically. A simple horizontal lens receives this beam, and converges it through the object, also placed horizontally, in an upward direction, on to the focussing lens, situated above it. The image is then received upon a second mirror, and thereby reflected on to the screen.

This arrangement has the disadvantage of being tedious and difficult when it is desired to show a horizontally-placed object amongst a number of objects which need not be placed horizontally, and is also objectionable on account of the loss of light which the multiplicity of the mirrors and the situation of the lenses involves.

With the view of obviating these objections, he employs a pair of ordinary dissolving view lanterns mounted one over the other, but the upper one is hinged to the lower at its back part, so as to make it capable of tipping backwards, and projecting an image in an upward, instead of a horizontal direction. A single mirror is employed to receive the image, and reflect it on to the ordinary screen.

His claim is:—"A projecting lantern hinged to its base in the manner described, so as to be capable of projecting an image either horizontally or vertically at will, and the combination therewith of a single mirror, or its equivalent, for reflecting an upwardly projected image horizontally on to a screen."

15,901. 3*rd Nov.*, 1888.—"Photographic Printing Frames." CHARLES TOMLINSON, Soho Iron Works, Oldham Road, Rochdale, Machine Maker.

The invention relates to photographic printing frames, and has for its object to improve the construction of such frames, and to facilitate their manufacture. An ordinary printing frame consists, in so far as the frame proper is concerned, of two wooden side pieces, connected by two shorter and thinner pieces, or end pieces. The side pieces are rebated upon the edges which face each other when the frame is put together, the end pieces being equal in thickness to the ribs produced upon the side pieces by the rebating. The four pieces are usually or sometimes fitted together so as to form a slot and tenon joint, and the front inner edges of the frame are subsequently bevelled. In some cases the pieces have been bevelled before the frame has been put together. The inventor cuts the side pieces from strips which have been bevelled and rebated, and the end pieces from strips which have been bevelled. He subjects the side pieces to the action of cutters, which simultaneously remove portions from each end, so as to form a rebate equal to the thickness of an end

piece, the inner face of each rebate being shaped to fit the bevelled edge of an end piece. The distance apart of the cutter spindles determines the length of the aperture in the frame. When the frame is glued together the bevelled edges make a mitre connection at each corner. The corner joins are farther secured by means of nails, pins, screws, or rivets. The end pieces, he says, are not so much weakened as in the ordinary construction hereinbefore described, and the cost of production is lessened.

Proceedings of Societies.

London and Provincial Photographic Association.

On the 10th inst. Mr. J. H. Taylor occupied the chair.

The Hon. Sec. exhibited a very portable camera-stand by Mr. I. W. Ramsden, of Leeds; also a lantern slide carrier by the same maker.

Mr. L. Medland passed round a cutting die for making lantern slide masks. He considered it very useful, as openings of various sizes could easily be made with it.

This was the first lantern night of the season, and the remainder of the evening was devoted to the exhibition of member's slides. The exhibitors were Messrs. L. Medland, Adkins, T. E. Freshwater, and H. M. Hastings. Mr. Ramsden's new lantern carrier was used on this occasion.

The Camera Club.

On Thursday night, last week, at a meeting of the Camera Club at Bedford Street, Strand, London, Major J. F. Nott presided.

Mr. W. A. Greene read a paper upon "Detective Cameras." He said that the employment of the detective camera is abused by people who go about with them everywhere, and who hold nothing and nobody sacred, so that photographers and photography are beginning to be thought a nuisance by the public. He spoke of the meanness of the men who go about photographing sea-sick passengers, and added that hand cameras ought to be visible, and not concealed inside a box. He himself used Shew's quarter-plate hand camera with a roll-holder, by means of which he could obtain forty-eight negatives. His experience was, that after a little practice a finder is not necessary. With detective cameras a few good pictures were usually obtained among a heap of rubbishing ones; these latter had better be destroyed, and not printed. He was uniformly successful in the stripping of the films; he used a lens of 4½ inches focus.

The Chairman thought the advice of Mr. Greene to be in the right direction. He hoped that the Club would distinguish between the photographer proper, and the "cad" who uses detective cameras for annoying other people, and not for the purposes of art.

Several of the members and others present then exhibited their detective cameras, the points of novelty in which cannot easily be adequately explained at public meetings without the use of diagrams, and in newspapers without the introduction of engravings.

Mr. E. J. Humphrey exhibited the "key camera" of the Platinotype Company. The plates are carried in little cases, and, when required, are let in and out of the camera in the field, by passage through a kind of light-tight tap with a long slot; thus the camera is reduced to about the size of a cigar-box for quarter-plates, and the charged plate-cases are carried in the pockets of the photographer. The lens is of 5½ inches focus, and the shutter said to work in the one-hundredth of a second. The camera can be fitted on a stand, and used in the ordinary way with a focussing screen. He also exhibited a small modification of the same instrument, which, he said, could almost be carried up the sleeve.

Mr. Crouch exhibited a hand camera, the point of novelty in which, he said, was the way in which the plates were worked.

Mr. Hindley exhibited a detective camera, the Facile, which carried twelve plates. There were two grooved boxes inside, one above and one below; as one of the boxes moved forwards the other moved backwards, so that a plate, after it had fallen from the upper box into the lower one, and had been exposed, was drawn a little backwards, and then another plate fell into the position for exposure.

Mr. D. P. Rodgers exhibited two or three detective cameras lent by Messrs. Marion and Co. One of them was Dr. Krugener's "book camera," with the back abolished, and the working parts mounted inside a wooden case. The plate-changing arrangement in the Krugener cameras is one of the best extant, but it was first invented in this country.

Mr. Fitz-Payne exhibited a half-plate detective camera.

Mr. T. Samuels exhibited a detective camera, the points of novelty in which, he said, were smallness and simplicity; it took plates 4¼in. square, and had a Ross' lens of about six inches focus. He did not agree with what Mr. Greene had said about concealed cameras, for he did not like a lot of people about him when he was photographing.

Mr. Rodgers then exhibited what he called a "makeshift" instrument of his own, consisting chiefly of an ordinary quarter-plate camera mounted inside a box.

Mr. Rushton exhibited a camera devised by himself for use in yachting. When an ordinary hand camera is used on a passing yacht, the top of the spars or some other parts of the vessel are often likely not to be included in the picture; he therefore used a double camera, the one on the top of the other, both furnished with lenses of the same make and focal length. The upper camera was used as a large-sized finder, the lower one for the exposure of the plates. The instrument was furnished with an ordinary drop shutter, and a pneumatic tube.

Mr. Conrad Beck exhibited his detective camera. He preferred long focus to short focus lenses, and Newman's shutter; the latter, he said, was the only one he knew which was nearly satisfactory in giving different brief exposures with tolerably accurate regulation.

Mr. J. B. Robinson exhibited two detective cameras, and explained their mode of action.

Messrs. W. Watson and Sons' representative, an intelligent boy, exhibited their detective camera and its mode of working; his explanation was so clear, and his remarks so brief and to the point, as to form one of the best speeches of the evening, consequently at the close he was greeted with a special round of applause.

The Chairman remarked that they had just listened to the very able representative of an old-established firm.

Mr. R. Abraham exhibited a detective camera, the working parts of which were so simple, that he claimed that the camera would not "miss fire once in a million times."

Mr. George Davison exhibited Messrs. Swindon and Earp's camera, which has already been described in these pages; also another of foreign make, which, he said, had been kindly lent him for the evening from the Exhibition of the Photographic Society. Its chief point of novelty was that the plates packed into exceedingly small compass by suitable mechanical arrangements.

The Chairman remarked that a kodak camera had kindly been sent to the meeting, but need not be described, as it was already so well known.

Mr. E. R. Shipton opened the discussion by saying that with a fixed focus camera, good results cannot always be obtained. He thought a quarter-plate detective camera to be the most serviceable, and he did not think that there was much use in attempting to conceal the instrument, for the public seem always to be aware of its presence. All the cameras exhibited that evening he believed to be lacking in one important point, for not one of them could be used as a landscape camera in its true sense; there was no rising and falling front, or swing back. He thought that the consensus of opinion was in favour of the use of a finder of some sort, and he was of opinion that one with a hood over the top was preferable. A lens of seven inches focal length for a quarter-plate was a great mistake; his friends who used Beck's camera often failed with it because of the seven-inch focal length; five-and-a-half or six inches focal length was preferable. Once he had exhibited a stereoscopic detective camera to the Club, but it was too heavy; at present he used a quarter-plate camera instead. Swift, and perhaps some other opticians, turned out lenses which would work at f, made of the new Jena glass; they gave a power which he thought to be almost indispensable. Mr. J. Traill Taylor spoke well of the intensity, and Mr. Dallmeyer was experimenting in that direction. He thought that a shutter which opened and closed from the centre and between the lenses was preferable to others, for it seemed to promote sharpness. Newman had made him a special shutter which worked from ¼ second up to $\frac{1}{300}$ second, but the latter point he had not tested. He believed that the days of changing backs were over; they attracted public attention, but a magazine of some sort was indispensable. His tripod stand fitted together like a fishing rod; it was an old-fashioned one, which had long been in the market. He had a double cover to his lens. He changed his plates on the principle first made known by Mr.

Samuels, but with the means so arranged that he could make the changes with one hand, instead of sitting on a doorstep to get the use of two for the purpose.

Mr. RODGERS asked how Mr. Shipton could use a swing-back, and the small stop neeessitated thereby, with a hand camera.

Mr. SHIPTON did not use the swing-back while using his camera in the hand.

Mr. A. STROH endorsed all Mr. Greene's remarks. He wished that all the improvements shown that evening could be introduced into one camera. He had used a hand camera for three or four years, and had come to the conclusion that it did not matter how complicated the inside of the instrument might be, provided that the governing parts outside were few and simple. The plate-changing should be effected by a single movement; the shutter release should be one motion also. The camera should have a flap or some extra protection for the plates when the shutter is not in use, and there should be an arrangement for focussing; also for inserting different stops. The camera should have a rising front, and a swing-back if possible, but perhaps slightly tilting the lens would be simpler, especially as he thought that a hand camera should never have to be tilted. There should also be an arrangement for changing the speed of the shutter, for sometimes an open landscape has to be taken; at others a dark street. With a complete camera of this kind, it did not seem as if the few motions of which he had spoken at the outset could be employed to govern its action, but when the operator changed a plate, the same motion should also re-set the shutter. The flap which protected the plate should be combined with the release of the shutter. The focussing motion could not be combined with any other, neither could the arrangement for setting the shutter at different speeds. The changing of the plates ought to bring all the appliances back to zero, which should be the fixed focus, so that the operator shall then always know what he has to begin with, and that nothing shall be liable to be forgotten.

Mr. E. FERRERO had never possessed a hand-camera because he could never find one to suit him. Hand-cameras might be divided into three classes. Of the first of these, Mr. Shew's was a very good type. The second class were those cameras with bellows, and which he thought in a few years would only be found in museums; they were too bulky. The outside of the box should form the camera itself, and the best he had seen of that kind was that of Mr. Willis, but it did not permit focussing. He did not believe that there was much use in a shutter which worked faster than $\frac{1}{25}$ or $\frac{1}{30}$ second, except for very special purposes not generally required. He thought that the shutter should be behind the lens, because space in a hand-camera is usually available there, and the photographer can then use certain adjuncts without changing the shutter. He believed that plates had seen their day for this class of work, and would in time be superseded by good films.

Mr. CROUCH did not think that an ordinary worker required to give exposures longer than $\frac{1}{30}$ second. Newman's, in his opinion, was the best shutter, but it took up too much space. He found that when using a detective camera with a lens working at $\frac{f}{16}$, out of every twenty-four plates exposed in fine weather he brought home twenty good pictures. He believed a lens of long focus not to be essential, and that one of five inches was good and easy to adjust. By working it at $\frac{f}{8}$, any desired result could be obtained, except in narrow streets. In the latter class of cases, Mr. Taylor used a portrait lens working at $\frac{f}{4}$, and had obtained results better he—the speaker—thought, than had been obtained by anyone else under similar conditions.

Mr. CONRAD BECK remarked that he had no very high opinion of his own opinion, and had only expressed his views about the foci of lenses for what those views were worth.

Mr. W. ENGLAND exhibited stereoscopic twin lenses with a shutter, which he had recently bought in Paris, because they had taken his fancy while inspecting apparatus as one of the jurors at the Paris Exhibition. The shutter would work at seven or eight different speeds, and the adjustments for the purpose were quickly made and exceedingly simple. He thought its highest speed to be about $\frac{1}{30}$ second; it could also be used to give time exposures. He had been very pleased with the way it had worked in his hands. He then exhibited a slide for celluloid films; he said that it was home-made, and had nothing new about it, but was light and simple.

Mr. T. SAMUELS remarked that he never sat down on a doorstep or anything else to change his plates. He considered Mr. Stroh's remarks to be valuable, but he had set inventors a hard task. A detective camera should be marked by its simplicity, and one essential feature it should possess had not been stated that evening, namely, that it should work noiselessly. He had used his detective camera in the Law Courts, and nobody was aware of his operations. Krugener's camera worked noiselessly, but once while he was using it at a sitting of the Parnell Commission, out of forgetfulness he moved a part which made a noise. In photographing interiors an instantaneous shutter was useless. He liked a simple piece of thin steel working across the lens near the stop, and with a piece of string at each end; by giving quiet pulls to these strings the shutter could be opened and closed. He had been interested in the shutter shown by Mr. Robinson that evening, and Shew's shutter was very valuable; he also liked the shutter exhibited by Mr. Hindley. He was rather inclined to say, in relation to making the changes necessary with detective cameras, "Do everything by hand, and know that you have done it." He did not think a swing back to be necessary; the same result could be achieved by moving the lens, but this should not be attempted with a detective camera pure and simple.

Mr. FOX SHEW remarked that on the table he had placed a larger child of his small camera; it would take whole-plates, and was of light weight. With a rising-front for hand-cameras, a swing-back was unnecessary. He had once exhibited a revolving rising-front, by which the lens could be raised 1 or 1½ inches, which was as much as the lens would stand; a swing-back added greatly to the weight of the apparatus. In Paris, he had recently bought a lens with a flange which consisted of a portion of a globe, so that the lens could be tilted in any direction by a kind of ball-and-socket arrangement, and then could be clamped; it was manufactured by Enjalbert. It was a little heavy.

Mr. SHIPTON asked Mr. Beck whether there were not an optical disadvantage in tilting the lens.

Mr. BECK replied that such would not be the case if the lens were tilted to a small extent; but if tilted to a large extent it would be very disadvantageous.

Mr. FERRERO thought that it came to the same thing in the results as if a swing-back had been used.

Mr. SHIPTON responded that the late Mr. J. H. Dallmeyer had published that the tilting of the lens introduced a marked defect into its working.

Mr. GEORGE DAVISON believed a lens of long focus to be essential for accurate and artistic work; with a lens of short focus, a part of the print must be cut away to get the same result.

Mr. HUMPHREY said that a shutter working between the lenses sharpened up the picture considerably.

Mr. CHARLTON WOLLASTON remarked that the centre of a lens is its most useful portion, and that portion is always at work during the exposure with shutters which open and close from the centre, and work between the lenses.

Mr. FERRERO agreed that it was the best place, but not the best place when using detective cameras, for in them compromises must be made somewhere.

Mr. WOLLASTON stated that with other shutters the most useful portion of the lens was in operation only during about half the time of exposure.

Mr. BECK added that with those other shutters the photographer only obtains in $\frac{1}{10}$ second the amount of light he would otherwise get in $\frac{1}{20}$ second. The roller blind shutter next the plate was the best. Good lenses in detective cameras did not require to be stopped down.

Mr. DAVISON remarked that Messrs. Edwards and Co. were going to bring out a camera with the roller blind shutter, and that Mr. J. B. B. Wellington had done so already.

Mr. SAMUELS stated that Mr. Collins had been making cameras of that class for some time.

Mr. W. ENGLAND said that in 1858, in the old wet plate days, he could get good results only with a shutter working next the plate; it fell through the camera into a bag below, and was altogether a bulky arrangement. In that way the first street views, he believed, were taken. At that time Ferrier had not begun such pictures.

Mr. F. DE P. CEMBRANO had used a detective camera for four years, with a shutter working in the worst possible position; in fact, his method of working was practical, and not theoretical. He had tried his shutter against the roller blind shutter for speed, upon horses trotting at right angles to the lens, and had obtained the best exposure and the least movement. He could not explain this, but he could show the plates. He was making a camera to suit his own convenience first, and to see whether it would fit theory afterwards. The experiment with the two shutters had been fairly tried, and Mr. Wellington—who was a

good friend of his—had been staggered at the result. He used a lens of long focus, which probably had something to do with it. The camera he was making was as light and simple as possible.

Mr. J. S. Whatton did not altogether agree with the contents of Mr. Greene's paper in relation to the morality of the use of detective cameras; there could be no harm, he thought, in taking groups, and there was no object in shooting at persons if they had to be told first that they were to be shot at.

The Chairman remarked that it was impossible in one evening to deal with all the subjects which had been started; they should be divided into different classes, and an entire evening given to each class. He used a 5 by 4 inch plate in order not to have to tilt the camera, and afterwards he cut out a quarter-plate picture therefrom. With a little experience it became easy to gauge the distance for focussing.

Mr. W. A. Greene, in the course of a brief reply to the speakers, said that no camera on the table met his chief want—namely, the free use of his hands when climbing mountains; one could not then carry boxes as he could carry Shew's folding camera. He did not think that there was any objection to taking groups unawares, but the members of the Club were not detectives, and did not want to be. Individuals ought not to be photographed against their will; of such a line of action strong disapproval should be expressed.

West London Photographic Society.

The annual general meeting was held on the 11th inst., at the Addison Hall, London, Mr. W. England in the chair.

The Chairman spoke of the retirement, owing to ill-health, of the co-secretary, Mr. March. Bearing in mind that it was the first year of its existence, he thought the Society was in a prosperous condition both in regard to finance and numerical strength.

The rules were then discussed and amended. It was agreed that in future the annual subscription should be ten shillings, with an entrance fee of five shillings; lady members to be charged half fees.

The ballot for the election of officers was then proceeded with, and resulted as follows:—

President—Mr. Chas. Bilton, B.A.

Vice-Presidents—Messrs. G. F. Blackmore, E. W. Foxlee, Dr. F. H. Low, and Mr. Walter L. Colls.

Council—Messrs. Chas. Winter, W. Rickford, T. S. Hazeon, J. Hyatt, Harold Power, T. B. March, C. G. Richardson, Chas. Whiting, G. E. Varden, J. D. England.

Auditors—Messrs. Henry Selby and Leslie Selby.

Treasurer—Mr. Lionel C. Bennett.

Hon. Secretary—Mr. John A. Hodges.

In future all meetings will be held at the Addison Hall, W., on the second and fourth Fridays in each month. The next meeting will take place on October 25th, at 8 o'clock; an address will be delivered by the new President, followed by exhibition of slides in the optical lantern.

The first annual report of the Council of the West London Photographic Society sets forth, among other items, that the council acknowledges gratefully the encouragement which members have given them by attending the indoor meetings regularly. The summer excursions, on the contrary, have not been as successful in point of numbers as the council expected, the attendances on several occasions being small. It is recommended that monthly indoor meetings be held in future during the summer months in lieu of the outdoor excursions, and that one special outdoor meeting be held annually. An exhibition of members' work will be held on the 10th January, 1890, further particulars of which will be duly announced. The exhibits will be classified, and medals and certificates awarded in each class. It is suggested that work sent in for competition should be limited to that produced during the present year, but other work may be sent for exhibition only. There will also be a special lantern slide competition. Mr. March, one of the secretaries, has been compelled, owing to continued ill-health, to place his resignation in the hands of the council, who express their hearty appreciation of his services.

Abney Camera Club.

The inaugural meeting of the first winter session of the above Society was held on Friday last, with Mr. E. C. Williams in the chair.

The Hon. Sec., Mr. F. H. Leeds, read a paper on "The Study of Photography," in which he drew attention to some of the various branches of the subject, both scientific and artistic, and urged photographers, if they wished to be in the first rank, to confine their attention to a small number of processes. He also pointed out the interest and benefit to be derived from a study of scientific photography, and regretted that more amateurs were not willing to devote themselves to this part of the subject.

The Secretary announced that on October 18th a paper would be read by Mr. Adkins on "Chloride Emulsion Making."

Visitors are invited to any of the meetings. Rules and all particulars can be obtained from the hon. sec., M. F. H. Leeds, 29, Bouverie Road, Stoke Newington, London.

Birmingham Photographic Society.

An ordinary meeting was held at the Club Rooms, Colmore Row, on the 10th inst., with Mr. W. J. Harrison in the chair, when Mr. W. L. Hipwell was elected a member.

The Hon. Sec. read the award of the judge, Mr. G. Bankarts, for the prize for three pictures, to Mr. E. C. Middleton.

The remainder of the evening was devoted to a discussion on "Lenses and their Uses"; the subject was opened by Mr. Walter Griffiths.

On Wednesday, the 9th inst., the Vesey Club, Sutton-Coldfield, invited the B.P.S. to a special meeting of their Club. A number of members attended, and Messrs. Horton, Harrison, Jaques, and Middleton gave papers epitomising the several developments of photography—viz., Daguerrotype, Collodion, and Gelatine Emulsion, and Printing and Photo-Mechanical Processes. A resolution was proposed "That the Vesey Club approve of the suggested photo-survey of the County of Warwick, and would be willing to aid the B.P. Society in the way of recording geological, botanical, or other matters of interest, and by using its influence in carrying out so desirable a project."

The Mayor of Sutton, and Vice-President of the Vesey Club, Mr. J. B. Stone, J.P., gave a *conversazione* in the Town Hall, Sutton-Coldfield, on the 12th inst., at which he exhibited a portion of his large collection of photographs, 15 by 12 and upwards, of American and Continental views, supplemented with a large number of photos from the members of the B.P.S. A lantern display was given by the Lantern Committee B.P.S., Mr. E. H. Jaques showing his Norway series, and Mr. C. T. Fowler the Society's slides.

Some 250 friends and members were present, and the entertainment was much appreciated, and the Mayor remarked that the two societies might work together with mutual benefit in the cause of science.

Derby Photographic Society.

The usual monthly meeting was held in the Society's rooms, Derwent Street, on Tuesday, Oct. 8th, when the following were elected officers for 1890:—

President—Capt. W. de W. Abney, C.B., R.E., F.R.S., &c.

Vice-Presidents—Messrs. C. Bourdin, R. Keene, T. Scotton.

Committee—Messrs. F. Cooper, J. A. Cope, C. B. Keene, E. J. Lovejoy, R. L. Warham, R. Woods.

Treasurer—Mr. A. B. Hamilton.

Hon. Secretary—Mr. C. J. Chadwick, Sydney Villas, Mill Hill Road.

Auditors—Messrs. F. Hyde and J. Riches.

Leicester and Leicestershire Photographic Society.

The first meeting after the recess was held in the Mayor's Parlour, Old Town Hall, on the 9th October, Mr. S. S. Parkedge in the chair. The transaction of routine business was followed by a lecture by Mr. F. Pierpoint, entitled "A Trip up the Thames from Oxford to London Bridge," illustrated by slides from negatives taken *en route*.

Sheffield Camera Club.

An ordinary meeting was held in the Club Room, New Surrey Street, on October 11th; Dr. Morton presided.

A number of pleasing views obtained by the members at the late excursion to Conisborough were exhibited.

Mr. H. J. Hardy, hon. secretary, read a paper on "The Chemistry of Photography," in the course of which he said that photography might be conveniently divided into two sections—one embracing technical art, and the other, science. He thought the art side had been made more prominent, but we should not

allow a scientific discovery to degenerate into a purely empirical art. Many of the industries have lost, or remained stationary, by working by rule-of-thumb; art ought not to outstrip science, and branches of photography would be advanced by the scientific aspect. The action of light on certain bodies produced a physical or chemical change, sometimes both. The action of light on sulphur effected a change in the crystalline structure, but no chemical action; in other cases, a disassociation of the constituents is effected, as in certain salts of silver; chemical changes or decompositions also take place uninfluenced by light. Examples of photo-chemical action on the salts of silver, iron, gold, also chromates and bitumen, were described, and the formulæ traced on the black-board. The theories of some changes in haloid salts forming the photographic image were as yet obscure; but the researches of Captain Abney and others were tending to their elucidation.

A discussion followed, in which the president, Mr. Gilley, and Mr. Howarth, took part.

Nelson Camera Club, New Zealand.

We receive the following report in the shape of a letter from Mr. F. W. MacLean, the Honorary Secretary of the above Club.

"Perhaps it may interest the readers of the Photographic News to know that in this out-of-the-way corner the delights of photography are not neglected. Our Club, founded about fifteen months ago, is composed of some twenty-five members—amateurs—not a very large number, but we make up for our weakness in that direction by a large amount of enthusiasm. The meetings are held on the third Wednesday of each month, in a room of our President's office, and are quite of an informal character, partaking very much of the nature of a friendly chat over our pipes and cigarettes, in the course of which we explain our difficulties, exhibit work done, and anything new in the way of apparatus, or process of development, or printing, sometimes with practical expositions.

"At our last meeting our patron, His Excellency Lord Ouslow, who is an enthusiastic photographer, honoured us with his presence, and during the evening we tried some experiments with the magnesium flash.

"The Club has a portfolio, to which members are expected to contribute from time to time.

"There is an abundance of very fine scenery in the neighbourhood, and last summer we had one or two excursions. Some of the best scenery is most easily reached by sea, and several of the members combine yachting with their photography. One of the excursions was a yachting trip, when two pleasant days were spent.

"We propose to hold a small exhibition in December.

"Visitors are cordially invited to the meetings, and we are always glad to give strangers any information and help."

Photographic Club.—The subject for discussion on the 23rd inst. will be "The Ideal Camera." Nominations for officers for the ensuing year, and notices of all alterations of rules, must be given at this meeting.

Photographic Portraiture.—M. Loewy, of Vienna, uses reflectors of different colours, according to the complexion of the persons whose portraits he has to take. For pale or slightly coloured faces the reflector is of a brilliant red; for dark complexioned persons he makes use of reflectors coloured in proportion to the depth of colour of the sitter. The results, it appears, are excellent.

Toning Photographic Prints.—M. J. Thibault writes to *L'Amateur Photographe*:—"I have made some experiments on the use, as indicated by Pizzighelli, of chloride of potassium in order to vary the tones of gelatino-bromide paper, and I found that the prints acquired a warmer tint. It was the same thing for gelatino-chloride papers, and in this case we can dispense with the toning, which is impossible without the use of chloride of potassium. Struck with the action of this product on the salts of silver, I sought the effect to be obtained on albumenized paper. A print well washed in a solution of chloride of potassium, slightly fixed, gave me an intense red colour. Evidently this would only suit a few subjects, but it seems to me that some come better in this manner than with the use of a toning bath.

L., Photographic Club, and G., Birmingham Photographic Society. The copies of your papers only reached us on Thursday, this week.—Secretary, Cardiff Exhibition. The list of awards about which you write has not been received.

Answers to Correspondents.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

Amateur.—The invitations signed by Mr. Kenric Murray seem to have been distributed pretty widely in the first instance. There was nothing wrong in this, for it was left to the recipient to determine his eligibility, or otherwise, by being engaged in photographic trade. If you are an amateur, only selling your negatives occasionally, it is hardly probable that you will think it worth while paying an annual subscription to maintain your commercial rights; but a professed lantern-slide maker would do so. It was decided at the meeting last week to limit the membership to those actually engaged in trade: how else could you come into association with, or claim the protection of, the London Chamber of Commerce?

S. S.—Messrs. Abel and Imray, Southampton Buildings, Chancery Lane; or Messrs. Thompson and Boult, 323, High Holborn, W.C., are more often heard of in connection with scientific inventions than either of the names you mention.

A. D. H.—Your picture will only bear enlargement to 10 by 8, the Autotype Company's price for which is eight shillings, extra copies one shilling each. The puff of white smoke would have shown better against a darker background; but perhaps the negative has more detail than the print.

R. P.—Even if it be true that a measure of economy results from mixing a certain amount of zinc dust with the magnesium powder intended to be burnt in the flash light, the production of zinc oxide fumes would render such admixture upon the whole a very questionable advantage.

M. L.—Silk is entirely soluble in concentrated hydrochloric acid, but neither wool nor cotton is so attacked. The new artificial silk is a partially denitrated nitro-cellulose.

H. B.—The advertisement sheet forwarded is known as the Woodbury Water Mark. It is produced by milling the paper in contact with a Woodbury gelatine film; and, to heighten the effect, the face of the mould is sometimes treated with just a trace of oil. Be very careful not to use too much of the latter, for fear of spreading into the paper and blurring the outlines of the impression.

W. H. M. ("Amateur").—The bitumen process is described in Mr. H. Trueman Wood's account of "Photography and the Printing Press." See the News of February 3rd and 10th, 1888.

X. Y. Z.—In our answer to you last week, please read Collotype instead of Calotype, as printed.

G. J. S.—The smoke cloud which arose over Antwerp on the 6th ult., immediately after the explosion of the cartridge factory and petroleum store, was photographed within two minutes of the occurrence by M. Huybrechts, by means of a detective camera. The originals were enlarged by M. Van Neck, and are shown as two whole-page illustrations in the *Bulletin de l'Association Belge*, from which we are enabled to appreciate the awful nature of the catastrophe, and the monster mushroom form of the column of black smoke.

Carl.—The whole picture is duplicated, as though the camera had slipped, or one of the legs given way during exposure. In soft ground this might have happened, unless you took the precaution to lay down a few stones, or used what are technically called "shoes" (flat plates of metal perforated) on which to rest the legs of the tripod.

M. E.—It might be well at this season to give your top windows a good washing down outside, to dislodge the accumulation of soot and dirt; then you may hope to take full advantage of all the light we are likely to get at this dull period of the year.

Phototype.—See the answer to W. H. M., above. In addition, we give you the following references:—For photo-engraving, lithography, and mechanical printing, consult the News for June 15th, August 3rd and 10th, October 26th, November 16th and 23rd, 1888. Captain Abney's "Instruction in Photography" (Piper and Carter, price 3s. 6d.) describes the heliotype, phototype, photo-lithography and zincography, photo-reliefs, and photo-engraving.

H. L.—We thank you for your letter of 15th inst. A short account of your proceedings and experience would form a very acceptable contribution to the Year-Book.

Devon.—The metal dark slides are so much cheaper than wood, and pack in less space, that even if they did not last so long, or bear so much rough usage, it might be well to give them a trial. You need not at once discard your wooden carriers, but take both sorts into use, and be guided by experience in any future equipment.

A. G. K.—Indigo, if used by itself, is known to fade, and so does ultramarine in contact with acid. Prussian blue, cobalt, and smalt ought to stand fast. Which did you use with the Indian-ink?

M. & B., Platin, and other correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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PERMANENT PAPER PRINTS.

THE endeavour of Mr. Lyonel Clark to render silver prints more permanent by means of a good practical process of toning them with platinum instead of gold is a step in the right direction, but the permanency of the platinum print proper is not to be expected under the circumstances. Toning seems to be but a surface action, leaving in its original condition the bulk of the deposit which forms the image. Some years ago we printed a silver image on plain salted paper, then left it in the gold toning bath for an hour or two after it had gone cold and black therein. This vigorously toned image was then placed for hours in nitric acid sufficiently diluted with water not to destroy the paper. Gradually the half-tones of the image grew warm, and of the pinkish-red colour which characterises photographs we have produced by pure gold processes; hence the assumption was that the black deposit had been dissolved entirely away in the half-tones, but not so in the deepest shadows, and that that which had been dissolved by the nitric acid was not gold. In ceramic photography the silver is sometimes replaced entirely by platinum by the substitution process, but in such cases the original positive image in the collodion film appears to be excessively thin.

Of the majority of those photographers who pass from our midst into the Great Beyond, it may be truly said that "their works do follow them," for their photographic productions have not an abiding place here of any great duration; slowly or quickly do they fade from mortal vision. This fading of present-day prints is the bane of photography in relation to its use for historical purposes, so the attention of all the best workers is turning more and more to the employment of platinum in photographic processes. In any national gallery devoted to photography, platinum prints will become a necessity.

In Paris, exquisite portraiture in platinum is tolerably common, and outside the houses of many photographers are painted the words, "Unalterable photographs in platinum." This should be the case in England, and the words, "Platinum photograph," ought to be printed on the mounts of pictures sold. Some such guarantee is necessary, and should be demanded by the purchasers, for developed bromide prints can be produced so closely resembling platinum prints as to be indistinguishable without the application of chemical tests; the same may be said of silver prints toned to a sufficient depth by Mr. Clark's method; consequently, it is desirable, in the interests of the public and of photographers, that when real platinum prints are sold, the vendor shall describe them as such in writing or in print.

THE EIKONOGEN DEVELOPER.

BY extensive reading of home and foreign photographic literature, it will be noticed that the results of experimentalists who have been trying the new eikonogen developer may be broadly divided into two classes; in the one class the negatives are all that could be desired, and in the other weak grey images have been obtained. The latter has been our experience, but possibly the sample of eikonogen was bad because of exposure to the air long before use; if this be the case, why do the German makers send it out in tins with a moveable lid, thereby implying that it does not suffer much while in a dry state if kept out of finely stoppered bottles? Carelessness of this kind implies in addition, that there may also possibly be little acts of carelessness in the manufacture, causing different samples to vary in quality. All photographic processes depend so much upon careful attention to minute details, that carelessness is not permissible.

Dr. J. Schnauss has published that for instantaneous exposures the eikonogen developer must always be used when freshly mixed, and without bromide of potassium. For time exposures the opposite mode of treatment is best. He finds that it gives better half-tones than does quinol, but less vigorous images. This is no disadvantage as regards eikonogen, for perhaps the best method of development for those operators who can spare the time is to bring out a weak image first, and to strengthen it afterwards, as in the old wet plate days, and in one of the methods of Major Russell with early dry plates.

MR. ANDREW PRINGLE.

With the present number of this journal is issued a likeness of one of the most popular men connected with photography, namely, Mr. Andrew Pringle, ex-President of the Photographic Convention. A popular man, such, for instance, as the average Mayor of an English town, is usually polite and obliging, a good speaker, one who never assumes the offensive until his good nature is rudely strained by the incautious; he can then assert himself with vigour. He can sink his own crotchets in public in relation to subjects upon which there is legitimate room for difference of opinion, so can give a fair hearing to all sides. If he be a candidate for parliamentary honours, he can bear a shower of dead cats and rotten eggs with a sweet smile, and kiss all the babies brought to him by the wives of working men who have votes. He is not one of those shoddy upstarts and snobs who object to the professional photographer "as sich," but is a gentleman. All this is Mr. Andrew Pringle, except that we should not like to try whether he will imitate the just described parliamentary candidate; someone else may make the experiment.

Mr. Pringle was born July 8th, 1850. He was educated at Harrow, at Trin. Col. Camb., and the Royal Military College, Sandhurst. A year or two of his life was spent in the 8th Hussars. Soon afterwards he took (1) to photography, 1874; (2) a wife, 1875; (3) his first medal for photographic work, after a tour of fifteen months in Italy about 1879. Since then he has been awarded many medals for landscapes. In 1886 he took to photo-micrography, and has kept at it ever since, chiefly in relation to bacteria. He has partly illustrated Klein's last edition of "Histology," also partly the Local Government Blue Book, and several other papers. He has taken seriously to the preparation of micro objects, chiefly pathological, and quite lately has demonstrated a bacillus in an extremely rare skin disease, which discovery created a great sensation at late Dermatological Congress in Paris. It may here be mentioned that his brother, Dr. J. J. Pringle, is skin-physician at Middlesex Hospital. Another of his brothers is a well-known writer on agricultural matters.

Mr. Pringle has, perhaps, worked every process purely photographic, and made great numbers of batches of emulsion—collodion and gelatine. He designed an appliance for the oxyhydrogen gas-jet, and a box for packing plates for travelling; he has also devised several other things in common use, "for which," he says, "I get and want no credit." He is a Fellow of the Royal Meteorological Society, President of the West Kent Amateur Society, Hon. Member of the Glasgow Photographic Society, and of other bodies. He has photographed in France, Germany, Switzerland, Italy, Spain, Africa, and on one occasion all round the world. Mr. Pringle is joint author with Mr. W. K. Burton of "Processes of Pure Photography," and sole author of two books shortly to appear on "Photo-micrography," and the "Optical Lantern." He has written numberless articles in photographic periodicals. He assures us that he is of "a sweet, trusting disposition, never given to joking nor ribaldry, mad on music; I am the best of husbands, the fastest of friends, and the darnedest of fools. Whatever my execution may be, my intention is always admirable. The *New York Herald* says I am remarkable for modesty, and I don't deny it."

THE SOLUBILITY OF EIKONOGEN.

BY F. GOLDBY, MEM. PHARM. SOC.

Having been asked by the editor of this journal to ascertain the solubility of eikonogen in glycerine and water, also in borax, some trials were made with the following results.

Twenty grains of eikonogen were well triturated in a glass mortar to a fine powder, and half a fluid ounce each of pure glycerine and distilled water were gradually added, with constant stirring; two-thirds of that quantity were just sufficient to dissolve the twenty grains. This indicated a solubility of eikonogen in equal parts of glycerine and water of almost exactly thirty grains to the fluid ounce. The colour of this solution was a deep rich brown.

A fluid ounce of nearly saturated solution of borax—one in twenty-four—dissolved with similar treatment twenty-seven grains of eikonogen. Its colour was the same as in the preceding experiment.

The solubility of eikonogen in pure distilled water was found to be thirty grains to the ounce, so the presence of glycerine in water seems to make no difference as to solubility; possibly, however, glycerine may act to some extent as a preservative. In water alone the solution also was brown.

Next I triturated twenty grains of eikonogen with forty grains of sulphite of sodium, to ascertain whether the latter exerted any solvent action, but on gradually adding distilled water, found that one ounce and three-quarters of distilled water were necessary to effect complete solution. The colour of this was a dull green.

On making a concentrated developer of the following formula:—

Eikonogen	55 grains
Sodium sulphite	110 ,,
Glycerine	½ oz.
Distilled water	4 oz.

the solution at first was of a brownish green colour, which gradually changed in the course of a few days to a brighter green, which colour it still retains ten days after mixing.

Having been informed that in some journals it has been recommended to dissolve an excess of eikonogen in hot water, and to filter after cooling, I have found in so treating other substances that this method is not a satisfactory one for obtaining a saturated solution, as the excess of the substance which is taken up by the hot water is rather more than deposited again during the act of crystallisation on cooling. A better result is obtained by trituration and gradual treatment with the solvent at a normal temperature.

The sample of eikonogen used for the above experiments, it should be mentioned, was not from a freshly-opened package; I am informed it had been opened perhaps a month or two before I received it, and it was of a minutely crystalline character, with a general chocolate colour.

In the United States, a plan has been introduced of treating photographs on celluloid with a celluloid varnish. For this purpose, a special commercial varnish is used which is described as colourless and transparent, and is said to answer well.

PATENT OFFICE LIBRARY

Supplement to "The Photographic News," October 25th, 1889.



Typogravure & imprimerie Boussod, Valadon & Co (Goupil & Co) Paris.

Very truly yours
Andrew Pringle.

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APPARATUS AT THE PHOTOGRAPHIC EXHIBITION.

No. III.

Fig. 1 represents some adjuncts recently made to the popular hand-camera, well-known as the "Eclipse," made by Mr. Fox Shew. This camera is of interest, because, so far as we know, it is the only one made in this country which has a method of folding when not in use, which is much used in France, especially by French Alpine tourists. The more recent additions made to it by Mr. Shew are the

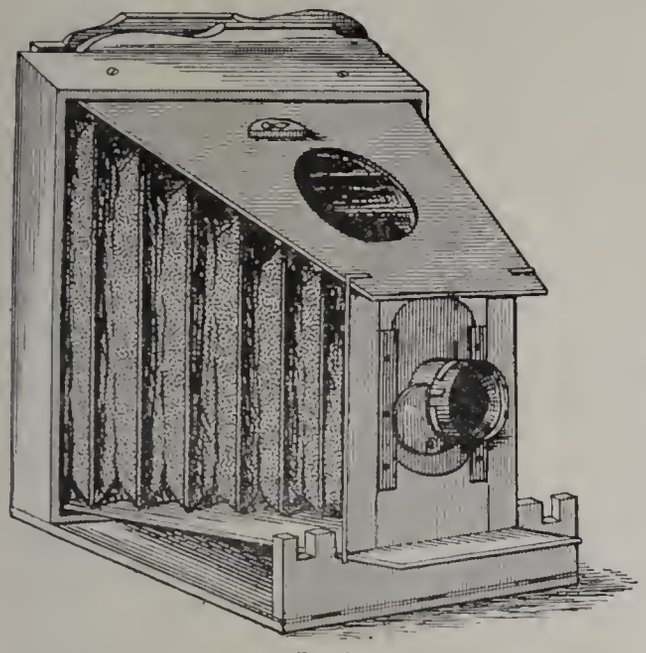


Fig. 1.

base-board represented in the cut, to give it additional firmness when used on the top of a stand, and the rising and falling front, which occupies no space worth mentioning, as it consists simply of a piece of blackened metal.

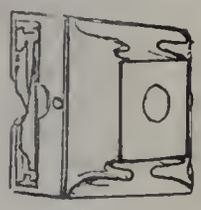


Fig. 2.

Mr. Shew has recently devised a leather case for his folding hand-camera, as shown in fig. 2; it was a matter of some difficulty so to do, for the leather had to fold also, and to leave those portions of the instrument exposed which have to be manipulated when taking a view.

Fig. 3 represents the head of his bamboo walking-stick stand, when not in use in photographing. Fig. 4 shows



Fig. 3.

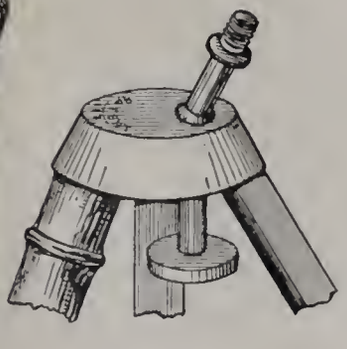


Fig. 4.

the head-piece—ordinarily carried in the pocket—and the tops of the three legs; one of these legs is the bamboo stick, and the others are two rods of hickory, which, when not in use, are slipped into the hollow cane. The screw attachment, which receives the little camera, is represented in an inclined position; its base is a ball-and-socket joint, which can be clamped by means of a screw. This stand is handy for small cameras when there is little or no wind, and when the photographer wishes to reduce to a minimum the weight to be carried.

Fig. 5 represents Mr. Shew's combination hand camera and changing back. This camera, with its sliding body, has the advantage over the ordinary detective camera in that it permits the use of lenses of different focal lengths.



Fig. 5.

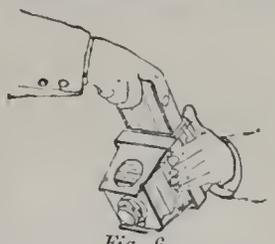


Fig. 6.

Probably cameras of a type which primarily may be used on the top of a stand, and possess appliances for doing good work, yet which secondarily can be used in the hand, are likely, as time elapses, to grow more and more into favour, although the rage at present is chiefly for those which are primarily "detectives." In Mr. Shew's camera the lens, whether of long or short focus, is inside the case, and shaded from light not required to form the image. The changing back which Mr. Shew issues with this and some other cameras is also on view at the Photographic Exhibition, and is a cleverly devised piece of apparatus. Externally, it is a kind of rectangular box, not much larger than the dozen plates it contains. After being placed in the camera, a kind of inner rectangular box is pulled up, just as one pulls up the handle of a squirt; a plate is then left in the lower box, and pushed by springs into the proper position for exposure. By suitable manipulation this plate can again be restored to the case, and another plate substituted; the whole operation is as good as conjuring. Some recent improvements have been made in the original apparatus, namely, a "pusher" at the bottom to let the operator know otherwise than by sound whether he has safely restored the exposed plate to its case, and some holes at the bottom of the box, which admit air, but no light; these holes are to obviate suction when pulling up the interior box, and resistance of compressed air when pushing it down. When the twelve plates of one changing back have been exposed, another changing back, with its twelve plates, can be brought into play. Fig. 6 represents the use of this changing back in a hand camera.

Fig. 7 represents Mr. Shew's enlarging or reducing apparatus. The cut almost explains itself, but the following is the inventor's description of the mechanism:—"The apparatus consists of two small square bodies of polished mahogany, one sliding within the other, and fitted with a screw to hold them in any position, and a tilting board to screw on to any tripod top, or to stand on a table, by which the large camera can be tilted at any angle to face the light employed. At the end of the inner body is screwed an ordinary

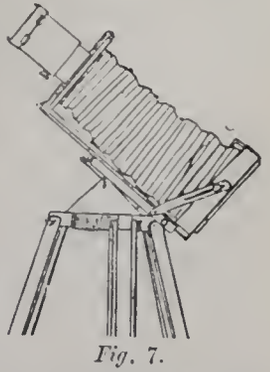


Fig. 7.

front to fit any larger camera; so that for enlarging, the operator has only to remove the front of the camera in use, and slide in its place the spare front, to which is attached the enlarging body; then screw the large camera on to the tilting board, and tilt the apparatus so that the original is pointed to the light; a good north light is preferable, but any good powerful artificial light can be used. At the back of the inner body is screwed the flange for the lens. At the reverse end of the apparatus, which is the outer body, there are two grooves, the inner one of which is intended to carry the transparency or negative, and the outer one a ground

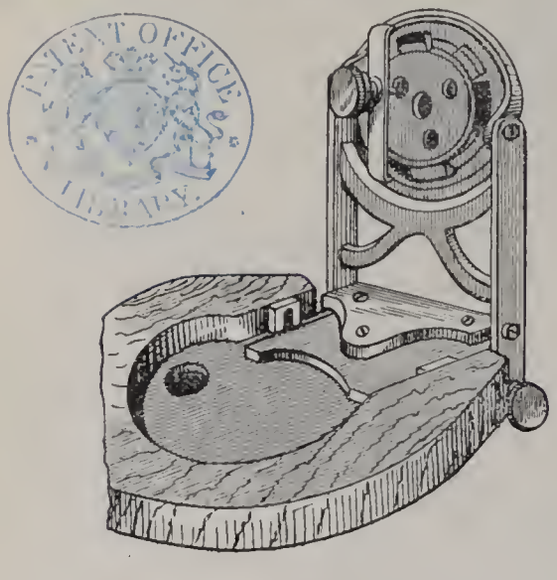


Fig. 8.

glass for diffusing the light. The appliance can also be used for paper enlargements of large sizes by screening the light from the distance between the large camera to the easel or stand on which the bromide paper is fixed."

Fig. 8 represents a reversing head for camera stand, invented by Mr. J. H. Taylor, M.A. By its means the camera can readily be turned on its side, and firmly clamped in any position; the appliance is strong and heavy.

St. Elmo's Fire.—In a paper on "St. Elmo's Fire on Ben Nevis," by Angus Rankin, in the *Journal of the Scottish Meteorological Society*, it is stated that St. Elmo's Fire as seen occasionally at the Ben Nevis Observatory takes the form of jets of light on the tops of all objects that stand any height above the general level of the roof of the Observatory, such as the chimneys, anemometers, and lightning-rods. In a very fine display the tops of the objects are quite ablaze with the phenomenon, which then glows and hisses in brilliant tongues of white and blue, from four to six, or even more, inches in length. Nor is the phenomenon confined to these objects alone in the finer displays; for, if the observer stands on the roof, his hair, hat, pencil, and so on, glow with it as well, and when he raises a stick above his head the stick has also a long flame at the top. Farther, however, than having a slight tingling in his head and hands he suffers no inconvenience. The hissing is a very marked characteristic of the phenomenon, being always heard during ordinary displays, though in the feebler displays, when the light can barely be seen, it cannot be distinguished from the hissing of the wind and the snow drift. On one occasion the sound was a very highly-pitched note. In the finer and even in ordinary displays St. Elmo's Fire is an object of great beauty, and the stormy character of the weather—namely, squally winds with heavy showers of snow and hail, and with clouds of snow-drift flying all around—heightens rather than diminishes the effect, although at the same time it detracts from the convenience of observing with advantage.

BERLIN PHOTOGRAPHIC EXHIBITION.

BY DR. H. W. VOGEL.

America at the Berlin Photographic Exhibition—Platinotype Prints and Colour Sensitive Plates—Dead Amateurs as Working Competitors of Living Photographers—The Action of Envelopes and Wrapping Paper as Preservers of Gelatine Plates.

Our Berlin Photographic Exhibition is open, and has assumed greater dimensions than we dared to hope for, and beyond our expections. The American contributions arrived in time, and, as a matter of course, you are anxious to know what impression they have made. It gives me pleasure that I can report to you only favourably, very favourably, about them. Your countrymen have given rise to astonishment and surprise. First rate! That is the general verdict about the American exhibits. Still, there is only one American exhibitor of portraits, Mr. Kirkland, of Cheyenne, and it is altogether a peculiarity of this exhibition that it lacks in portraits; but in their place it has an abundance of fine and rich landscapes, scientific pictures, reproductions, and photo-mechanical prints, besides a rich collection of apparatus, chemicals, and historic pictures. In the landscape branch it is again a man of the Far West, but well known throughout the United States, Mr. Jackson, of Denver, who has distinguished himself ahead of all. Such powerful prints of 20 by 74 inches have not been looked at here before. To this is to be added the technical superiority and the wonderful scenery which captivated our public, and has given them for the first time a true impression of the picturesque Far West of the United States of America. Crowds of people constantly surround these pictures. The United States does not excel less in the scientific branch. Such a solar spectrum as that of Professor Rowland, of Baltimore, 40 feet in length, was never made here, at least with a grating. The view of the yellow and red part, which could be done only with colour sensitive plates, is admirable. The magnificent concave grating with 25,000 lines to the square inch, also exhibited by Professor Rowland, is unsurpassed in Europe. It was sold at once, of course, and Professor Kayser, of Hanover, who is ardently occupied with spectrum studies, is the fortunate purchaser and owner. The Messrs. Pickering Brothers, of Harvard College, obtained equally high honours with their wonderful star photographs and star spectra. Such pictures as those of the Jupiter and Saturn moons have not been attempted yet here by anybody, and they will give quite a new impulse to our star photography. The same may also be said of the star spectra, which have a brilliancy as if they were views of the solar spectrum. In comparison with these masterpieces, some of the European works of a similar nature have a very incomplete appearance. The Lick Observatory, in the United States, has favoured us with a large transit of Venus picture, and a moon picture, taken in the principal focus of the big telescope. The excellent reproductions of oil paintings by Mr. Kurtz, in New York, taken on azalin plates, leave also all European copies from the same originals far behind. You see, therefore, that the participation from the United States has not been very extended, but what they have sent us is first rate.

Besides this, I may say about the exhibition that it will open a new field to us. It will be active in two directions—the general acknowledgment of the platinum print, and the colour sensitive plates. Quite a number of exhibitors have executed portraits in platinum, which pleased the public excellently, and just as large is the number of ex-

hibitors of landscapes and portraits with colour sensitive eosin silver plates—eoside of silver plates—taken without yellow screen. Still there are some people who to the present day disregard the colour sensitive plates. Thus, the president of a photographic society in England declared to me, not a year ago, that he had never applied colour sensitive plates, and would not use them. To better inform himself, I would recommend to that gentleman a visit to the Berlin Exhibition, and an hour would be sufficient to convert him. At this time I would like to remark that the expressions "isochromatic" and "orthochromatic," in general use in the United States as well as in England, are both wrong. Isochromatic means "equal in colour"; the meaning of orthochromatic is "correct in colour." Is there, therefore, any sense in speaking about isochromatic or orthochromatic photography? The process is not chromatic (coloured), and much less are the pictures! Besides this, the so-called isochromatic plates or processes are not all equally sensitive for all colours, and also not absolutely correct in sensitiveness; they only approach the ideal. Therefore I say "colour sensitive," because it is a fact that the colour sensitive plates have a sensitiveness for different colours (green, yellow, red), while the ordinary plates are actually sensitive for one colour only—for blue. At some later time I will prove that their sensitiveness for violet and ultra-violet is of importance only with regard to light sources and spectrum views in red, for the very simple reason that the non-luminous bodies reflect very little violet and ultra-violet light, its action showing itself first during exposures which require a much longer time than the ordinary photographic exposure.

So far the professional photographers have been afraid of the living amateurs, but what will they say about dead amateurs entering the arena as competitors? In all cities and towns are to be found the well known automata, which, by placing a small coin in the designated place, give you a cigar or candy and tell your weight. But automata furnishing your portrait are new. This was considered a swindle; but at the Hamburg Exhibition such an automaton was actually shown, and the same will furnish your portrait on the payment of fifty pfennigs. The inventor, Mr. Cristel Fröge, is a talented young mechanic, and has taken out patent rights in all countries. By putting a coin into the apparatus, clockwork is set in motion, and causes a plate to slide from the mazagine to behind the objective, an instantaneous shutter opens, and the picture is made. The clock-work next plunges the ferrotype plate into a developing bath (eikonogen) and lifts it again, while the inner arrangement turns and places it in the fixing bath, which in turn comes directly under the plate. The plate is lifted once more, and another turn furnishes the third dish, in which the plate is washed. After five minutes the picture is ready for delivery. A disc on the outside of the automaton is so arranged that it will indicate the correct working of the apparatus, which, in this way, can be easily controlled. By putting another fifty pfennigs into the apparatus, a handsome frame can be had for the picture. Mr. Fröge has fifteen different automata besides the above in his pavilion. They will give you electricity, Selters water, salt, perfume, flowers, and cigars. Unfortunately the inventor could not finish in time a second photographic apparatus for the Berlin Exhibition, which would have been greatly admired here. This is actually making a machine of our beautiful art; but, as real music cannot be supplied by the organ grinder, no automaton will be able to degrade our beautiful art.

Recently my son, E. Vogel, made some interesting experiments regarding the formation of black edges on dry plates. He had proved before that the impurities of the wrapping paper are the cause of this defect. Lately he has tested numerous kinds of paper with regard to their action on dry plates. The method published by him before was to test the papers by mixing the aqueous extract, which can be obtained by boiling the papers with a solution of nitrate of silver, but this will not always give conclusive results. If, for instance, a paper is impregnated with negative varnish, and is afterwards boiled in water, the aqueous extract of this paper will act less upon nitrate of silver than the one which was not prepared with varnish. But a practical test will show the reverse. Burnished and unburnished papers of the same kind show a like result in a chemical test, but in a practical test the burnished paper will prove to be more useful. He proceeds now as follows:—From the several papers to be tested he cuts out a certain figure—for instance, a cross—and brings the same—in the printing frame—in the dark room in contact with the dry-plate film. To avoid mistakes, papers, as well as dry plates, are numbered. After at least a week—a longer time is better—all plates are developed simultaneously and an equal length of time. Bad papers will give a complete copy, leaving nothing to be desired regarding strength, &c. In this way a complete scale of the utility of the several papers can be obtained. For this test it is best to take colour-sensitive plates, or ordinary plates of high sensitiveness, because they are most sensitive to the evaporation of the paper. The actual reason of the hurtful influence of some of these papers has not been definitely determined yet. Undoubtedly they consist of gases—sulphurous acid—which cause the decomposition; at least he has made the observation that impure paper will even act through pure porous paper. By testing the most popular papers, the following table was the result after eight days:—*Very Strong Action.*—1, rough black paper; 2, rough black paper burnished; 3, smooth black paper; 4, ordinary writing paper. *Weak Action.*—5, photographic plain paper; 6, yellow smooth wrapping paper; 7, filter paper. *No Action.*—8, Swedish filter paper; 9, tissue paper; 10, tissue paper impregnated with paraffin. That even plain photographic paper, which is supposed to be the most pure, should number among the papers of bad action, may surprise many. But it is a fact that extracts from this paper would even reduce silver salts. Of what importance the selection of the proper wrapping paper—particularly for a tropical climate—is, can be proven by the fact that all negatives taken by the explorer, Capt. Kundt, in Cameroon, Africa, arrived here in a decomposed condition, although the plates were of Monckhoven's make, whose good quality is beyond doubt. —*Anthony's Photographic Bulletin.*

Photographing the Heavens.—At the meeting of the Academy of Sciences on September 30th, with M. Des Cloizeaux, President, in the chair, were presented the fourth sheet of the bulletin of the International Committee for preparation of a map of the heavens, and a report of the meeting of the committee at Paris Observatory, by M. E. Mouchez. Five other observatories—Vienna, Catania, Mexico, Manilla, and the Vatican—have been added to the original sixteen. Each observatory will have to take about 700 photographs in the zone allotted to it, and it is hoped to finish the work in three or four years. A central office for utilizing the results will be necessary.

ART, SCIENCE, AND BUSINESS.

BY H. COLEBROOK.

It has been complained that photographers in their profession have given more time and study to the scientific than to the art side of the subject. The complaint may be in a measure justifiable, and yet, with a moderate amount of thought, it may be proved that for the future of photography this is not altogether unwise. It seems that such constant application to the scientific side has reduced, and is reducing, photography to an almost mechanical operation, by this means giving a man who has failed in everything else an opportunity, not exactly of making a livelihood, but of failing in this also. Through this simplifying action of science, the unscientific amateur who has dabbled in everything but photography receives a fresh subject for dabbling, and, of course, dabbles. In other words, the result is simply that, by giving outsiders the benefit of hard earned experience, the at one time select photographer has, to all appearance, ruined his business, and lowered the standard of his art. But there is another more important result, that of dividing photographers into two distinct classes. Though photography as a profession may have many grades, there must naturally exist a wide distinction between the purely mechanical, and the intelligent and educated application of the mechanical. It might be said that, did our "art-loving public" justify its name, the purely mechanical man would prefer a ward in the workhouse to starvation in his studio; but our "art-loving public" does not justify its name, and, in consequence, the purely mechanical man continues, not to thrive, but to prevent his more deserving relation from doing so.

To prove the truth of this, I wish to draw a comparison, but before doing so may mention incidentally that I speak of the distinction of *classes*, and therefore generally, and not individually. A fair estimate of a photographer's class may be taken by his shop window, and that irrespective of the actual work contained therein. The arrangement of the window, the advertisement of the name and position —generally artist and photographer—of the owner in every possible space, even the number of specimens shown, all go to prove pretty nearly the one class, the other class being conspicuous by simplicity and total absence of display. There is a saying that "Advertisement is to business what steam is to machinery," and so on. This may be true enough, but does not necessitate a page advertisement of "Good morning! Have you been photographed at So-and-so's?" Neither does it necessitate posters, circulars, and what not. Advertisement requires money; time means money. Turn money into time, and spend that time in the greater perfection of work, the truest and best advertisement a photographer can have.

A better estimate of the two classes can be had by looking at the mounts sent out by photographers. A highly enamelled surface, richly embroidered and bedecked with precious metals, emblazoned with heraldic devices, and a bold and flowing signature in every available space—here is the one; and the other shows but a good, stout, plain card, a very small and unpretentious name and address at the bottom, and possibly the same on the other side. A small distinction this, but one that says plainly, vulgarity or good taste; ostentation or simplicity. The best estimate, of course, is the actual work, on the comparison of which columns might be written. The corkscrewed, heavenward-looking pose, and the natural, unstrained pose; the fancy lighting and the effective lighting; the excess of accessories, and accessories as accessories only; the not dim but distinct vista of noble columns, of palaces, and every other impossibility, and the plain or shaded background. Photographers would do well to take the *sense* of the following quotation: "There is perfection of the hedgerow and cottage as well as of the forest and palace; and more ideality in a great artist's selection and treatment of roadside weeds and brook-worn pebbles than in all the struggling caricature of the meaner mind, which heaps its foreground with colossal columns, and heaves impossible mountains into the encumbered sky."

The matter may be summed up in a few words. Science has simplified; simplification has produced excessive competition; excessive competition has reduced prices and the standard of work at the same time. The probable result is that, as cutting prices will be continued, the standard of work will become more degenerate. This will necessitate, if it has not already, the lowering of wages, and bad pay and bad work go together. Our art-loving public will then have sufficient penetration to see that, after all, the photographer who has stuck to his prices from a love of his art and a conscientious wish to keep and improve its standing, is, perhaps, the real "artist and photographer;" the finale, of course, being the exit of the degenerate photographer amid fire and brimstone, "unwept, unhonoured, and unsung," and the entrance of the Photographic Millennium.

According to precedent, however, millenniums are rather slow in their movements, and require a little acceleration to bring them in sight in reasonable time. Doubtless, the best form of acceleration possible would be to allow those photographers who wish to cut their own throats to do so. The true lover of the art should create as wide a distinction as possible between his and the aforesaid gentleman's work, by doing his best work at a good price. It goes without saying that good work cannot be done at a low price. If cartes-de-visite are reduced from 10s. a-dozen to 5s., not only is the profit far less, but double the amount of work must be done to equal the original cash receipts. Where, then, can the necessary time come from to keep up the standard of the work? One important fact seems to have been entirely overlooked. Photographers complain of the cheapness of the age, but it may be taken for granted that those customers who go to a photographer for the sake of cheapness, prove themselves plainly to be those out of whom little or no profit can be made.

Death of Dr. Joule.—James Prescott Joule, LL.D., D.C.L., the discoverer of the law of the mechanical equivalent of heat, died at Sale, near Manchester, on Friday night, 11th inst., after many years of feeble health. Dr. Joule was born at Salford, December 24th, 1818, and in his early youth he studied chemistry under the great chemist Dalton. In 1841 and in 1842 he was working at the subject which is so indissolubly associated with his name, and in 1843 the earliest form of his great discovery was announced in a paper on "The Calorific Effects of Magneto-Electricity, and on the Mechanical Value of Heat," read at the Cork meeting of the British Association. In 1850 he received the Royal medal of the Royal Society, and in 1870 the Copley medal of the same society. He was author of a large number of papers, published in journals and transactions, and a complete collection of these papers has been published by the Physical Society. In 1880 the Society of Arts awarded the Albert medal to Dr. Joule "for having established, after most laborious research, the true relation between heat, electricity, and mechanical work, thus affording to the engineer a sure guide in the application of science and industrial pursuits."

ENAMELLED IRON VESSELS.

Vessels of enamelled iron have a certain amount of good repute in photography for their unbreakable character, and the way in which some of them bear for a long time the application of heat without deterioration ; others of them have had a bad reputation because of the readiness with which the enamel cracks after a few heatings, and because of obnoxious substances sometimes present in the coating. In the last number of *The Pharmaceutical Journal*, a long paper read by Mr. E. Davies before the Liverpool Chemists' Association is published, in the course of which the author says that every manufacturer has his own formulæ and proportions for enamelling iron, and to give a long list of formulæ would be of very little use or interest. He therefore gives an example of an enamel being the first proposed in Hickling's patent (1799), which consists of—

Calcined flint	6 parts
Litharge	9 ,,
Borax	6 ,,
Argillaceous earth	1 part
Nitre	1 ,,
Oxide of tin	6 parts
Potash	1 part

Or,

Flint	4 parts
Cornish stone	1 part
Nitre	2 parts
Borax	8 ,,
White marble	1 part
Argillaceous earth	½ ,,
Oxide of tin	2 parts

Reichel's composition—

Glass	16 ,,
Fluorspar	8 ,,
Borax	12 ,,
Nitre	4 ,,
Oxide of zinc	1 part

Although Mr. Davies has seen a great number of formulæ, he has not met with one in which arsenic entered.

Whatever composition is taken must be finely powdered, mixed, fused, ground when cold, sifted, and levigated with water. It is then made into a pap with water or gum water. This is brushed or poured over the vessel, dried, and fused in a muffle. He says that the Prussian Government prohibited the use of lead or its compounds many years ago, and, so far as his experience goes, it is not used in those of German make sold in Liverpool.

In order to ascertain what action would be exercised on enamel by cooking food in the vessels, it is clearly not fair to use stronger acids than would in practice be met with. He regrets that he had not time to make more experiments, but gives the results which he has obtained.

He used a 1 per cent. solution of lactic acid, and a 1 per cent. solution of acetic acid. To see if stronger acids would destroy the enamels, he also tried the effect of a 1 per cent. solution of HCl and a 4 per cent. solution of HCl. The anhydrous acid is understood in each case. The pans used were, one bought in Bold Street, German make ; one, a cheap one, of German make ; and one of English make, Kenrick's. There is also a small dish of English make. The following is a table showing the effect :—

	1 p.c. Lactic.	1 p.c. Acetic.	1 p.c. H Cl.
Best German	Trace of tin	Nothing	Much tin.
Cheap German	2 grs.	Nothing	Not tested.
Best English	Nothing	Nothing	Not acted on.
Bad English	Much lead	Lead	Not tested.

He says that the best German above was tested with 10 per cent. HCl. 10,000 grams of the dilute acid were boiled for an hour in the pan, loss by evaporation being supplied. 5·44 grams of SnO_2 was dissolved, but there was only a slight colouration of copper in Reinsch's test for arsenic. He could not get distinct crystals, but he believes that there was a faint trace of arsenic. The amount was far too small to have any perceptible effect, and it could only be got at by the use of strong acid. None of the other tests showed the faintest trace of arsenic, so that there need be no fear of danger or of the slightest contamination with arsenic in using these enamelled articles.

Ammonio-Citrate of Iron.—The ammonio-citrate of iron of commerce is sometimes found to contain tartaric acid, and different samples sometimes vary greatly in the proportion of ferric oxide present. These variations may introduce uncertainties in the blue printing photographic process. Another peculiarity of some samples of the commercial salt is thus set forth by Mr. R. Wright in the last number of the *Pharmaceutical Journal:* —"I have examined a number of samples of this scale preparation, and have not met with a single one which did not contain a large proportion of ferrous salt. A good method of testing I have found to be the following. A small quantity of the scale is dissolved in water, a little dilute sulphuric acid is added, and the mixture gently warmed for a minute or two. This splits up the compound, and yields a straw-coloured solution, which is easily tested for ferrous salt by means of potassium-ferridcyanide. With regard to residues containing magnetic oxide, I cannot say whether or not it is possible to convert the latter into ferric oxide, but certainly it is unaffected by exposure in a platinum dish to a red heat for four or five hours in the open air. My own impression is that it would be difficult to move a strong base like ferrous oxide when in combination. I may say that when estimating various samples of ammonio citrate, I made solutions containing about 100 grains in eight ounces distilled water, and although some kept good for several months, ultimately a kind of fermentation set up, with evolution of bad smelling gases ; the iron deposited as oxide or sulphide, and the solution became colourless."

National Photographs.—Before the completion of the new National Portrait Gallery—indeed, before its foundation stone is laid—we would suggest to the country the advisability of supplementing its grant of land by an extension of liberality in the direction of the class of portraiture admissible within the walls. At present historical portraits of the conventional type in oil, water-colours, pastel, or black-and-white, together with busts, are alone permitted. We would ask the Government, the trustees, and the anonymous Pious Founder, to extend their favour to photography. As matters at present stand, we have no national home for our best sun portraits. They are dependent for their preservation on the private collector alone. In former days, when photographic prints were multiplied by the silver process, their tendency to fade detracted seriously from their ultimate value. After a few years' exposure to the light, grandfathers or uncles, cousins and aunts, became literally the ghosts of their former selves. But the wondrous strides which this most faithful art has made surmounts the difficulty to-day, and now absolutely permanent prints in carbon and platinum are issued from all the high-class ateliers in England. Why, therefore, should not these indelible presentments of our celebrities be preserved? Photography gives us the man in his habit as he lives, the statesman, the soldier, the philospher, the actor are brought before us with a startling realism such as no artist can hope to reproduce. The painter's position rests secure in his colour ; but the photographer's fame depends upon his manipulation of monochrome. Why should the one be enshrined within a gallery, and not the other? A photograph room in the new Historical Portrait Gallery would be of immense service to future generations, for under the discriminating eye of a photographic curator a collection of contemporaneous portraiture could be formed, such as would be of incalculable use to the artists and historians and comparative physiognomists of the future.—*Sunday Times.*

NOTES FROM THE ALPS.

BY CAPT. ABNEY, C.B., R.E., LL.D., F.R.S.

I HAVE been on my usual wanderings this August, in Switzerland, and it need scarcely be said have taken my photographic apparatus with me. Perhaps there is no more convenient size than that I use for ordinary work, viz., 7½ by 5, particularly when it is compact and light, as mine is, when made by a first-rate maker such as Meagher. There is a feeling of being at home in places where one has passed summer after summer, as I have done at Grindelwald and Zermatt. The hotel proprietors give one such a hearty welcome, and endeavour for friendship sake to make one as comfortable as they can, and at *prix très modérés*. I suspect any one who has been at the Bear at Grindelwald once or twice must always, as July nears, feel a bitter pang, if he cannot during that or the next month pay a friendly visit to the Boss family, who are so prominent in their attention to their guests. The photographer too, will feel a double pang, for he knows that one of the brothers—Théophil—is an ardent follower of the craft, who will give every facility for deveveloping his plates, and is lenient to the messes which are made when the bed-room is for the nonce converted into the dark room. Personally I have been to Grindelwald for the last six or seven summers, and for the last three winters, and, perhaps, it is at Christmas time that Grindelwald is most enjoyable. It is like going into a new country. The sleighing up from Interlaken behind a pair of fast trotting horses over the crisp snow in the dusk ushers one into a new world quite different to that of summer, and when one arrives at the Dépendance of the Bear which is fitted up for winter quarters, and is ushered into the snug hall with its immense wood fire burning, and finds the cheering cup of tea, with something in it, waiting for one, and, not least, the hearty hand-grasps of the Brothers Boss, it makes one feel that Christmas may be well spent in such hospitable quarters; and there I hope to spend that festive time once more this year. But it is with summer notes that I must continue. The winter is at a measurable distance from us, and however enjoyable it may be to recount one's experiences in it, yet an article giving details of our life there would be like sending out Christmas cards at Midsummer.

Well, then, it might be thought that with so many seasons passed at these two mountaineering centres, nothing was left for one to photograph. I thought so myself, but every season differs from another; the glaciers change in character, and a photograph of a glacier seen one year is vastly different to a photograph taken at another. Then, too, there are ever-changing effects of cloud and mountain scapes, and a careful photographer will be able to produce, not the ordinarily sought-after tourist's photograph with a plain sky and that sharpness of distance which usually characterizes Swiss scenery in cloudless weather, but *pictures*—artistic pictures—with delightful atmospheric effect, which will give height to the mountains, and distance where distance should be, and by getting a peep of a mountain top through a belt of clouds he may produce a *chef-d'œuvre* of art which will repay him even for the bad weather which such effects indicate.

There is one class of view of which I have never been afraid—viz., taking views facing the sun, or views which include the brighest lighted distant snow and the deep shadows of Arolla pines, both of which are somewhat difficult to develop. I have at the Camera Club indicated how I conduct such development, and will here give an outline of how I proceed. I don't think that the ordinary photographic note-book gives quite information enough as to the character of the view taken. It should contain a column showing what kind of development a subject requires. When going to develop a plate, I always ask myself the question as to what kind of development it should be subjected to. Thus, for a bright landscape, such as described, one should use very different development from that employed with an ordinary landscape. In Switzerland I found that I gave much longer exposures—four or five times longer—than do most photographers. But I also find it is advantageous in that there is a reserve of power, as it were, during the actual progress of development. Had one not this, one would be unable to develop, as I shall describe. When we come to look at the constituents of the ordinary developer we find that it consists essentially of three parts—the alkali, the bromide, and the pyrogallic acid (or hydrokinone). The first and last are the main props of the process. Give plenty of alkali and very little pyrogallic acid, and you get a feeble image; increase the pyrogallic acid and you get density. As to the bromide, my advice is never to fear adding plenty—three or four times more than is ordinarily recommended—more particularly when the exposure has not been confined to the bare limits of necessity. For developing bright sun-lighted snow and dark trees on the same view, a fair dose of alkali should be used, and very little pyro.

Thus, in a view which I have before me, the image was developed as follows:—Ammonia (10 per cent. solution) 40 minims, bromide of potassium 5 grains, sulphite of soda (saturated solution) 60 minims, pyrogallic acid, just sufficient to cover the point of a small penknife. The solution was made up to 2 ounces. The image appeared very, very gradually indeed; before all the detail was apparent a quarter of an hour had elapsed. When viewed by transmitted light the image was a phantom one, and, if fixed, would have been unprintable. The next operation just reversed the principles I had worked on. The developer was poured off, and pyrogallic acid—this time a good quantity—and a little bromide were added to 2 ounces of water, and the necessary density was rapidly attained, occasionally adding 2 or 3 drops of the ten per cent. solution of ammonia.

(*To be continued.*)

ON the 14th of October, at the North Middlesex Photographic Club, the evening was occupied by Mr. Hiscock, who demonstrated the processes of lantern slide making and opal printing.

PHOTOGRAPHING A MIRAGE.—Can a mirage be photographed? To this question, which has often been put to us, we cannot but reply in the affirmative if we accept the statement of M. Symons, who, in June, 1879, had the honour and satisfaction of obtaining one of these effects in England, at six o'clock in the evening. He obtained a picture of Tenby Church when invisible from his point of view, and Dr. Phipson could explain it only as the effect of mirage.—*L'Amateur Photographe.*

REDUCING BROMIDE PRINTS.—Mr. Adolphe M. Levy recently described at the Photographic Club how he reduced bromide prints by means of old slightly acid ferrous-oxalate developer, followed by immersion in the fixing bath; the strength of the latter was three ounces of hyposulphite of soda to one pint of water. Prints were soaked in water, then flooded with the developer for five minutes, drained, then, without washing, placed in the fixing bath for fifteen minutes; in all cases perceptible reduction was effected. He thinks it highly probable that the reducing effect is due to the presence of ferric salt in the old developer.

THE EIKONOGEN DEVELOPER.

Herr E. Lomberg, a dry plate maker at Langemberg, gives the following formula for the use of eikonogen :—

Solution A.

Sulphite of soda	10 grammes
Distilled water	1,000 c.c.
Afterwards add eikonogen	10 grammes

On slightly warming the liquid, the eikonogen will dissolve rapidly.

Solution B.

Pure carbonate of potash	150 grammes
Distilled water	1,000 c.c.
Hyposulphite of soda ...	... ½ to 1 gramme

He says that the above solutions keep well separately: for use, they are to be mixed in equal volumes. The function of the hyposulphite of soda is to shorten the exposure, and to render the negatives more harmonious. If solution A be more concentrated—that is to say, with about 20 grammes of sulphite of soda, and 20 grammes of eikonogen to 1,000 c.c., of water—the development is much more rapid, but the negatives are greyish, and less harmonious. The plates should be alumed after fixing, and their tone is modified if exposed to light directly they are removed from the alum bath.—*Revue Photographique.*

SHINING NIGHT-CLOUDS.

The following is a summary of a request for observations made by Herr O. Jesse :—

"The time of year has again arrived when the lustrous silvery clouds, which have appeared annually in June and July from 1885 to 1888, may be expected to again become visible to observers throughout Europe.

"These clouds are not only of high meteorological interest, but may be of an almost greater astronomical one, for, from their so decidedly pronounced periodicity, joined to their extraordinary height, it may perhaps be inferred that they are of extra-terrestrial origin.

"As there is entire lack of previous record of these clouds, and they may disappear soon for an indefinite period, I would earnestly ask for such early observations as may be likely to determine their origin, nature, and periodic motion. Spectroscopic examination of their light would be valuable. Prof. Galle and others have considered that the clouds in question are phosphorescent; but this is very improbable, and I hold they are scarcely, if at all, visible unless the sun shines directly upon their substance. On this assumption, their height in 1885 was found to be from 49 to 54 kilometres; but, by photographic observations in 1888, it came out as great as 75 kilometres.

"Prof. Kohlrausch advances the opinion that these clouds have in some way been formed by the eruption of Krakatao, although they were not generally seen until nearly two years after that event. From this hypothesis I suggest that they may be caused by the condensation of gases from that volcano, and that the process of condensation occupied the intervening time. One observer, however, states that he saw them in 1884."

Mr. John Le Conte, writing to *Nature* about the recent letters in that journal in relation to apparently self-luminous cloud-like bands in the skies after nightfall, calls to mind the analogous phenomena of noctilucous clouds involving the whole visible firmament. He says that we are indebted to the indefatigable industry and zeal of the illustrious Arago for the collection of the scattered facts relating to the phenomena of self-luminous clouds of divers kinds. According to the records collected by him, noctilucous bands and zones of clouds are sometimes associated with the electrical manifestations accompanying distant thunderstorms. To this class belong the luminous phenomena noticed by Rozier on August 15th, 1781, and by Nicholson on July 30th, 1797. In other cases, the association of the phenomena with electrical disturbances is by no means obvious. To this class belong the luminous clouds observed by Beccaria over his observatory at Turin; likewise the luminous appearances witnessed by Delue near London, and also those observed by Major Sabine over the Isle of Skye in Scotland. In all these cases the noctilucous condition of the clouds was localised and confined to bands or zones in limited portions of the sky. But, under certain conditions, this apparently self-luminous property of the nocturnal clouds involves the entire visible hemisphere. It is to this latter aspect of the noctilucous phenomena that I desire to call attention. Omitting the consideration of the exceptionally rare and analogous phenomena of so-called phosphorescent "dry-fogs" as those of 1783 and 1831, in which the luminosity was so pronounced as to enable one to read ordinary print at midnight, we come at once to the generally recognized phenomenon of that faint diffused cloud-luminosity which enables the "country doctor," with comparative security, to perform his lonely mignight drives on cloudy, moonless nights. Frequently the glow is so faint that it is only possible to observe it at a distance from cities and large towns, in places where the air is free from smoke, and where the darkness of the sky is not affected by the general illumination due to gas and electric lights.

A POWERFUL LIGHT FOR PHOTOGRAPHING CAVERNS.

The following is a mixture which gives a penetrating light, visible in clear weather at a distance of 100 kilometres, and having an illuminating power of 20,000 candles; it will answer, consequently, for lighting large dark spaces, such as grottoes and caverns.

Manifestly, so much light would be altogether superfluous for portraiture :—

Powdered magnesium	20 parts
Nitrate of barium	30 ,,
Flowers of sulphur	4 ,,
Beef fat	7 ,,

The fat is added in the melted state, and the mixture allowed to cool in zinc boxes ten centimètres high, and seven centimètres in diameter. The weight is about half a kilogramme, and the time of combustion twenty seconds. —*Le Moniteur de la Photographie.*

A Comic Photographic Journal.—German photography has a comic journal all to itself, just issued, the *Stechfliege*. The four pages of its first number are filled with photographic wit in verse and prose, comic announcements, and advertisements. It expects, according to the *Photo Zeitung*, to enjoy an ephemeral existence upon its subscription price of 1.50 marks.

Silvering Albumenised Paper.—Very few amateurs care to silver their own paper, indeed it scarcely pays where only a few prints are wanted at a time; but where one can keep his negatives until he has a number to print from at one time, the freshly prepared paper is by far the best; it prints quicker, tones better, and gives much more brilliant prints than the ready sensitized paper. I use a bath containing sixty grains of nitrate of silver to the ounce of distilled water; float my paper on it from a minute and a half to two minutes, draw it over the side of my dish to get rid of as much surface moisture as possible, blot off between clean blotting paper, and hang up to dry. When dry, each piece is laid between blotters prepared as follows :—Dissolve four ounces of carbonate of soda in one quart of water; have ready as much good white blotting paper as you may require, cut a trifle larger than the sensitized albumen paper; pass the blotters through the soda solution, and hang them up to dry. When thoroughly dry they are ready for use. Take one of the blotters, place a sheet of sensitized paper on top, then another blotter, and so on, until you have all your albumen paper between the blotters; then put the whole under a heavy weight or in a letter press. Paper so stored will keep good at least three weeks; in fact, I have used it after two months with results that compared very favourably indeed with paper prepared the night before.—R. P. Harley in *The Beacon.*

Notes.

There is no end to the uses of photography, but one would never suspect that it could serve the ends of a pickpocket. An English tourist in Paris lately made the discovery to his cost. While strolling along one of the minor streets he was accosted by a polite French man, who with many apologies desired him to favour a lady amateur at the window of a house with the opportunity of taking his photograph. This was enough for the vanity of the tourist, who allowed himself to be put in position. One moment was sufficient, and the tourist went on his way glowing under the warmth of the Frenchman's thanks—and minus his watch.

It is the fashion among the ladies of New York to become amateur photographers. A daily paper states that along shore and on mountain top, the girl photographer with a camera is now a part of the landscape. The wife of a leading politician is, it is said, always provided with a detective camera and a generous supply of dry plates, and is inclined to believe that her pictures of her husband wheeling barrow-loads of stones about their country house ought to help the politician with the working-men in his campaigns. The secretary of the Photographic Section of the Brooklyn Institute is a lady, and women always accompany the Section's fortnightly summer excursions. A great many newspaper women use the hand "detective" camera. So says an American photographic contemporary, and it ought to know.

An old saying declares that the success of a joke depends not upon him who makes it, but upon him who takes it. To paraphrase this, it may with equal truth be said that the success of a portrait depends not upon him who takes it, but upon him who looks at it. No two people agree perfectly in what constitutes a good likeness, and when a number of portraits of the same person are put together, confusion grows worse confounded. Mr. Theodore Watts is about to publish an article upon the portraits painted, sculptured, and photographed, which have appeared of Lord Tennyson, and the article is to be accompanied by engravings of those which are considered the best and truest. Though the public will doubtless look upon the collection with much interest, it is doubtful whether they will derive a better idea of Lord Tennyson—that is to say, if the portraits do not embody their idea of what they conceive him to be like. It is stated that "so many so-called 'portraits' have been placed before the public as likenesses of the poet, but which, in point of fact, are many of them the merest libels, that this authoritative paper will possess not only the interest which is due to it intrinsically, but will carry with it the authority of an authentic family record." This may be so, but if the public have got used to the so-called "libels," they will certainly prefer them to the truth.

The peculiar quality of the amateur photographer is his propensity for turning up in unexpected places. In this respect he is something like the ubiquitous London boy, who is never far off when anything is happening. The latest example of the amateur's prowess in the way of the unexpected comes from Belgium. At the late military manœuvres, a number of amateurs followed the troops and photographed several points of the movements. The commanding officer, General Van der Smissen, hearing of this, desired to look at the photographs, and so discovered at once that his command had not in every case been carried out. This, of course, all very well from the point of view of the general; but how the under officers who, no doubt, received the usual reprimand, must have blessed the pertinacious amateur!

The daily papers do not improve in their knowledge of photographic progress. One would suppose that M. Enjalbert's automatic photographic apparatus in the Paris Exhibition—which apparatus, by the way, we were the first in England to describe—was pretty well known to all newspaper scribes, considering how many paragraphs have gone the rounds of the Press; yet we have the *St. James's Gazette* blundering most amusingly, and describing the apparatus as something new. So long as it keeps to generalities, our contemporary is pretty correct, but on displaying its "knowledge" it comes very soon to grief. It remarks gravely, "The photograph is not on sensitive paper (which would require at least twenty-four hours for its development), but it is developed on a metal plate—some preparation of tinfoil, probably—and is really an improved type of Daguerreotype." A print which required "twenty-four hours for its development" is a novelty indeed, and the suggestion that tinfoil is used is equally refreshing. The *St. James's* has evidently never heard or seen a "ferrotype," which probably accounts for its assertion that the automatic photograph "is really an improved type of Daguerreotype." It would be interesting to hear *St. James's Gazette* again discourse on photography.

The series of lectures on celestial photography given this week at Gresham College by the Rev. E. Ledger have been exceedingly well attended, many persons being turned away unable to gain admission. This is satisfactory so far as it goes, but the character of the audience is not altogether what one would like to see. Bald-headed and grey-bearded old gentlemen, and a goodly sprinkling of old ladies form the major portion of the assembly, and though one would not debar them from listening to a lecture on astronomical photography, it would be more gratifying to see the youth of London showing a greater interest in science. A college, we presume, is intended chiefly for the youthful, and not for grey-beards. However, if the young men of London will not take advantage of what is offered them for nothing, it is their own fault. Gresham College is not the dreary and dusty place it once was.

PHOTOGRAPHIC OPTICS.

BY W. K. BURTON.

Chapter XI.—The Spectroscope.

The fact that when a ray of white light passes through a prism it is divided up into various colours has already been mentioned. The row of colours obtained is called the *spectrum*. The study of the spectrum is a matter of great interest, and is one indirectly connected with photography.

In speaking, so far, of the passage of a beam of light through a prism, it has been assumed that that beam consisted of a single ray of light, or, in other words, had no breadth. This is, however, evidently an impossible state of affairs. The light must emanate from a source of light having some size. This source of light is commonly an opening of some kind having light—such as the sky—behind it; for example, a hole in the shutter of a darkened room.

If this opening be of a size larger than the smallest, the spectrum is continuous; that is to say, it is a row of colours without any break. If, however, the opening be made very narrow, be reduced to a fine slit, the spectrum from many sources of light—from the sun, for example—is found to be interrupted by a number of dark lines crossing it. In the case of certain sources of light these lines are bright in place of being dark. My object here is merely to describe the instrument called the spectroscope, and it is, therefore, impossible to go farther into the matter than to say that sources of light which consist of heated solids—for example, an incandescent electric lamp—give continuous spectra. Incandescent vapours—such as we have in the electric spark—give spectra consisting of bright lines; light which passes through the vapour of these bodies at a temperature below that of incandescence, is absorbed so as to produce dark bands, corresponding in position to those light bands which would emanate from those same vapours if in a state of incandescence.

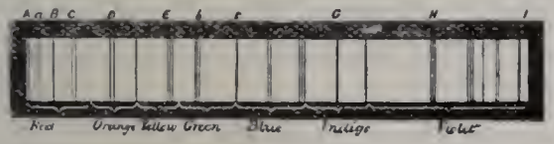


Fig. 55.

The annexed cut shows the principal lines in the spectrum of the sun. I say the principal lines because the real number is very great—many thousands—and the lines, before apparently single, are almost daily found to be divisible. Any substance always gives, under the same circumstances, the same spectrum. It is, therefore, possible to judge of the composition of bodies, even when inaccessible, by the spectrum that they give. Thus, the spectra of many bodies well known on the earth have been observed in the light of the sun.

The spectroscope is merely an instrument for closely observing the spectrum. It consists essentially of a slit to admit light to one or more prisms through which the light passes. The light passes through a lens before it reaches the prism. This lens is called the collimating lens. Its object is commonly said to be to render the pencils of light passing from the slit *parallel*. This statement is scarcely correct, although continually made by those who ought to know better. It may really be looked upon as an objective, throwing an image of the slit on the screen for receiving the spectrum. The spectrum thus consists of an infinite number of images of the slit.

When it is desired to photograph the spectrum it is received on the sensitive plate, a photographic lens being, as a rule, interposed between the prism and the plate, although this is not an absolute necessity; but when it is desired to examine it directly, a telescope, or it would perhaps be better to say a compound eye-piece, is used. The difference here is precisely the same as that between a camera and a telescope. When we wish to *photograph* an object, we receive the image given by the photographic objective on the sensitive film; when we wish to examine a distant object by the eye we look at the image given by the telescopic objective through an eye-piece.

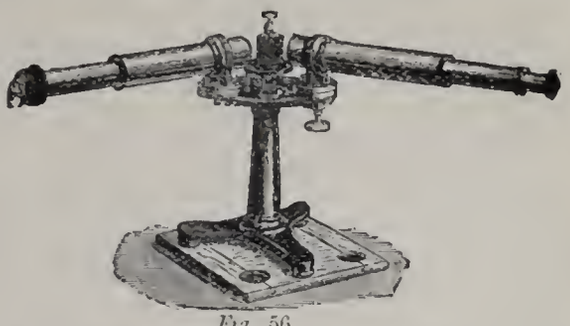


Fig. 56.

The two annexed figures show the external form of the spectroscope. In each case the left-hand tube supports the slit and the collimating lens, the right-hand tube the

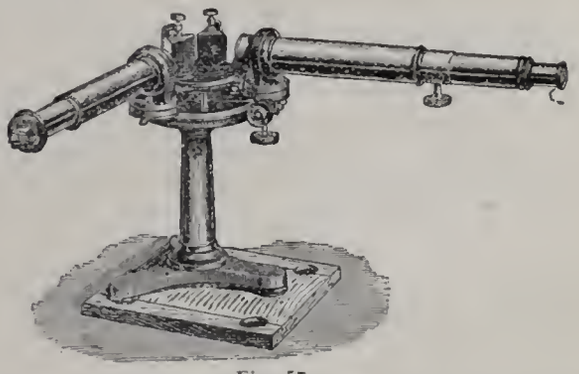


Fig. 57.

eye-piece for examining the spectrum. The second cut shows a spectroscope with two prisms. The advantage of two prisms is that greater dispersion is obtained; in fact, we get a spectrum on a larger scale than before.

(To be continued.)

M. Leon Brin, of Brin's Oxygen Company, was the inventor of butterine. He tells us that he considers the invention a blessing to mankind, as butterine can be made as good as any butter, and better than numerous samples; consequently, by cheapening prices, it is a blessing to rich and poor.

French Artistic Taste.—It has been so long the custom for us to regard the French art opinion as possessing many claims to infallibility, and we are so much inclined to accept without question the French judgment upon æsthetic matters, that it is hardly surprising that recent events in Paris should appear to have special significance for all members of our artistic community. The Paris Exhibition and the Secretan Sale have, in different ways, given somewhat exceptional opportunities to the Parisian experts for the expression of some very interesting views. . . . The Secretan Sale has come in most opportune conjunction with the Paris Exhibition. It has given us an additional proof of the growing popularity of the finest and most wholesome type of art, and of the decline in the general appreciation of the conventional "old master." The whole array of artists who have devoted their energies to preaching the gospel of Nature, and whose assaults upon the all-pervading conventionality were regarded by their contemporaries as rank heresy, are gaining steadily and surely their rightful position in the public estimation.—*The Artist.*

TONING PRINTS WITH PLATINUM.

One of our contributors, M. Masse, says *La Nature*, has been trying for some time to substitute platinum for gold toning with plain salted or albumenized photographic silver prints, and has arrived at a satisfactory result. He has been good enough to send us the formula which gives the most satisfactory results. By his method the print is toned and fixed at the same time. This method permits the operator to definitely select the final tone of the proof without fear of any subsequent degradation. Two solutions are used:

Solution A.

Chloride [bichloride?] of platinum	1·5 grammes
Distilled water	100·0 ,,

Solution B.

Hyposulphite of soda	150·0 ,,
Crystallised acetate of soda ...	30·0 ,,
Distilled water	900·0 ,,

It is necessary to employ only a sample of chloride [bichloride?] of platinum, well freed from fumes of chlorine and nitric acid. For the toning-fixing bath 10 c.c. of solution A are mixed with 90 c.c. of solution B, and the prints are kept in the mixture until they acquire the desired tint; they are then washed with water for five or six hours. Ordinary photographic tones may be obtained in this way; also the lithographic black. The proofs on salted paper have great beauty, and are easy to retouch either with Chinese ink or the crayon. Proofs on papers slightly albumenised have very vigorous blacks, and with good transparency in the half-tones. In the hands of a skilful practitioner this process gives admirable results. We possess several prints of a rich black colour which have been toned in this way.

The *Moniteur de la Photographie* of October 15th has published abstracts of the photographic papers read before the British Association at Newcastle.

Diffused Daylight.—At a recent meeting of the French Academy of Sciences a paper was read on analysis of the light diffused by the sky, by M. Crova. He made observations on the top of Mont Ventoux, with a modified form of his spectrophotometer, which could be directed to any part of the sky. The curves for zenithal light—alone examined—show a predominance of the more refrangible radiations at sunrise, diminishing towards midday, then increasing towards sunset; but not reaching, in homologous hours after noon, the same values as in the morning. The curves vary notably from day to day, with the state of the atmosphere. His figures show to what extent the light is bluer than the direct sunlight, and the light of the sky at Montpellier.

Sir John Herschel.—The *Century Magazine* for October contains some interesting reminiscences of Sir John Herschel by the late Miss Maria Mitchell, who, during her visit to England in 1857, was for some time his guest. "I could scarcely believe," she says, "when I saw Sir John Herschel in his family, guessing conundrums with the children, playing at spelling, and telling funny anecdotes, that he was the same man of whom one had said to me when I first landed in England, 'He is living at Hawkhurst, not very well, and not very good-natured.' Probably the expression on his countenance of physical suffering had been mistaken for ill temper. He was remarkably a gentleman; more like a woman in his instinctive perceptions of the wants and wishes of a guest." Sir John told "pleasant little anecdotes of some self-made astronomers who came to him with most absurd notions, such as the non-existence of the moon—founded upon the reading of his works! And one good soul sent to him to have a horoscope cast, and inclosed a half-crown. Another wrote to him asking, 'Shall I marry, and have I seen her?'"

PHOTOGRAPHING THE MOON WITH THE LICK TELESCOPE.

An exceedingly interesting article, accompanied by fine specimens of photo-mechanical printing, and written by Mr. A. C. Ranyard, is published in this month's *Knowledge*; from it we make the following quotations:—

"I am indebted to Mr. Burnham for the photographs of the moon from which the accompanying plates have been made, and to Professor Holden, the director of the Lick Observatory, for leave to publish the photographs in *Knowledge*. The plates have been prepared from silver prints, made from the negatives taken in the principal focus of the great telescope. When it is used for photographic purposes an additional lens is placed in front of the object glass, reducing its aperture to 33 inches, and the focus of the telescope to 550 inches.

"It will be noticed that the different photographs are not all of the same diameter; for example, the middle photograph on the first plate is only about 5⅛ inches in diameter; whilst photograph No. 1 is about 5½ inches in diameter; yet all the photographs have been copied in the same way from the original negatives, and they are nearly exactly the same size as the originals. This difference is due to the moon's varying distance from the earth. If we had a photograph taken when the moon was at its nearest (in perigee) side by side with one taken when the moon is furthest from the earth (in apogee), there would be a difference of nearly three-quarters of an inch on the scale corresponding to the photographic focus of this great telescope, for the apparent diameter of the moon varies from 29′21″ to 33′30″, and its distance from nearly 253,000 miles to about 221,600 miles.

"The photographs sent over by Mr. Burnham are exquisitely sharp, and, considering that two photographic copyings are necessary in order to produce the blocks from which the accompanying plates have been printed, the result is very satisfactory; indeed, I think that the plates are the best representations of the moon which have yet been published.

"The dark ink in which they are printed brings out in striking contrast the difference of brightness of various parts of the lunar surface. The great planes are mostly very dark compared with the mountains and higher regions. The general brightness or *albedo* of the moon's surface is, according to Zöllner, 0·1736, perfect whiteness being called 1; but there are many parts of the lunar surface which are as white as the whitest terrestrial substances, such as clean snow, the *albedo* of which, according to Zöllner, is only 0·783.

"Seen as a whole, the moon appears decidedly grey. Sir John Herschel compared its colour to that of the weathered sandstone rock of Table Mountain. He says, 'I have frequently compared the moon setting behind the grey perpendicular facade of the Table Mountain, illuminated by the sun just risen in the opposite quarter of the horizon, when it has been scarcely distinguishable in brightness from the rock in contact with it, the sun and moon being nearly at equal altitudes, and the atmosphere perfectly free from cloud or vapour." This estimate of the moon's general brightness agrees well with Zollner's measure of the moon's *albedo*. Zöllner gives the *albedo* of white sandstone as 0·237, clay marl 0·156, quartz porphyry as 0·108, and dark grey syenite as 0·078. The whiter parts of the moon must therefore reflect much more light than grey sandstone."

PHOTOGRAPHING INTERIORS.

BY CATHERINE WEED BARNES.

Science plus Art equals Photography, is an equation needing no demonstration to those who love the last-named well enough to labour faithfully in gaining for it ever-increasing honour. In no branch of the art-science is study more needed than in that of interiors.

It is absolutely necessary, to begin with, to have good plates, a good camera, and the best wide-angle lens to be procured. Of course, many tolerably good pictures can be made with cheaper materials; but no one who has once seen the results of careful work with a fine instrument can ever be satisfied with the dense shadows, cloudy lights, and out-of-focus appearance of the ordinary interior. From the very first day I set up my camera this work attracted me, possibly from my having studied painting interiors, and from the fact that my home offered exceptional advantages: there are no buildings near it, and light enters on all four sides, while the house, being large, allows many rooms to open into each other, thus creating the vistas so much to be desired.

As usual, I began this work with my view lens—an 8 by 10 Ross' rapid symmetrical—which proved altogether too long in focus, and was laid aside for, first, a Morrison, and then a Dallmeyer wide angle. This last cuts 10 by 12, as I wished to be sure of perfectly clear corners. Smaller lenses cannot do full justice to handsome rooms. It is better to use a tripod than a stand with this lens, and, indeed, I had to have my camera bed arranged to suit both long and short focus lenses, or run the risk of having it intrude in the picture. I usually focus with full opening, and stop down only so far as will enable me to see the intended picture clearly on the ground glass. I do not believe in stopping down until hardly anything can be seen, and then giving a long exposure, as the former method gives me soft lights and clear shadows, while the latter gives dense shadows and too brilliant lights.

The plates used ordinarily should not be rapid ones, though I prefer them for very dark rooms, and usually like the Seed or Stanley plates. And, just here, I would like to say that if plate-makers would abolish the use of separators it would be a great gain. Mr. F. C. Beach's plan of packing plates is an immense improvement on the old way, as I have learned from experience.

There can be no fixed rule for timing interiors, but my usual limits are from fifteen minutes to an hour and a half, rarely exceeding the latter time.

Of course I am continually asked to take rooms where it is simply impossible to make a good picture, and the usual comment on my remark to that effect is to "try and see what will be the result." In other cases I have waited weeks for just the right light, and twice the coveted opportunity came as I was starting for a train. It is needless to say that it was but a few moment's work to throw off my wraps, set up the camera, take the picture, and lay the plate away for future development. In both cases the result well repaid me. It takes me some time to properly arrange a room for having its picture taken, without destroying its general character. Rooms, like people, can be so altered as to destroy all interest in them. Very slight changes make a world of difference in the result, and there is sometimes infinite scope for taste in this respect. Too often the light is poor or comes from the wrong direction, and one must remember the rule to avoid the use of light facing the camera. If sufficient can come from behind or at the sides it is often possible to cover the windows for the first exposure and uncover them for a second or two when that is finished. I have gone directly in front of the uncapped lens to do this, besides passing between curtains, and no impression of the act appeared on the plate, but it was done quickly and quietly. Various plans have been proposed to prevent halation, but the wisest one is to avoid facing the light.

The accusation of not using a spirit-level led me several times to put one on the camera after focussing, but the lines always proved straight. No one who has not an accurate eye for form and measurement will succeed with interiors unless willing to depend on a spirit level. As to position, it is not my custom to photograph a room square front unless obliged to do so, for the view is much more artistic if taken at an angle. The arrangement of the furniture must also be studied, so as to prevent large pieces being near the camera, interfering with each other, or presenting themselves at an ungraceful angle. If orthochromatic plates are not used, it is very important to study the colour-values, dark objects being brought into the light, and the light ones placed in shadow. People, generally, do not realize the labour thus required, and call you "fussy" when you take half an hour or so for getting ready, another long time for exposure, and then an indefinite time in the dark room. It is at times a question with me whether or no it is best to spend so much labour of mind and body on work that is only appreciated by a limited audience, for thoroughly good work must too often be its own reward. The scant praise of the expert few is, after all, better than the unthinking commendation of the general public.

Allowing the picture to have been taken, we come to the no less important operation of development. While not open to the difficulties of instantaneous work, it yet requires much care. For a long time I used the Moreno developer, getting excellent results, but it discolours quickly, stains everything it touches, and, when old, works too intensely, and this makes it very expensive in the long run. Then, in common with many others, I tried hydrochinon, but that worked too slowly, and interiors do not seem to bear prolonged development without fogging the shadows. I have finally fallen back on two developers, pyro and soda, or pyro and ammonia, whichever happens to be prepared, and I prefer making my own solutions. Ammonia gives much brilliancy, but I use soda for portraits. It is safest to begin with a weak solution, adding pyro as needed, but no bromide, and a well-timed negative is developed very quickly. In a recently published formula I noticed the important ingredient of "brains," and it should be kept constantly on hand, for the longer one works the more strongly will this truth be impressed on the mind. I have made it a habit to study every picture I make to see where it can be improved, and never admitting that it requires none.

A gentleman once told me that after two years' work he did not do so well at first. This should be impossible to a faithful camerist, and betrays great lack of interest or ability. To be sure, I retain some negatives for their very badness to be compared with later work, and the conclusion drawn is that if improvement is apparent it should be constantly increased. "Do not go backward," Mr. T. C. Roche once told me, and in photography, as in other pursuits of life, not to go forward is to slip backward. One cannot stop in mental progress, as on the railroad up Mount Washington or the Rigi. One should read everything on the subject in the regular photographic magazines and chance articles, besides consulting every authority, professional or amateur, it is possible to reach,

and then go to work on one's own feet, not trying to pick at once all the fruit on the tree of knowledge, but assimilating only what is positively helpful. There is no lack of good landscapes among amateurs, but a sad one of good interiors and portraits. Each branch has its own special difficulties, but each is splendid training for the eye and brain, and the horizon of enjoyment seems to constantly widen with increased progress in the work. Not being subject to many of the disadvantages of landscape work, interiors make especially suitable work for ladies, but there are no chances about it. No touching a spring gue sing at the focus, or using any flash-light ever made will take the place of conscientious, steady, and trained artistic perception, aided by the light which nothing can supplant—the light of the sun.—*The American Amateur Photographer.*

Toning with Platinum.—Much attention, says Mr. R. P. Harley, has been given of late to the subject of platinum printing; the black tones which it gives appear to be coming into favour, and were it a little easier to manipulate, either the Pizzighelli or the Willis process would be much more worked than it is. But it is not necessary to go through all the troublesome operations belonging to these processes to obtain a print in platinum; it can be had by the simple process of toning an ordinary silver print with a platinum salt instead of gold. Either plain or albumenized paper may be used, the plain paper giving the best results. My experiments have not gone very far as yet in this direction, but they have been successful. Proceed as follows:—Make your prints as for toning with gold, but print if anything deeper, wash thoroughly in at least three changes of water, getting rid of all the free nitrate of silver, and make the toning bath as follows:—Saturated solution oxalate of potash three ounces, chloroplatinite of potash one to six solution half-dram. Immerse the prints in this bath one at a time; the toning proceeds rapidly, the result being for some subjects very beautiful. The tone inclines to the cold side, but further experiment may lead to something warmer. The oxalate of potash in the above may be omitted, and pure water alone used instead, or phosphate of soda substituted with varying results. I hope to have something more to say upon this subject in the near future.—*The Beacon.*

Testing New Apparatus.—In purchasing new apparatus, either cameras or plate-holders, never take the manufacturer's word for it that they are absolutely light-tight. These necessary pieces of apparatus are now made in such large quantites that manufacturers seldom stop to test them experimentally. To test the light-tight qualities of a bellows, put the plate-holder in position, remove the lens board, then, while holding the camera in bright sunlight, cover the head with the focusing cloth, and look in at the front. The space occupied by the lens board is so small that it is very easy to exclude the light and watch for any leaks. While looking, revolve the camera so that the sunlight falls squarely on three of the flat sides of the bellows. Should no leak be observed, you can rely upon the bellows being reasonably light-tight. The front of the camera can be tested also in the same way by removing the ground glass and looking in at the back. By placing the camera on a tripod, in the sun, and putting in empty plate-holders, these can be readily tested for light leaks by drawing out the slide while one looks in at the front of the camera. If the light trap in the holder works poorly, pencils of light will be seen shooting inward. This advice is equally applicable to apparatus that has stood for some time, hence the safest way is to occasionally test the camera and holders for light leaks. Sometimes leaks occur in the screw-holes in lens boards, and cause fog and duplicate miniature pictures on one section of a plate. Censure of plate manufacturers will in many cases be avoided if these precautions are observed, while the negatives will have a crispness and brilliancy that it is pleasant to see. It is always advisable to cover the camera and plate holder with the focusing cloth before drawing the slide.—*American Amateur Photographer.*

THE LONDON CHAMBER OF COMMERCE.

The London Chamber of Commerce, which, before long, is likely to exert considerable and beneficial influence upon photographic trade, has for its President, Sir John Lubbock, Bart., M.P.; Vice-Presidents, Mr. C. Magniac and Mr. J. Herbert Tritton; Treasurer, Mr. W. H. Willans; Ex-Officio Member of Council, the Lord Mayor, the Members of Parliament for the City, the Governor of the Bank of England (Mr. Wm. Lidderdale); Chairman of the Council, Mr. David Howard (Hopkin and Williams); Deputy-Chairman of the Council, Sir Vincent Kennett-Barrington; Secretary, Kemic B. Murray. Offices:—Botolph House, Eastcheap, London.

The circular which convened the meeting for the formation of the Photographic Trade Section set forth that the special advantages of organising under the auspices of the London Chamber of Commerce are, that the Chamber is already in possession of suitable premises and staff, under which the necessary work of the Section can be adequately performed; time will be spared members in preparing bye-laws and other regulations of procedure; whilst no financial responsibility in involved beyond payment of the entrance fee and subscription to attain membership of the Chamber; nor is it necessary even for members, in case they are not satisfied with the management of the committee, to continue their membership or subscription, as enrolment in the Chamber does not involve more than an annual subscription, which can always be terminated by a month's notice prior to the expiration of the current year. The formation of the Section in connection with the Chamber is in every way, therefore, less costly, and at the same time more effective, than if it were attempted to form a separate committee apart from the Chamber, which would have to rely upon its own resources.

The Photographic Trade Section will not interfere with the work of existing associations, but will discuss and promote the trade interests of photography apart from scientific and amateur interests. It will, in fact, be an integral part of the London Chamber of Commerce—a body composed of 3,000 members engaged in almost every kind of trade and industry. No less than twenty-one trade sections, formed within the Chamber itself, are directly represented on the Council by their own delegates, in addition to eighteen of the leading mercantile associations in London, and it is intended to give the same right to the remaining branches of commerce. It was felt that so important an interest as that of the photographic trade should not remain without direct representation, and this will be secured by the formation of a Photographic Trade Section, whose chairman possesses a seat on the council of the Chamber, to whom he submits for confirmation all resolutions, reports, or recommendations adopted by the Section. Action is then taken in the name of the Chamber itself.

On all the subjects which might be considered, the recommendations which the Section could make to the Council would be of special value, and the influence of the Chamber with the Government departments, with Parliament, with provincial and colonial Chambers of Commerce, and public bodies generally, would greatly assist in carrying them out. Wherever possible, the Section will obtain the co-operation of other sections in regard to common objects.

On Thursday, October 31st, a discussion upon Eikonogen will be opened at the Camera Club by Messrs. H. M. Elder, M.A., and Lyonel Clark. Meeting at 8 p.m.

NOTES ON THE PHOTOGRAPHIC EXHIBITION.

Fourth Notice.

It is difficult to avoid coming to the conclusion that portraiture now occupies a much lower place in photographic exhibitions than it once did. It is not that photographers are less skilful in manipulation, or that they have not improved from an artistic point of view, but rather that portraiture in photography, as in painting, has found its level. At one time, so long as the pose was good, the lighting effective, the modelling of the flesh truthful, a photographic portrait satisfied all requirements. This is no longer the case. We demand now much more, and perfect manipulation unaccompanied by the charm of expression or by some sympathetic quality, excites but languid interest. The portrait of some well known person is always admissible because of the personality involved, but the claims of Mr. Smith or Miss Jones must be very marked indeed to justify a photographer sending the portraits of these estimable but uninteresting persons for exhibition. At Burlington House presentation portraits of His Worship the Mayor and the Rev. Head Master are hurried over as soon as possible, and there seems no reason why at Pall Mall portraits of a similar character should demand more attention. At the same time, it is well to see every year work which represents the standard of what may be called professional photographic portraiture, and so long as one is not asked to regard such examples as other than showcase photography, no harm is done.

Passing over this class—which, it may be said, is neither better nor worse than what has been exhibited before—one comes with interest to those pictures aiming a little higher. Among these may be placed Mr. Abel Lewis's "A Lady Violinist" (No. 49) and "A Portrait of a Young Lady" (No. 80). These two pictures seem to indicate that Mr. Lewis is enamoured of a shadow. In the first one he has managed to secure a most prodigious shadow, which repeats the outline of the young lady in so pronounced a fashion as to become almost unpleasant. Unquestionably "A Lady Violinist" is a clever piece of work, but somehow, despite the shadow, it has a peculiar inlaid effect. Surely the figure standing in a full blaze of light sufficient to produce the shadow indicated, would have been more brilliantly illuminated. The arrangement of No. 80 is exactly the same as No. 49; the outline of the shadow repeats the outline of the figure, but in a more subdued fashion. The pose of the left arm is not good. Still, the pictures on the whole are commendable, as being out of the beaten track. Mr. G. Watmough Webster, who has in former seasons distinguished himself, has produced a distinctly clever piece of grouping in Major Russell's children (No. 62), and it is a pity that a place nearer the level of the eye could not have been found for the picture.

Mr. W. W. Winter has maintained his reputation by the soft and harmonious photographs of Miss Mabel Francis (No. 63), and Miss Beresford and her sister (No. 312); Elsie (No. 377), and Miss Bury (No. 378), are equally good. The fault, if fault can be found, is that they lack force, but the thoroughly artistic treatment is very marked. The best compliment which can be paid to Mr. Winter's work is that it is unphotographic. Mr. Byrne's portraits have just the opposite quality—they are intensely photographic. They show admirable manipulation, and they triumph over technical difficulties, but they are somehow unsympathetic. Perhaps the fact that they are done to order is too plainly written upon them. He has got farthest away from the mechanical in 341, the portrait of an old gentleman dozing. Miss Malcolm Corrie has revived memories of Mrs. Julia Margaret Cameron in No. 348, but unfortunately they are not memories of Mrs. Cameron at her best.

Mr. Enrico Resta has succeeded in producing some capital portraits of children, original in pose and very droll in expression. They will not compare as art pictures with the children of Mr. R. F. Faulkner (No. 392); but whose can? Still there is so much vitality and "go" about Mr. Resta's youngsters that they compel attention. Mr. Resta, I take it, is a little of a humourist, and therefore, as a contrast to his laughing natural children, he gives us a life-sized head of the mystic Madame B'avatsky. This head, with its singular eyes, is either a magnificent portrait, or a caricature, just as you happen to be, or not to be, a theosophist. I dare not pass an opinion upon it. Of No. 403 it need only be said that it is the biggest portrait in the room—higher praise cannot be given. Messrs. Gunn and Stewart's pictures of children (No. 404) are what Artemus Ward would call "ornary." There is that objectionable obstreperousness about them which some photographers in their portraits of children contrive to suggest. Mr. Lyonel Clark's "Study of a Head" (No. 410) and "Portrait" (No. 409) are both exceedingly fine, and refreshingly free from the common-place. Mr. Friese Greene's opaline portraits are of course noticeable as examples of a new process of printing, but do not otherwise demand attention.

Mr. F. H. Evans has some clever "At Home" portraits (Nos. 435 and 446), but he has been terribly unlucky in his models. There is one gentleman whose nose is a nightmare. Why? It is impossible not to say that Mr. R. H. Lord has succeeded in his large picture "Try Again" (No. 438), and the expression of the old lady trying to thread her needle has been admirably rendered; but one is tempted to ask, was the subject worth the trouble which the production of such a picture must have entailed?

Turning to the screens, Herr Muller's work will at once attract the eye; but it has the besetting vice of the continental school—it is retouched until all sense of photography has fled. As specimens of handicraft they are excellent. Lieut. R. C. Tyllier Blunt, who also shows some excellent pictures in another part of the room, has a fancy portrait (No. 630) which is exceedingly effective and showy.

Leaving portraiture, and coming to examples of instantaneous pictures, one has, as on former occasions, to search for them. It is rather singular that in the present rage for detective cameras, and when every inventor considers it his bounden duty to patent a new shutter, as in days gone by inventors used to patent new corkscrews, there should be so little instantaneous work shown. The cause, I suppose, must be found in the fact that a really good instantaneous picture presenting any novelty must be rare, or demands more patience than the amateur cares to bestow. A successful instantaneous "bit" is also something in the nature of a "fluke," and flukes are not certainties: hence the trouble. As examples of purely instantaneous work, Mr. A. R. Dresser's studies of a "Dog Jumping" (No. 585) must be considered to bear away the palm. Curiosities are Mr. A. Withers's snap shot of the "Ascent of Cecil V. Shadbolt, Esq., in his balloon 'Victoria'" (No. 319), and Mr. A. Chancellor's similar feat in photography, "Captain Spenser with Balloon and Parachute;" but apart from their peculiarity they present no inherent technical difficulties. Mr. J. S. Teape shows some clever studies of street life, and with these the instantaneous work, known as such, must be said to come to an end.

PHOTOGRAPHY IN GERMANY.

BY HERMANN E. GUNTHER.

Fixing Bath for Plates Developed with Eikonogen—Retouching on Glossy Bromide Paper—Blisters—Eikonogen Development—Simple Hydroquinone Developer—Frilling—New Platinotype Paper.

Fixing Bath for Plates Developed with Eikonogen.—Gelatine plates which have been developed with eikonogen may, after thoroughly rinsing them, advantageously be placed in the following fixing bath :—

Hyposulphite of soda	250 grammes
Bisulphite of soda	50 ,,
Water	1,000 c.c.

This fixing bath, which is recommended by the introducers of the new developing agent themselves, has the following advantages :—The negatives acquire by it an excellent colour, which materially facilitates printing; the new fixing bath remains perfectly clear, even after it has been used oftentimes ; the treatment of the plate with alum solution *before* fixing may be dispensed with, so that the well known white film of alumina which forms if the alum treated plate has not been sufficiently rinsed, is entirely obviated. Should it, however, be desirable to harden the film, an alum bath either before or after the application of the new fixing bath may always be used, but in this case it should contain only 50 grammes of alum in 1,000 c.c. of water, as a more concentrated solution will lead to the formation of blisters in the gelatine film. The bisulphite of soda of the above formula may be replaced by the ordinary neutral sodium sulphite which is used in making up the eikonogen developer, if it is made acid by the addition of sulphuric acid. In this case the formula is as follows:—250 grammes of hyposulphite of soda and 50 grammes of neutral sodium sulphite are dissolved in 1,000 c.c. of water, and 6 c.c. of concentrated sulphuric acid gradually added to the solution. This bath is as efficient as the other one, and, if carefully prepared, it keeps also perfectly clear.

Retouching Prints on Glossy Bromide Paper.—The retouching or spotting out of prints on glossy bromide paper is generally supposed to be a very difficult operation ; in reality, however, if properly done, the touching up of these prints is quite as easy as in the case of salted paper. For a practical hint in this direction I am indebted to a professional friend of mine. He recommends to take a piece of black drawing-chalk, to shave of it as much as required and as finely as possible on a palette, and to mix it with albumen which is obtained by beating up the white of an egg to a froth, allowing it to stand for twelve hours, and by adding to it one-third of its volume of ammonia. The colour obtained is then exactly the one of the photographic print, and may be applied to the latter without any difficulty.

Blisters on Albumenised Paper.—Much has been said and written of late about this old photographic disease, and many a cure for it, after lying dormant for a number of years, has been re-discovered on this occasion. In a paper read before the last convention of the German Photographic Society at Weimar, Herr Scib declared, as the ultimate cause of blisters, the well known osmotic action, and also by others the annoyance has been traced to this action. Dr. Stolze, in the last number of its journal, the *Photographische Nachrichten*, refutes this explanation, stating that the contents of the blisters do not consist of a liquid, as this ought to be the case if the osmotic action were the ultimate cause, but that these blisters are in reality air-bubbles, the cause of which might be found in the gases dissolved in the washing water. All the water from the water-conduit, as well as all the spring and well water, contain, if freshly used, rather large quantities of them. It will, therefore, be always the best to use for the first washing water after fixing a water as much as possible free from gases ; even water which has been allowed to stand for several hours may advantageously be used. A much better and more certain cure, however, consists in the use of boiled and then cooled water. After such treatment blisters will never make their appearance.

Experiences with Eikonogen.—Eugen von Gothard, the eminent photo-astronomer of Hereny (Hungary), gives in the *Wochenblatt* a short resumé of his experiences with eikonogen, with which he has of late worked very much, as it is an energetic developer which, in spite of its energy, produces exceedingly delicate negatives. A yellow stain of the film, in the case of eikonogen development, never makes its appearance if, for fixing, an acid hyposulphite of soda solution be used. The formula used by Herr von Gothard is the following :—

Solution No. 1.

Sulphite of soda	200 grammes
Water	3,000 c.c.
When dissolved, add	
Eikonogen...	50 grammes

Solution No. 2.

Soda cryst....	150 grammes
Water	1,000 c.c.

For use, 3 parts of Solution No. 1 are mixed with 1 part of Solution No. 2, in a quantity which suffices for the whole day. The greenish solution, No. 1, keeps very well in absolutely air-tight bottles ; if, however, the eikonogen is dissolved in plain distilled water, it decomposes very soon. In an open bottle the solution becomes, after a few minutes, yellow, then more and more dark brown, at last coffee-black. Also a mixture of the two solutions 1 and 2 decomposes very soon ; in a few days it will be useless. The eikonogen developer acts very powerfully, but it is for this reason that it tends to the production of hard negatives. If, however, the solution is diluted with half its quantity of water, the deposit becomes much more delicate and harmonious, though, of course, the solution then works much slower, green fog being thereby sometimes produced. After development, the plate must be very thoroughly washed if an alum bath is to be used, otherwise a white deposit of alumina will be produced, which spoils the plate. If, however, the acid fixing bath, as I have described it above, is used for fixing, the alum solution may entirely be dispensed with before fixing.

A Simple Hydroquinone Developer.—By the following method, according to M. Petry, a perfectly colourless hydroquinone developer, which keeps for a long time, may be prepared :—In a pounding-dish at first forty grammes of chemically pure sulphite of soda, and then, apart from it, eighty grammes of carbonate of soda, are pulverized as finely as possible. Then into a perfectly clean and dry glass bottle of 1,000 c.c. capacity, eighty grammes of hydroquinone are placed, and the pulverized sulphite and carbonate of soda added to them. The salts are mixed by shaking the bottle, when the latter is filled up with rain water, and shaken again until the salts are completely dissolved. M. Petry has also observed that a gelatine plate, which is placed in a hydroquinone developer for about one minute, then washed and allowed to dry, materially gains in sensitiveness.

A Cause of Frilling.—It has often been stated that the frilling of the gelatine film is generally caused by the alternate unequal expansion and contraction of the glass and of the film; but if this be the case, the frilling would make its appearance in all cases in which an expansion or a contraction of the bodies takes place, since glass and film possess a materially different expansiveness; this is, however, not the case, as it has been proved lately by a great number of experiments, made by Herr A. Brunner. These experiments have, on the contrary, shown that the cause of frilling is solely to be sought in the rapid expansion and contraction of the film alone, which depends on the difference of temperature of the baths and washing waters employed, whereby in the case of plates liable to frilling, the imperfect connection between glass and film is loosed partly or entirely. It is therefore advisable, in order to prevent the failure, to use baths and washing-waters of the same temperature, even in cases where this temperature is a relatively higher one, which in the summer cannot always be avoided.

The New Dresden Platinotype Paper.—The firm of Unger and Hoffmann, Reissiger Strasse, Dresden, for many years celebrated for its albumen paper and gelatine plates, has recently introduced a new platinotype paper, which, on account of its excellence, is at present worked in most German photographic studios of fame. I have repeatedly tried the new paper with equal success, and I am now convinced that much finer results may be obtained with the platinotype paper for the hot-bath process, than with the one without development, known here as Pizzighelli-Platinotype paper. The mode of working the new brand is the following:—The paper shows before the exposure a chrome-yellow colour, which, during printing, turns at first to a greyish-brown, and finally to an orange colour. As soon as this latter colour is attained by the darkest parts of the picture, the exposure may be interrupted; the time of exposure depends of course on the density of the negative, and on the quality of the light, but generally five to ten minutes will be sufficient. The developing bath consists of a solution of 200 parts of potassium oxalate in 600 parts of water. The solution should always be tested with blue litmus paper, with regard to its acidity. If the solution is not slightly acid, the print will be deficient of the pure whites; to prevent this, sufficient of oxalic acid must be added, until the solution shows an acid reaction. This solution, provided the exposure has been a normal one, is heated up to 145° to 167° F. The print, with the film side down, is immersed into the bath, and rapidly drawn through it. In the case of air-bubbles having been formed, or the picture being still too light, the paper is drawn once more through the liquid. It should, however, be borne in mind that the wet prints, after development, must always appear lighter than they are to be in the finished state, because they proceed to darken during drying. According to the degree of exposure they have experienced, the prints must be developed at a more or less high temperature; deeply-printed pictures requiring a less hot solution than only lightly-printed ones, and *vice versa*. The developing bath may be used again; it should, however, be tested with litmus paper beforehand. The prints are fixed with a solution of hydrochloric acid one part in water eighty parts, into which they are placed with the film side down. After about ten minutes, the acid bath should be changed, which is repeated two or three times, until the bath remains clear. The prints are then washed in four or five changes of water, and then placed on blotting-paper to dry. Great and constant attention is required to keep the paper thoroughly dry. It is kept in a metal case with a small quantity of calcium chloride, and during printing it is well to keep a thin sheet of india-rubber behind it. The finished prints show a beautiful, even ivory tone, together with unsurpassed shadows and perfect lights. The great beauty of the process, and its permanency, will fair to make it the most formidable rival that the silver print has yet encountered.

Patent Intelligence.

Applications for Letters Patent.

15,714. C. Hoddle, 258A, Mare Street, Hackney, London, "Photographic Shutter."—October 7th.

15,767. R. Boyd, 1, St. James's Square, Manchester, "Controlling Descent of Shutters, Screens, or Curtains."—October 8th.

15,777. G. Hand-Smith and P. Warnford-Davis, 44, Chancery Lane, London, "Rendering Ivory, Bone, Horn, Wood, and similar materials, non-absorbent."—October 8th.

15,798. H. H. Lake, 45, Southampton Buildings, London, "Machine for the Manufacture of Flanges."—October 8th.

15,837. A. Martin, 209, The Grove, Hammersmith, London, "Suspender for Pictures."—October 9th.

15,844. J. Corlett, 69, Lawrence Road, Liverpool, "Taking Photographs by a Telescopic Extension Camera."—October 9th.

16,095. Kate Wadmore, 106, Hawksley Road, Albion Road, Stoke Newington, London, "Painting on Porcelain and other Substances."—October 12th.

16,106. J. S. Fairfax, 433, Strand, London, "Films for Photographic Purposes" (Frederick Crane) United States.—October 12th.

16,111. C. Lawrance, 141, Fulham Palace Road, London, "Improvements in Detective Cameras, and in Carriers and Shutter connected therewith."—October 12th.

Specifications Published.

16,785.—19*th November*, 1888. "Magic Lantern Slides and Apparatus." Walter Ponyter Adams, Electrical Engineer, Springwell, The Terrace, Barnes, Surrey.

My improvements relate to the substitution for glass of a flexible and transparent support for the picture, in slides used with the magic or optical lantern.

Gelatine, algin compounds, and celluloid are suitable for this purpose.

Slides made with such substitute may be of the usual square form or in strips.

The following is a description of one way in which a series of photographic views may be produced in a strip with gelatine as the support:—

Each view is printed on a special paper, known to the trade as "transferotype paper," and then squeegeed in a row on to a smooth even surface—glass will do—carefully levelled, and previously polished with French chalk; when dry, the paper is removed with hot water, leaving the picture film adhering to the glass; over all is flowed a solution of gelatine so as to form an even layer. A solution of gelatine prepared as follows gives good results: for a series of views 3½ inches square—the glass being about 4 inches wide—dissolve ¾ ounce of gelatine in 8 ounces of water; this is filtered and applied hot. When "set" it is soaked for five minutes in a saturated solution of chrome alum, to render the gelatine insoluble; it is then well washed and again soaked in a solution of 1 ounce of glycerine in 15 ounces of water; when thoroughly dry the strip is cut to the required width, and a length of 4 inches left at each end for attachment to rollers, then the whole layer of gelatine, with the picture films adhering, may be stripped from the glass.

In connection with the strips of pictures I use roller-holders to bring each view into place in front of the lantern condenser.

The rollers are placed on opposite sides of a frame, whose position, when in use, is in front of the condenser, and the strip is wound on to one roller from the other, so that each view passes the condenser in turn.

The movement of the rollers may be accomplished by hand or mechanically.

The inventor then describes a form of roller slide that he finds convenient for the change of pictures mechanically.

The inventor claims:—

1. The employment of a flexible and transparent substitute for glass as the support for the picture in optical lantern slides.

2. The employment of roller holders in connection with the flexible and transparent strip lantern slides.

17,005.—*November 22nd*, 1888. "Illusion Apparatus." ALFRED EBENEZER COCKMAN, 4, Paisley Road, Walworth, Conjuror; and GEORGE DE MELVEN, of 2, Wheatsheaf Lane, South Lambeth, Conjuror.

This invention relates to apparatus for use in a performance wherein, by an optical illusion, a living person is made to appear as though divided at the waist, the bust or upper part of the body alone being visible and appearing to be supported upon a stool or pedestal on a suspended platform, or wholly above the platform, without in either case apparent means of concealment for the lower part of the performer.

The invention consists essentially in a trick platform constructed apparently too thin for the purpose to afford space for the concealment of the lower part of the performer, and in certain adjuncts thereto whereby the illusion is carried out more effectually.

The platform is provided with an internal chamber projecting at the middle of the lower side of the platform, and is so covered as to be practically invisible to the spectator. At the centre of the upper side of the platform is an aperture leading to the chamber; the said aperture is surrounded by a "coaming" or vertical flange which fits close around the waist of the performer. The platform has a removable segment or gate, by which the performer is enabled to insert the legs and lower part of the body into the chamber in the platform, and which is inserted in place after the performer has entered. In order to make the bust appear as though resting upon a pedestal upon a platform, a frame constructed in two or more parts is applied around the raised flange or coaming above referred to; the said frame has externally the appearance of a pedestal, and is in strong contrast with the platform, which is wholly covered with black velvet, whilst the pedestal is white or other colour.

Suitable draperies, preferably of black velvet, are provided in the rear of the suspended platform in order to facilitate the illusion, and in order to make it more effectual, gear is provided whereby the suspended platform may be rotated in sight of the audience, so as to bring all sides of the bust into view.

By removing the frame representing the pedestal, the bust appears to be floating above the platform without visible support, the coaming or flange around the aperture in the platform being covered with black velvet, and becoming confounded, to the eye of the spectator, with the covering of the platform and the drapery in the rear.

In the rear of the apparatus is provided a pair of doors covered preferably with black velvet, and having a space between them when closed sufficient to allow the performer to enter and take his or her position on the platform without being seen by the audience; a bright coloured scarf is placed in front of the platform between its suspension rods to hide the performer in entering.

17,298. *28th November*, 1888. — "Photographic Shutters." GEORGE SYLVESTER GRIMSTON, Claremont, Glenluce Road, Westcombe Park, Greenwich, Kent, Engineer.

This invention has for its object the improvement of instantaneous or time shutters for photographic purposes, and consists mainly in the construction and arrangement of the releasing and detaining mechanism, and is applicable to those shutters which have a reciprocating action of the sliding shutter, and also to those which have a revolving action of the shutter, and can be applied to those shutters which are situated outside the lens combination, as well as to those which are used within the lens combination.

In applying this invention to a reciprocating shutter, in which the reciprocating action of the sliding shutter is caused by the revolution of a crank or similar device actuated by a spring, I use a crank-plate or disc, to which the sliding shutter is attached in the usual way by means of a crank pin. On the edge of this crank-plate are placed notches or detents for holding or detaining the sliding shutter—two notches for holding it when set ready for action, and one for detaining it when fully open. This latter notch can be used for holding the sliding shutter when fully open for focussing. These notches will be hereinafter called Nos. 1, 2, and 3, according to the order in which they come when setting the shutter ready for use. These notches engage with a pin on a lever connected with a pneumatic pump or other device for actuating the lever, the pin on the lever being kept up against the disc when the lever is in its normal condition by means of a spring. From notch No. 1 to notch No. 2 a thin strip of metal, forming a guide, extends round the outside edge of the aforesaid crank-disc, and at such a distance from it as to allow of the said pin passing freely between it and the disc. This strip leaves off just short of notch No. 1, and has its end there slightly turned up towards the disc. Notch No. 3 is just beyond notch No. 2—these two being diametrically opposite on the crank disc to notch No. 1—and has its edge at the same distance from the centre of the crank-disc as the outside of the aforesaid metal strip.

The action is as follows: if it is desired to give an instantaneous exposure the crank disc is turned round until the pin on the said lever engages into notch No. 3; on disengaging the pin from this notch the disc begins to revolve, and the said metal strip comes between the pin and the disc, thus preventing the pin from engaging into notches Nos. 1 and 2. Consequently the disc performs a complete revolution opening and closing the sliding shutter. If now it is desired to give a lengthened exposure, the crank disc is turned round until the pin on the said lever engages into notch No. 2. On disengaging the pin from this notch, the pin pressed by the said lever endeavours to force itself further away from the disc, but is detained by the said metal strip, which as the disc revolves delivers the pin into notch No. 1, which thus holds the sliding shutter open until a second pressure on the lever releases the pin, when the disc completes its revolution and closes the shutter. If before the pin is delivered into notch No. 1 by the said strip there should be any pressure on the said lever, the end of the strip being turned up as aforesaid prevents the disc from revolving when the pin reaches this turned up end until such pressure is relieved, when the pin is delivered into notch No. 1 as aforesaid. In order to diminish the shock or jar when the said notch No. 1 hits against the said pin the lever is mounted on a spring, thereby acting as a buffer.

In applying this invention to a revolving shutter the said disc forms the shutter, having an opening in it for giving the exposure, the notches and strip being arranged in the same manner as for the reciprocating shutter hereinbefore described.

It will thus be seen that when the apparatus is set for an instantaneous exposure one pressure on the lever causes the shutter to open and close rapidly. And if set for a lengthened exposure one pressure opens it, and it remains open until the the second pressure releases it, and the shutter closes.

A NEW SALT BORDERING ON POTASSIUM FERROCYANIDE.—F. Mahla (*Berichte*).—If we exhaust with cold water the mixture which has served for purifying coal-gas, and submit the liquid to fractionated precipitation with ferric chloride, the last portions, instead of prussian blue, yield a deep violet precipitate. This precipitate, if treated with alkalies, yields ferric oxide, and a yellow solution which, after neutralisation, gives, with ferric chloride, a violet precipitate, with copper salts a parrot green, and with salts of cobalt a fresh red.—*Chemical News.*

Correspondence.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY'S EXHIBITION.

Sir,—I should be obliged if you will make it known, through the medium of your valuable paper, that in deference to many expressed wishes, and on account of the many late applications for particulars, the council has decided to make the last day for receiving entries and exhibits, Saturday, October 26th. The insertion of this in your next issue will be esteemed a favour by yours truly, Fred W. Dew, *Hon. Sec.*

October 21st.

Proceedings of Societies.

Photographic Society of Great Britain.

At the technical meeting of this Society, held on Tuesday evening last, the chair was occupied by Mr. John Spiller, Vice-President.

In accordance with the established custom, this meeting, held during the exhibition month, was devoted to the explanation and consideration of the apparatus included amongst the exhibits. Most of these have been fully described in the pages of the Photographic News.

The first exhibit shown was a camera of the detective kind, and exhibited by Messrs. Mawson and Swan. There was a decided demonstration of approval of some of the most novel points of this instrument, particularly of the arrangement by means of which the lens is kept concealed except during the actual exposure.

Messrs. Sands and Hunter showed two cameras, one of which was remarkable for the closeness with which it was packed, being only two inches in thickness for a whole plate size.

Mr. Leon Warnerke enquired to what size it could be extended, and, finding it to be between nineteen and twenty inches, expressed his opinion that a whole plate camera should open to twenty-two inches, so as to serve for one of the lenses of an eleven inch combination when used alone.

Mr. T. Samuels had a detective camera which, he stated, had nothing automatic about it; every movement was made with the hands. The camera was for 5 by 4 size, and the changing box was furnished with a dozen plates, which were placed in position by being lifted out of the holder, the hands feeling it through the thickness of a bag of black material. The camera was arranged to take lenses of several foci, a point Mr. Samuels considered decidedly advantageous.

Mr. W. E. Debenham asked whether the plates having to be manipulated through a bag did not incline to show dust spots.

Mr. Samuels had not found that to occur.

Mr. Wormald's enlarging camera was next shown and described, and was followed by the camera to which a medal has been awarded, exhibited by Messrs. Swinden and Earp.

Mr. Shew then showed his latest detective camera. Amongst other improvements a "pusher" had been introduced by means of which it could be felt whether the plate was in its proper position in the camera before exposing it. It was also pointed out that if, by some accident, a broken plate got into the camera, the work need not be stopped, but the holder containing the remaining eleven plates could be safely withdrawn, and the broken plate turned out.

Some carriers for films by Mr. Ferrero were next exhibited, and were followed by Messrs. Marion and Co.'s articles, which included an instantaneous shutter opening and closing from the centre, and an apparatus for printing lantern slides from half plate negatives by means of a sort of camera of millboard, near the centre of which a lens was fixed, at such a distance as to focus on a lantern plate placed at one end, when a half plate was in a carrier at the other end.

After the meeting Mr. W. England exposed some plates upon the members gathered at one end of the room; the illumination was produced by two of Schirm's flash lamps burning magnesium dust.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 16th inst., Mr. W. E. Debenham in the chair.

The Hon. Secretary exhibited the "Automatique" shutter; it had the advantage of being always ready set, exposures could be made very rapidly, and the shutter was released by pressure of a pneumatic ball and tube.

Mr. F. P. Cembrano exhibited a detective camera—"The Key." The plates are carried separately from the camera in sheaths, each sheath carrying two plates inserted face to face when an exposure is required to be made. The end of the sheath containing the slides is fitted into a tube fixed to the top of the camera. A quarter turn is given to the sheath, bringing it to an upright position, and allowing one of the plates to drop into the camera through a slot opened to receive it. After exposure the plate is returned to the sheath by reversing the position of the camera. A diaphragm shutter is used between the lenses; the weight of the camera with three sheaths is three pounds.

Mr. A. Haddon remarked upon the necessity for finders being attached to this class of camera, as it was generally held in a position that made it very difficult to judge correctly how much of the required picture was in the field.

Mr. T. E. Freshwater had recently tried a sample of eikonogen that had been wrapped in paper for some time. It had acquired a chocolate colour, and the plates developed with it were not satisfactory. Better results were obtained with pyro and ammonia. He used six grains of eikonogen to the ounce.

Mr. A. Cowan said that in using eikonogen for transparencies, one drop of a ten per cent. solution of bromide to each ounce of developer would greatly improve the colour and clearness of the picture.

Mr. J. Summers found that after using eikonogen several times for bromide prints they became discoloured. He tried several acid baths, but was unable to remove the yellow stain.

Mr. A. Cowan was of opinion that the developer had become contaminated with hypo. A trace of the fixing bath on the finger might do this.

Mr. J. S. Teape was elected a member of the Association.

The Camera Club.

At a meeting of the Camera Club at Bedford Street, Strand, London, on the 17th October, Mr. J. Traill Taylor presided.

Mr. George Davidson, the Hon. Sec., announced that platinotype prints by Mr. Burchett were on view in the room. The Club had received tickets for sale for the lantern exhibition for the benefit of the Photographers' Benevolent Association, to be held at the Exhibition of the Photographic Society at Pall Mall.

The Chairman stated that as president of the Benevolent Association, he wished them to know that the Association had money, but not sufficient objects on which to expend it. If any of them knew any photographers in distress they had better let the Association know. At the same time, the Association wanted all the money it could get.

Mr. Lyonel Clark then read a paper on "Toning Silver Prints with Platinum." The latter metal, he said, being more stable than gold, it promised advantages if used for toning. Herschel experimented in early times on the reduction of platinum by light, but Willis was the father of all practical platinum printing processes. In 1859 Burnett, as recorded in the *British Journal of Photography*, fairly exhausted the subject in his attempts to reduce a great number of platinum salts by light, but this cannot be directly done. Caranza, as recorded in Vol. I. of the Photographic News, was the first who tried toning silver prints with platinum, but platinum toning only became a possibility after the discovery by Willis of the use of platinous salts in photography, for there is a great loss of half-tone with platinic chloride, as it is called; its true name is chloroplatinic acid. His (the speaker's) toning bath consisted of anhydrous potassium chloroplatinite dissolved in water in the proportion of 1 in 200 or 1 in 300, and used at a temperature of about 60° F. The prints, after toning, did

not change colour in the hypo. They were, when attacked by oxidising and other agents, more stable than prints toned with gold, but not nearly so stable as prints by one of the platinum processes proper. Mr. Clark here gave a demonstration of the process. Each print was toned in about half a minute or a minute after immersion in the solution. Some of the prints were on silk and on satin jean.

The CHAIRMAN remarked that Mr. Lyonel Clark was the first to introduce toning by platinous salts, and the process had these advantages:—1. Platinum is more stable than gold. 2. The prints are all of a beautiful black tone. 3. The toning is rapidly effected. He (the Chairman) possessed some of the early platinum prints produced by Mr. C. J. Burnett.

Mr. F. W. EDWARDS thought that when decomposition of such prints as produced by Mr. Clark was set up by chlorine, it would go on after the chlorine had ceased to act. He held in his hands one of Mr. Blanchard's prints which had been partly bleached by chlorine, and faded out afterwards.

Mr. CLARK responded that much of the picture could be brought back again. He then immersed it in old ferrous oxalate, and after a time much of the image reappeared.

Mr. DAVISON preferred rough rather than smooth paper for the process.

Major J. F. KNOTT thought that many amateurs preferred silver to platinum printing, because it was easier; and Mr. Clark had now shown them an easy and rapid way of toning with platinum.

Mr. H. J. GIFFORD had found that different kinds of undistilled water affected the results obtained when toning with gold.

Mr. FRIESE GREENE thought Mr. Clark's process a boon to silver printers.

Mr. P. BRAHAM thought spots sometimes produced during toning to be due to perspiration from the fingers.

Mr. E. P. ROBINSON believed it to be a merit of Mr. Clark's process that warm tones could be obtained by it by not pushing the toning too far.

Mr. LYONEL CLARK then replied to the various speakers, and the proceedings came to a close.

ABNEY CAMERA CLUB.

A MEETING was held on Oct. 18, Mr. C. H. RUSHTON in the chair.

Mr. ADKINS read a paper on "Chloride Emulsion Making," accompanying it by a demonstration of the whole process.

The HON. SECRETARY, Mr. F. H. Leeds, announced that on November 1st Mr. Hart would give a demonstration on "Flash-light Photography."

DERBY PHOTOGRAPHIC SOCIETY.

THE members of this Society, with a number of their friends, were entertained on Tuesday evening, October 15th, in the Society's Rooms, Derwent Street, by Mr. F. G. Pierpoint, of the Leicester Photographic Society, who gave a description of the many places of interest on the Thames from Oxford to London, illustrated with lantern slides made by himself from negatives taken *en route*.

NORTH SURREY PHOTOGRAPHIC SOCIETY.

A MEETING was held at the West Norwood Constitutional Club on the 22nd inst., Mr. L. MARTIN in the chair.

Mr. CHARLES O'MALLEY said that he had found tri-chloramine and tri-iodamine to possess developing powers similar to hydroxylamine as proposed by Messrs. Egli and Spiller, but they are rather slower in their action. One dram of either of the above "amides" is rubbed up in a mortar with half a dram of carbonate of soda, and six ounces of water are added. When both are dissolved the developer is ready for use; it seems to have no tendency to stain the film.

PHOTOGRAPHIC CLUB.—The next meeting, Wednesday 30th, will be the first lantern meeting of the season.

MR. A. L. HENDERSON has just reached London from Australia, and is greatly improved in health.

A. M. LEVY.—We regret that your paper reached us too late last week for publication in full.

Answers to Correspondents.

M. AND B.—It is difficult to say off-hand that the new eikonogen will altogether replace hydroquinone as a developer. It compares so favourably with the latter, and in many quarters is preferred, that the competition will run close for some time to come.

PLATIN.—You may see several examples of Mr. Valentine Blanchard's platinum-toned prints in the Pall Mall Exhibition; and, judging from these, a considerable range of variation in colour appears to be possible.

A. G. K.—If you have not already consulted Dr. Russell and Captain Abney's joint report on the "Action of Light on Water Colours"—Parliamentary paper, price 2s. 9d., Messrs. Eyre and Spottiswoode, 32, Abingdon Street, Westminster, S.W.—we should advise you to do so, for there you will find a record of exact experiments made upon all the recognized water-colour pigments, with tables showing their relative permanence under prolonged exposure to sunlight. By this you will see that indigo used alone, or in combination with other pigments, is by no means permanent.

ARSENIC.—The amount of arsenic in glycerine, when present, is, after all, excessively small—not more than one part in five or six thousand, according to Dr. L. Siebold, who read a paper on the subject at the recent meeting of the British Pharmaceutical Conference. A minute trace like this could scarcely affect even its medicinal use; much less would it stand in the way of its ordinary employment for photographic or technical purposes. The question was, however, as you say, raised in the course of the Maybrick trial; but "a dying man will clutch at a straw."

L. A.—Be so good as to repeat the question, for your meaning is not clear in the letter addressed to us this week. Have you made and tried the compound salt, or are you only now proposing to do so? A strong solution of nitrate of silver is known to dissolve a certain amount of chloride, but most of it separates again on dilution with water.

M. P. G.—Dr. Eder's mercury-oxalate photometer is described in Professor Meldola's "Chemistry of Photography," pages 18, 19, and 32. There is also a brief account of it to be found in Dr. Eder's "Chemical Effect of the Spectrum," page 56—Harrison and Sons.

J. A. C.—In offering to make search for you amongst the records of the Patent Office, we do not hold ourselves responsible for any mistake or oversight, but can only say that, looking back to the end of 1887, we do not find any entry of the kind you mention. Of course it will be the duty of your patent agent as a preliminary to see that the way is clear, but it would also be well to call his attention pointedly to this matter.

P. A.—Dr. Buckelandt's patent for "Improved Photographic Plates to be Developed in Water" is dated January 26th, 1888. Its number is 1201.

C. J. L.—Enquiries made for you have elicited the following addresses:—For china plaques, M. Rudowsky, 3, Guildball Chambers, Basinghall Street, E.C. For enamels on copper, Mr. A. L. Henderson, King William Street, London Bridge; or M. Walery, 164, Regent Street, W. In the Pall Mall Exhibition of 1887, a very fine set of enamels (portraits) was exhibited by MM. Benque and Cie., 32, Rue Coissy d'Anglais, Paris.

W. A. M.—As prints they leave nothing to be desired; the tone is good, and depth of printing right. The negative of view through the gateway was under-exposed, and wanted a wheelbarrow or small object to break the monotony of the gravel foreground. The only fault with the other is that the towers lean inwards just a trifle, showing that the camera had been tilted up, instead of the sliding front being raised.

H. P. R.—We are exceedingly obliged to you for your letter, and for the information therein contained.

B. C.—Aurine cake dissolved in methylated spirit and mixed with a little shellac or plain collodion makes an excellent non-actinic varnish. Apply it either with a brush or by pouring, but always on the back of the plate, so that it may be possible to clear it off in parts where too much may have been applied. A bit of rag moistened with spirit and held over the finger is a good way of doing this, whilst the negative is laid upon a retouching desk or held up to a window to watch the progress of your operation.

Wanted, the address of Messrs. Iblee and Horne, or any agent for the supply of Balmain's luminous paint, which now appears to be somewhat difficult to procure.

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IMPROVEMENTS IN PHOTOGRAPHIC APPARATUS.

THE last few years have been marked by a considerable improvement in tourists' cameras, and a certain amount of improvement in those in use in the studio. Not so very long ago, a falling front in cameras made for out-door work was the exception and not the rule, and the late Dr. Donkin once publicly complained of the carpentering he had to do over a newly bought camera to furnish it with the falling-front so necessary, more especially, in mountainous regions. In those days numerous loose parts to cameras were prevalent, and the different sections of the camera often needed so much fitting together and adjustment, that an amount of time which would now seem intolerable was lost over each picture.

An argument has been raised on the other side of the question, that there was a pleasure in all these preparatory operations, such pleasure as painters feel in mixing their colours, and in otherwise getting ready for their work. It has also been said that there was more pleasure in an old-fashioned stage coach ride than in a present-day journey by railway. In these assertions perhaps "distance lends enchantment to the view," for man has a tendency to view the past with regret, the present with dissatisfaction, and the future with hope. The vital objection to apparatus which takes a long time to erect is, that fleeting effects are sometimes lost which might otherwise have been secured. Cameras are now so made that in most cases they can be expeditiously brought into use; the chief waste of time at present is in the unscrewing and screwing when changing lenses. Mr. McKellen was among the first in starting, a few years ago, the march of the recent improvements in out-door cameras.

Day by day new detective cameras are to the fore; they crop up as rapidly as new instantaneous shutters, and the cry is "still they come." Perhaps in time, as we said last week, the demand will increase for thoroughly good small cameras first, which, however, can be used secondarily for detective purposes. One super-excellent negative is worth more than a dozen of merely average quality; to increase the percentage of the former the operator would often do well to fix his little camera upon a stand, and to take reasonable time over his work, when the selected subject will permit that course.

As stated on a former occasion, there is abundance of room for improvement in focussing glasses by means of good lenses, an eye-cup, a "draw" of, say, six inches, and a means of clamping the tubes when extended to just that length which suits the eye of the particular operator. Mr. Frank Bishop's recent improvement is described in another column; it is to be hoped that he will not stop there, but will be dissatisfied until the public want of additional improvements in focussing glasses has been met. A remarkable increase of comfort to the photographer is gained by focussing when the focussing glass is good, whilst at the same time the focussing screen of the camera is made of much finer ground glass than the average of that now used for the purpose.

NEW FORMULÆ FOR EIKONOGEN DEVELOPMENT.—According to the *Nachrichten*, the Anilin Manufacturing Company (Limited), of Berlin recommends the following formulæ:—1. *For Portraits and Landscapes.—a.* 200 grammes of sodium-sulphite, all dissolved in 3,000 c.c. of distilled water, and to this solution are added 50 grammes of eikonogen, which have previously been finely powdered in a pounding dish. The same solution can be prepared without a pounding dish in the following manner:—200 grammes of sodium-sulphite and 50 grammes of eikonogen are in an enamelled vessel dissolved in 500 c.c. of boiling distilled water, the dissolving being accelerated by stirring. The hot solution is then poured into a bottle of 3,000 c.c. capacity, which contains 2,500 c.c. of cold distilled water.—*b.* 150 grammes of crystallized soda are dissolved in 1,000 c.c. of distilled water. For use are mixed: 3 parts of solution *a* with 1 part of solution *b*. 2. *For Instantaneous Exposures with Detective Cameras* (about one-fiftieth of a second exposure). For this purpose formula No. 1 is used, with the difference, however, that the crystal soda is substituted by the equal quantity of potassium carbonate (pure potash). 3. *For Very Short Instantaneous Exposures* ($\frac{1}{1000}$ *of a second exposure*) *and for making the developers No.* 1 *and* 2 *more energetic in the case of under exposure:* 100 grammes of sodium-sulphite, 40 grammes of potassium carbonate, and 20 grammes of eikonogen are in an enamelled vessel dissolved in 600 c.c. of boiling distilled water. The solution is allowed to cool, and the stock solution kept in a small stoppered bottle. It keeps, if prepared exactly in the same manner, for a long time unaltered.

BROMIDE ENLARGING.*

BY J. HUBERT.

Although a moderately large sized photograph taken direct is, in my opinion, superior to an enlargement produced by any method whatsoever, it seldom happens that the first-named process is suited either to the capacities of the pocket, the room, the brain power, or the inclinations of most of the votaries of our beautiful art-science. Some of the foregoing remarks are hardly applicable to the majority of members composing the present distinguished assembly, but the choice of my subject emanates, not from the belief in the intrinsic value of this paper, or from a presumptive desire to teach, but from the conviction that the discussion following will be as far-reaching and instructive in its results to myself no less than to others, as the proceedings of this Society are generally reputed to be. Apart from this, when you honoured me with the request to perform before you to-night, and left the choice of the subject in my hands, it occurred to me that a practical demonstration of bromide enlarging had not within my experience been brought before this Society.

Small negatives being the rule amongst amateurs, they nevertheless often desire their charming tit-bits of scenery and other subjects, domestic, rustic, or otherwise, associated perhaps with pleasant reminiscences, changed to dimensions which are more in keeping with the magnitude of their imaginations.

If such negatives are sharply defined, no difficulties need present themselves to hinder the work. The first consideration is whether day or artificial light should be employed, but it depends very much upon the quality of the negative, a dense or yellow one requiring a penetrating light, such as day or—a capital makeshift—limelight; whilst thin negatives had better be printed by a weak artificial light, an oil lamp, or, in the case of the limelight, the hydrogen flame reduced will prove useful. Very thin negatives may advantageously be coated with iodine-coloured varnish, when they will yield good results.

Supposing it to be desirable then to use daylight, our thoughts turn naturally to the necessary apparatus, which may be extremely simple; an aperture cut in a wall, a window darkened all over with an opening sufficiently large to admit the negative, the key-hole widened to its size; each and all these means will be admissible if the landlord does not mind, and if it causes no inconvenience to the wife, the housekeeper, or the mother-in-law, whose tyrannical propensities are too well known to be left out of the question altogether. The next step in the construction of home-made apparatus will be to improvise a skeleton frame which holds an easel, on which the negative may be made to slide backwards and forwards, as well as to rise and fall, in order to allow of the adjustment and centering of the lens with regard to it. This frame, or better still, an old camera made to serve the same purpose, is placed exactly in front of the aperture in either of the spaces allotted by the aforementioned "want to know all's," can then be covered with a dark cloth, or, if such be unavailable, and you can manage to evade their vigilance, with the shawls, aprons, or waterproof cloaks belonging to those members of the family who are not using the articles selected. Immediately joining this frame, the lens must be fixed *pointing towards* the enlargement, and away from the negative. This arrangement may be stationary, inasmuch as the skeleton frame is made to slide all ways, for the purpose of being brought at right angles to the lens. No light should now penetrate into the room except through the lens, unless an enlarging camera be used. It only needs now an easel, constructed of two uprights held together by crossbars, to receive the sensitive sheet, which, fastened to a board 26 by 20 inches or more, may be made to swing between these uprights after the manner of a toilet glass; it can then be moved backwards and forwards in easily made grooves laid upon the floor, preferably joined in such a manner as to be easily taken apart for transport.

A negative having been inserted and focussing then proceeded with, it will be found that the enlargement looks extremely feeble, owing to the light proceeding through the aperture from an uneven source; it becomes, therefore, necessary to improve matters. A mirror, or piece of white cardboard, of a size large enough to completely illuminate the negative, must be placed outside the aperture at such an angle as to reflect the light of the sky against the negative. The size of the reflector depends upon the focal length between the object lens and the negative, as lines proceeding from the centre of the lens towards the extreme margins of the negative continued must still be intercepted by the mirror or cardboard reflector, and not radiate around it. A sheet of tin covered with Aspinall's or other pure white enamel is inexpensive and weather-resisting.

I have abandoned daylight enlarging, on account of no two successive exposures being alike. The system of trial exposures proves impractibable professionally to me at least, on account of the great uncertainty of the weather. If that were not so, I could not, however, conduct my demonstration by this agency, as the promised invention of bottling up daylight is as yet unavailable. Good enlarging lanterns can be bought at any photographic warehouse, but the apparatus may easily be constructed by buying a five or eight inch condenser, for quarter or half-plate negatives respectively, and fitting it to an ordinary sliding or bellows body camera, fixing it into the place where the ground-glass screen is ordinarily situated, pointing the lens with the camera towards the easel which is to receive the sensitized paper. It only needs now a tin box to hold either an oil, gas-lamp, or the limelight, but either arrangement must permit of an easy method of centering and focussing the flame. If the light consists of an oil or gas lamp, it is well to interpose a diaphragm between the flame and the condenser, to cut off rays from too wide an area, else sharpness of the image is decidedly impaired. Using such an illuminant, the excessive heat generated, which is much greater than with the limelight, must also be provided against by having a higher chimney to carry it off. Ere I proceed, I will just mention the possibility of making an enlargement without a condenser—that is, by illuminating the negative evenly with the body of a large flame, and interposing an opal plate—preferably ground—between the light and the negative. This mode may recommend itself to some, but requires a prolonged exposure. In case the operator can avail himself of the limelight, he may, as said before, modify the character of his negatives somewhat by using more or less hydrogen. Inserting the negative just in front of the condenser, with the film side away from it and towards the projection lens, we are ready for action.

A few remarks upon the condensers and objectives would not be out of place here. From the fact that light travels in straight lines from a luminous source sending out rays in all directions, it follows that most of these pass by the sides or above and below the negative, only a

* Abridgment of a paper read before the London and Provincial Photographic Association.

small proportion through it. The condenser *gathers* these marginal rays, concentrating them upon the negative. It is generally composed of two plano-convex lenses, mounted closely together almost touching each other at their convex sides, or one of them of a meniscus form—that is, like a horned moon. When a large condenser is employed, a third single and smaller condenser is often used between the lens and the larger one, as it intercepts and converges more rays towards the large condenser than otherwise would be the case.

The lens which is called the objective, and which is instrumental in projecting the image upon the screen, must be able to embrace the full size of the negative, or, more correctly speaking, to *amply* cover those portions of the negative you wish to enlarge. If architectural subjects are to be copied, a lens of the rectilinear type is desirable, but otherwise it is immaterial. I need scarcely say that the exposure increases or decreases with the focal length.

Focussing claims our attention next. An easy way of determining the positions is by measurement.

The focal length of the lens being known, you have only to double its value to give you the distance of the anterior and posterior foci that are before and behind the lens, to copy a picture to the size of the original. In that case, a lens of 8-inch focus will require the easel with the sensitized paper to be usually sixteen inches distant from it in front, as well as the negative sixteen inches, or the same distance at the back.

To find the distance that the easel must be placed from the lens, assuming that the magnitude to which it is desired to enlarge is known, it is only necessary to multiply the number of times of enlargement by the focal length, *adding* the number of inches of the focal length. Thus the distance with a lens of 6-inch focus, to enlarge six times will be six times six, adding six—the number of inches of the focal length—making a total of forty-two inches.

In the same manner can the focal distance between the lens and the negative be found. In this case, divide the focal length of the lens by the number of times you wish to enlarge or reduce, adding to this the focal length again. Thus, a lens of six-inch focus enlarging the negative six times, requires that distance to be seven inches: six divided by six makes one, and adding six inches makes seven. For those who do not want to make even that easy calculation, I may mention that it may be done approximately, focussing sharply afterwards. This accomplished, an old lens cap cut out in the centre, with a piece of yellow glass inserted, will permit of the easy adjustment of the sensitized surface by cutting off all but the yellow rays, which are of course non-actinic.

Rather than risking the waste of a large piece of bromide paper, a trial exposure should be made. An easy method of doing this is to pass a long strip of the sensitive paper—cut from the large sheets, which are always larger than necessary—through two pieces of brown paper fastened at the sides. A large round or square hole exposing part of the bromide paper must be left in the centre. The length of the exposure having been marked on it with pencil, it is drawn downwards a few inches, which will of course place another portion of bromide paper in position. Thus any number of exposures may be made, and afterwards developed together; the one correctly timed can be imitated when making the real enlargement. This paper must be placed where the greatest contrast happens to be.

Should the enlargement require vignetting, it is important to employ a contrivance such as a pendulum, but preferably a machine which admits being moved forward and backwards, so producing the softest effect.

Two rollers—one of which may be the spring end of an inexpensive spring blind roller with a circular band stretched over, from which the vignette paper hangs suspended—will answer well. One pull moves it, say, a couple of feet forward, the exact distance depending upon how much the two rollers are placed apart; releasing the string, it will move back again of its own accord.

Without such an arrangement local vignetting or otherwise dodging the negatives will almost be impossible, and I hold that next to a judicious development, this mode of vignetting for the purpose of reducing harsh contrasts or removing objectionable parts contributes chiefly to eventual success. When exposing, it should be borne in mind that doubling the distance necessitates not doubling but *quadrupling* the time, so that if one second were given at one foot from the source of light, at three feet nine seconds and at six feet thirty-six seconds will be the proper exposure.

Replacing the yellow glass cap on the lens it will now be possible in an emergency case, such as will probably present itself during our demonstration to-night, to develop the enlargement by the aid of that light alone. Dishes for large sized papers can easily be made out of cardboard; with care they last a long time. One of the large strawboards is turned up to the depth of one and a-half or two inches at the edges all round, and the edges are held in position by paper fasteners. Then melt in a common tin or silver pot, a pound or so of wax candles; the wax must be applied hot, previously heating the dish evenly all over. When cooled down, the tray is ready for use. Waterproof glue may also be used. Better dishes may cheaply be constructed by having glass cut to the requisite size, and a wooden frame made by a joiner, which may be cemented with waterproof cement, or even putty. The developer used may either be hydroquinone, pyro. amm., or pyro. soda, or ferrous oxalate, but the latter still holds its own. A saturated solution of oxalate of potash made with one pound of oxalate dissolved in fifty ounces of hot water, with three drams of acetic acid. Another saturated solution of protosulphate of iron made with one pound of the salt dissolved in thirty ounces of hot water, with half a dram of acetic acid, forms a good developer, it being that recommended by the Eastman Company. One ounce of bromide of potassium, dissolved in one quart of water, serves as a restrainer.

In mixing this, 6 oz. of the above oxalate solution, 1 oz. ditto of the iron, and ½ dram of the bromide, it is important to add the iron to the oxalate, as otherwise the iron is precipitated. In practice it will be found that the amount of bromide present in the developer has considerable bearing on the result, an excess being tantamount to underexposure, in comparison with an enlargement which, using a smaller quantity, appears well-exposed. Too little bromide tends to greyish poor looking blacks, and too much to hardness and inky appearance in the shadows.

One half of the quantities recommended by the Eastman Company I think a sufficient quantity. The Eastman paper is prepared with a much slower emulsion than either Morgan and Kidd's or the Ilford brands. Assuming the exposure to be rightly judged, the picture taken on Eastman's paper should quickly appear after the developer has been brought into contact with it, and gain full strength in a very few minutes—that is, when fresh solutions are used. Suspected or just realised over-exposed papers may be treated with solutions which have been repeatedly used.

Acidulated water in the proportion of citric acid $\frac{1}{8}$th of an ounce to a quart of water, or acetic or hydrochloric acid one dram to that quantity, is held in readiness to immediately stop development when desired, but more particularly to prevent the yellow stain which would otherwise occur. Before fixing, wash the acid out of the paper, and fix in four ounces of hyposulphite of soda to a quart of water.

That the fixing bath must be quite clean and freshly prepared stands to reason, as the purity of the whites is otherwise endangered.

Twenty minutes' washing under a tap, or a couple of hours' immersion in repeated changes of water, completes the process, all but mounting. Large prints are generally dried, suspended from two or three paper clips, and mounted whilst dry ; but mounting may also be proceeded with while the prints are in a wet state. I purposely dwell upon this part of the process specially because it often constitutes a real difficulty with the amateur. I moisten the back and front of the cardboard, the former to prevent it from curling, the latter to make it take more kindly to the mountant. The print is then laid on its surface, and the surplus water absorbed with a sponge or cloth, after which the back of the print is well starched over with the paste not too thin, and quite free from lumps, dexterously applied, remembering the edges, which must receive special applications. It is now quickly transferred to its cardboard support, whilst the palm of the hand, slightly wetted, is used to expel air-bubbles ; the greatest care must, however, be exercised, or else the gelatine film is sure to get damaged. Dry mounting prevents the difficulties of a tendency to curl at the edges, and if not rapidly starched, the paper expands unequally. These large prints have also a provoking way of ruffling the operator's equanimity of mind, by playing tricks, dodging about, and messing the front. To prevent this they want keeping down firmly whilst being starched. An india-rubber mounting roller is a useful little instrument to flatten the surface, if the palm of the hand is thought too delicate. It is also important to pass the print several times over a ruler or some such appliance to keep it flat.

NEW EIKONOGEN.—E. Vogel writes in the *Mittheilungen* that eikonogen is now produced and supplied in large crystals, this warranting a clearer and more permanent product. As he has found by experiments, the new material gives excellent results with gelatine plates as well as with gelatino-bromide paper, and the solutions prepared with it seem to keep for a longer period than the solutions prepared with the older uncrystallized material. To accelerate the dissolution, the crystals are previously to be powdered. The resulting powder is of a pure white colour.

EIKONOGEN DEVELOPER, AS RECOMMENDED BY T. F. SCHIPPANG AND COMPANY.—1. Eikonogen solution. In an earthenware vessel 300 c.c. of distilled water are boiled, and 30 grammes of pure sodium-sulphite dissolved in it ; the solution is allowed to cool down to about 500 c., and then 10 grammes of eikonogen are added to it. The solution is at once poured into well-stoppered bottles.—2. Concentrated potash solution of 25 per cent. In an earthenware vessel 50 grammes of chem. pure potash are dissolved in 150 c.c. of distilled water, and the solution is poured into a bottle.—3. Diluted potash solutions of $3\frac{1}{3}$ per cent. 10 grammes of the concentrated potash solution are mixed with 90 grammes of distilled water, or 10 grammes of pure potash are dissolved in 300 c.c. of distilled water. For use are mixed :—Rapid developer : 1 part of the concentrated potash developer with 10 parts of the eikonogen solution. Time developer : 1 part of the diluted potash solution, 1 part of the eikonogen solution, 1 part of water. Addition of potassium bromide acts as in the case of pyro developer.

COLOUR BLINDNESS.

IN this month's *Knowledge* are some pictures of the exterior of Lick Observatory, also one of the eye-piece end of the 36-inch equatorial telescope therein, all interesting, and printed from photo-process blocks. In additiou there is, among others, an article by Mr. R. Beynon, on "Colour Blindness," from which the following is an extract :—

Examinations of males and females of all races and ages prove that about 3·5 of the former and 1·5 of the latter are afflicted with colour bliudness. Professor Holmgren, of Upsala, examined 32,165 men, and found 1,019, or 3·16 per cent., colour blind. Of 18,556 men tested by Dr. Joy Jeffries, of Boston, Mass., 764, or 4·11 per cent., were colour blind. The London Committee for investigating the prevalence of colour blindness found 617 colour-blind people, or 4·156 per cent., out of the 14,846 examined by them. Dr. Bickerton, among 3,087 men tested by him, discovered that 105, or 3·40 per cent., were suffering from this visual affliction.

The method of examination in all cases was that recommended by Professor Holmgren. It consists in each individual picking out from a large number of differently coloured wools all those skeins which have in them any tint of the particular test colour placed before him. The large majority of people would pick out to the very last every skein which had any tint of green in it, no matter how delicate ; but a certain number would choose some colour, such as grey, yellow, or red, to match with the green, or they would omit to pick out the greens. In this manner their weakness of colour perception would betray itself to the examiners, who would then proceed to apply, under the same system, still more crucial tests. That colour-blind tests should be absolutely fair to the tested one, it is of the highest importance to distinctly observe the difference between the manner in which the colour-blind *sees* and the manner in which he *names* colours. The sensation is based upon the nature of the sense of colour iu the organisatiou of the optic nerve from birth. The name, on the contrary, is learned. It is purely conventional, and depends upon exercise and habit. The names of colours are naturally the objective expression of subjective sensatious. They are regulated by the system of the normal sight, and cannot, consequently, agree with that of the colour-blind. They can, nevertheless, be learned by the latter, and even applied correctly in many cases. It is no doubt under this veil that many colour-blind subjects unconsciously conceal their infirmity from themselves and their most intimate friends. Hardly any limit can be set to their capacity for learning other attributes of coloured objects, and of recognising and remembering their colour names through these alone. Thus they deceive themselves that they have gained by *practice* a colour perception they were not born with. Persons afflicted with colour blindness have been known to succeed as landscape and portrait painters ; but then their colours must either be marked or chosen for them, or detection of their failing may ensue. A student of the Royal Academy who was selected, not only by the authorities, but also by his fellow-students, as having the best perceptiou for form and power of light and shade, turned to the use of colours. In this branch of his art it was naturally supposed that he would also exhibit talent. He was allowed to take a portrait by Titian from the National Gallery, and have it iu a small room by himself. There he copied it to the best of his ability, and, as he stated to the Principal and his brother students, no one visited him while he was at his work. His result was the most perfect copy, as far as light and shade went, but all shades of green had been used.

The consensus of medical opiuion goes to prove that colour blindness is congenital and hereditary. Children born with it do not grow out of it as they rise iu years, nor can the defect be palliated by any practice with colours. It has been shown that this visual defect is subject to the general laws that govern the transmission of hereditary disease from one generation to another

PHOTO-ETCHING IN INDIA.*

The following is a description of the heliogravure process now worked in the Indian photographic office under Colonel Waterhouse. It is a modification of that used in the Military Geographical Institute at Vienna, and has been successfully worked out by Mr. A. W. Turner under Colonel Waterhouse's superintendence.

Original Negatives.—These should be unreversed, of good quality, clear, bright, and not too dense. For half-tone work, a good silver-printing negative will generally give good results. For line-work, the negative need not be so dense as for photo-lithography, but should be clear and bright, and show the finest lines well. As the process possesses more power of bringing out faint lines than does photo-zincography, it is better as a rule to intensify with pyrogallic acid and silver, rather than with the usual intensifier used for negatives of maps. In order to secure clean borders on the copper-plate, the subject must be masked out on the negative with thin opaque paper or black varnish.

The Transparency.—As a *negative* image is required on the copper, a *reversed* transparency must be prepared from the negative, and the simplest way of doing this is by means of the Autotype special transparency tissue developed upon a glass plate by the ordinary Autotype pigment printing process. When subjects have to be enlarged or reduced, the transparencies are best obtained in the camera on gelatine dry plates, but should not be too dense; care must also be taken that they are properly reversed, so as to produce a negative image on the copper-plate. Looked at from the film side, the image should be reversed just as it is on the negative.

Transparencies can also be obtained with the ordinary Autotype Standard Brown or other tissues, and this method is particularly suitable for dense negatives, which would take a long time to print, and give heavy shadows. Formerly such transparencies were intensified with permanganate of potash, but this is not now found necessary. The transparencies obtained with the special transparency tissue do not require intensifying, even for line subjects. The exposure under the negative varies, but from twenty to thirty minutes is usually sufficient for half-tone subjects, and for line subjects about two minutes in the sun. The transparency should be clear and bright in the lights, and not too dense in the shadows. Held at a short distance from a sheet of white paper, the effect should be very much as desired in the finished print, because the etched images reproduce very closely the characteristics of the transparency. Before being printed from, a mask of the size the finished picture is desired to be should be cut out of thin, semi-transparent paper, and applied on the back of the transparency, so as to provide a "safe edge," to prevent the picture washing up on development.

The Copper-plates.—These should be of the usual thickness, as prepared for the use of engravers, and of the best copper, free from holes, flaws, or surface markings, which will assuredly be brought out in the subsequent operations of steel-facing, and spoil the effect of the prints. They must be finely polished by rubbing with oil and fine tripoli or flour-emery, finishing up with powdered chalk applied with a felt pad. They then have to receive a fine, resinous grain, in order to hold the gelatine film during the after-process of etching, and also to break up the etched parts of the surface of the copper irregularly, so as to give them the necessary holding power to retain the ink during the printing. We have found that the best substance for this purpose is very finely powdered bitumen, though powdered rosin, or a mixture of the two, may also be used. The powdered bitumen is placed in a large box, which is best mounted on pivots, so that it can be turned over to allow the dust to fall from one side to the other; or, if the box is not so mounted, the powder can be blown up with a bellows or stirred up in any way, so as to produce a cloud of fine dust inside the box. As soon as the coarser particles have subsided, the plate is placed near the bottom of the box, and left for five or ten minutes till a sufficient quantity of the dust has been deposited upon it. A more even grain is obtained for fine work by allowing the dust to settle longer—for two minutes—and repeating the operation two or three times, so as to have a large quantity of very fine dust. For half-tone subjects more grain is required than for line, and dark, heavy subjects require a stronger grain than light and fine ones. Some experience is necessary to know the proper amount. The loose deposit of bitumen has next to be fixed to the plate. Formerly this was done by exposing the plates for a few seconds to the fumes of benzole or oil of lavender, but Mr. Turner has found it better to do it by heat, the plate being moved about for a short time over a dish containing a little flaming spirit of wine. A heater warmed by gas would, however, be better. It is an advantage to allow the plates to cool spontaneously after this operation. The plates are then ready to receive the negative transfer print from the transparency.

The Negative Pigment Print.—The tissue that has been found to answer best for producing the negative image in gelatine on the copper-plate is the Autotype Company's Standard Brown, No. 100. The tissue is sensitised by immersion for one to four minutes, according to the season of the year, in a solution of—

Bichromate of potash	... ...	30 parts
Spirit of wine...	... ...	150 ,,
Ammonia	... ...	4 ,,
Water ...	... ...	700 ,,

It is squeezed down upon a glass plate prepared with French chalk, fanned for about half an hour, placed in a box containing chloride of calcium, and left to dry. It has been found advantageous in the cold weather to leave the tissue for a few days in the chloride of calcium box before use.

The sensitised tissue is cut carefully square to the size required, and laid in its place over the masked transparency in an ordinary printing frame, and exposed to the sun or diffused light for a sufficient time to produce a thin bright image when developed on the copper-plate.

Development.—The copper-plate bearing the dust grain is placed in a dish of cold water—in hot weather ice must be used to lower the temperature to at least 60°—and the exposed tissue is immersed in the water, quickly arranged in its place on the copper-plate, and withdrawn with the latter as soon as possible, and squeezed down upon it. In the cold weather the tissue should be allowed to soak in the water for about two minutes, and more time can be taken in placing it in position on the plate. The plate with the tissue is left for a time, and then developed in the usual way with warm water. It is better to slightly over-expose and reduce the image, if necessary, by the addition of a small quantity of bicarbonate of soda in the warm water. It is very important that the image should be thoroughly developed and free of any soluble gelatine. The image being negative—*i.e.*, the lights of the picture being represented by varying thicknesses of gelatine, and

* From the Annual General Report of the Survey of India Department, 1887-88, just issued.

the shadows by more or less clear copper—some care is required in development, and this should be conducted slowly with water at a moderate temperature.

After development, the plate is flowed with a five per cent. solution of alum, and dried off with spirit of wine. This clears up the shadows and gives a sharper and crisper image than is obtainable by drying spontaneously. It is well to begin with a weak spirit, containing about equal parts of spirit and water, flowing it over the plate from one corner, so as to drive before it the water in the film, together with the insoluble scum which the spirit forms with any loose soluble gelatine remaining on the surface, and which must be removed with care to avoid markings on the surface. After treatment with stronger spirit till all moisture is removed, the plate may be set aside to dry, but in hot weather it should be finally flooded with a solution of one part of glycerine in twenty parts of spirit of wine, in order to prevent the splitting off of the film on drying.

The plate is now ready for etching. The borders all round the picture, as well as the back of the plate, are painted with a varnish containing twenty per cent. of bitumen dissolved in benzole, and left to dry thoroughly.

For etching, solutions of perchloride of iron are used in five different strengths, as shown in the table below :—

No.	Strength on Baumé's scale.	Sp. Gr. at 63° 5 Fah.	Approximate percentage of $Fe^2 Cl^6$.
I.	45°	1,444	47
II.	40°	1,375	41
III.	38°	1,349	38
IV.	35°	1,313	35
V.	27°	1,225	27

A stronger solution, at 48° Baumé, has also been tried, but has no penetrating power through even the thinnest film of gelatine.

The solutions are laid out in a series of flat dishes, into which the plate to be etched is immersed in order, beginning with the strongest (No. 1). For line work, as a rule, only Nos. I. and II. are used, the plate being left in No. I. for about two minutes, and then removed to No. II. for another three minutes.

For half-tone work the plate is immersed in No. I., and not left more than one minute after the copper is first attacked ; it is then transferred to No. II., and allowed to remain for three or four minutes, it is then passed into No. III., and remains for two minutes ; to No. IV. for one minute ; and, finally, to No. V., where it remains about a minute, till the highest lights are just about to be attacked. The use of the different strengths of perchloride and the time the plates should be exposed to them are matters which depend on the nature of the film, the temperature, and the hygrometric state of the weather at the time, and must be learnt by practice. A very good guide for the time the plate should remain in each solution is till the action of the perchloride appears to stop; it is then time to transfer it to a weaker solution, or a distinct line will be shown, and result in a hard black and white picture. With the Autotype standard brown tissue there is no difficulty in following the progress of the etching in its different stages. The whole operation is usually completed in from five to ten minutes, and should be stopped as soon as it is seen that the high lights are sufficiently bitten. In dry, cold, weather it has been found that the gelatine has less resisting power than it has in the warmer months, when there is more moisture in the air. Stronger solutions are therefore required as the weather becomes drier and colder.

As soon as the plate is considered sufficiently bitten, it is washed under the tap with a strong current of water, so as to drive out the perchloride of iron as quickly as possible ; the gelatine film is then gently removed by rubbing with a muslin or cotton rag. The plate having been dried, the asphaltum varnish is carefully washed off the face and back with benzine. The face of the plate is rubbed over with a little whiting and ammonia, dried and polished off with a little spirit of wine. The plate should now show a fine smooth polish on the highest lights, with a gradually increasing depth of biting throught the lights to the shadows, and a fine clear grain throughout.

Obtained as above described, the plates now require no re-biting, and very little touching up beyond oil-rubbing and cleaning.

The lettering for half-tone plates is usually done by hand, but recently we have adopted a method of lettering the transparencies by printing from type on slips of thin collodionised gelatine, which are cut and fastened in their proper places on the transparency. In order to make the printing more opaque, it is dusted over with red bronze powder, which adheres to the freshly printed letters, and gives them great opacity. Facsimile names and writing or printing on thin paper can also be inserted by coating the plate with sensitive asphaltum solution, and exposing it to light under the writing, &c., then developing with turpentine or benzine, and etching with perchloride of iron. Flat or shaded tints can also be inserted on the plates by applying and fixing the dust grain, then stopping out on the plate all but the parts required to be tinted, and etching with solution of perchloride of iron at 20° Baumé. This satisfactorily takes the place of machine-ruling on architectural drawings, and is much less trouble. In skilled hands a variety of effects could be produced by the combination of photo and hand-etching.

After lettering and touching up, the plates are carefully steel-faced and are ready for printing. They require very careful inking and wiping off, and a good pressure in printing to avoid streaks or woolliness. The native printers soon learn the work, and with due care the proportion of spoiled prints is small—much more so than with collotype.

THE *Beacon*, issued monthly by the Beacon Publishing Company, Tribune Building, Chicago, U.S.A., is an excellent photographic periodical.

LENS IMAGES MADE VISIBLE BY ELECTRIC CURRENT.—In the *Photographisches Archiv* Herr R. E. Liesegang, son of Dr. Liesegang, of Dusseldorf, describes an apparatus with which it is possible to render lens images visible at an indefinite distance from the original object by means of the electric current. The instrument is based on the well-known principle that an electric current is produced by light-waves. If light strikes upon one or two platinum, silver, or copper plates, which are arranged in the form of a galvanic element, this gives rise to an electric current. If the exposed plate consists of a large number of insulated metal wires of small diameter, lying very closely together, and if some of these wires are exposed, others not, then, of course, the electric current is produced only in these exposed wires. If the wires are conducted to another analogously constructed plate, which may be placed at any distance from the first one, then the electric current will also here be produced only at the parts correspondent with the exposed wires of the first plate. By coating the second plate with any substance which by galvanic decomposition undergoes a visible change, exposed parts of the second plate can be easily distinguished from the unexposed ones. If, therefore, an image is projected by means of a lens upon the first plate, the same image will be obtained on the second plate.

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PHOTOGRAPHY AS AN AID IN ANATOMICAL, HISTOLOGICAL, AND EMBRYOLOGICAL WORK.*

BY PROFESSOR ALEC. FRASER, M.B.

All morphologists will agree that the labour involved in illustrating their work properly is very great, and that any aid that would lessen this would be gladly welcomed by all, especially when that aid can illustrate in a manner with which they cannot hope to compete, however skilful their pencils may be.

In my own experience I soon found that the camera lucida was totally inadequate to illustrate in a reasonable time all the work which lay on my hands; while in adult anatomical work one's own hand, or even that of the skilled artist, could never reproduce with the same finish and accuracy what I am now able to accomplish with but little trouble.

In adopting the photographic method, then, I had two ends in view: the first was to reproduce the entire structure of the several divisions of the body, life-size; while the object of the second was to produce enlargements of my serial, histological, and embryological sections for purposes of reconstruction.

For the attainment of the first end, I had to employ a very large apparatus, arranged to work vertically, with a rapid rectilinear lens of long focus, so as to give me proper working distance to reproduce natural size; while by the correct use of diaphragms (down even to pin-hole ones) I was able to travel, dissection after dissection, through the particular division of the body at which I was working, without ever shifting the apparatus or the preparation; while by numerous combinations, all taken direct from nature as I went along, I practically made that particular division transparent.

For the attainment of the second end, I had to use an enlarging apparatus, with a rapid rectilinear lens of short focus and the oxyhydrogen light. In addition, I had special carriers made, holding twelve slides of the Leipsic or eighteen of the English form at one time, so that I could make twelve or eighteen exposures without further trouble than simply pushing the carrier along the breadth of a slide and changing the sensitive paper; each exposure using the Eastman bromide paper at full aperture of the lens lasting only four seconds.

In this manner, then, I could run through the serial sections of a small adult rodent's brain, or serial sections of embryoes, in a few minutes, enlarging up at one operation all the sections under a cover-glass measuring 40 by 30 mm., these being often 100 in number.

The ease and celerity with which this can be done, and the beauty of the enlargements, have to be seen to be appreciated; whilst the every-day aid that the method can yield both in teaching and original work will soon lead to its more general adoption.

The single and double prism spectroscopes pictured in these pages last week, in Mr. W. K. Burton's article on "Photograpic Optics" were those constructed by the well-known optician, Mr. John Browning.

Preserving Mounting Solutions.—An excellent means of preventing the formation of mould in such mounting solutions as those of gum, gelatine, strong glue, starch, arrowroot, and white of egg, is the addition of a little quinine. Ten centigrammes of sulphate of quinine are amply sufficient for 100 grammes of solution. In the Indies this method is used for preserving solutions of gum arabic, and not alone does it not ferment or go mouldy, but ants and other insects will touch it no more.—*L'Amateur Photographe.*

* Read before Section A, British Association.

ON THE FADING OF SILVER PRINTS, AND ITS CAUSE.

BY C. BRANGWIN BARNES.

That silver prints do fade is a fact that defies contradiction, and, although the silver printing process has been in use for many years, and the fact that the results produced thereby are evanescent has been known and acknowledged from the infancy of the process, it does certainly seem strange that to-day, in the year of grace eighteen hundred and eighty-nine, we are as far off from a solution of the difficulty as we, or our predecessors, were in eighteen hundred and fifty-nine. As I write, I have before me two silver prints on albumenized paper which were produced in 1858, and, strange to say, they are in a far better state of preservation than many I have seen which have only been produced for some eighteen months or two years. The prints in question, which have survived for thirty-one years with only a slight yellowing of the paper, were mounted in a scrap-book at the time of production, and have recently been framed. The question that has often struck me when looking at them is, "Why should these prints stand for so long, whilst others produced by the self same process—and in the production of which far greater care has been taken to ensure permanence—have long since disappeared from the paper?"

Insufficient washing has been most generally fixed upon as the main cause of fading, but in the days when these two prints were produced, all the washing they were likely to get was as a mere rinse in comparison to that which is given to the prints of the present day. Our modern washing troughs, with a central spray keeping the prints in constant motion, were in those days undreamt of, and an all night's washing in a shallow dish with the water just dripping into it from the tap was considered ample. If we take an ordinary every-day batch of prints as produced by any professional photographer of to-day, and test them after washing, we should in very few cases find the slightest trace of soda left in them. Difficult as it may be to eliminate hyposulphite of soda from paper, it is nevertheless a fact, that with the present system of washing we do eliminate it, and such being the case I would maintain that the theory that insufficient washing is the main cause of fading is an exploded one, and has, metaphorically speaking, not a leg left to stand upon.

The next theory upon which I would touch is that which declares that in "ninety cases out of a hundred the cause of fading can be traced to deleterious mounts." I think I have correctly quoted the proportion, and will candidly admit that bad mounts do undoubtedly cause fading in some instances, although in my opinion the case is very much overstated. The fact remains that the prints fade, and some one must bear the blame, so why not put it down to the mount-maker's account? There has been so much outcry of late about bad mounts that it has become the fashion to join in with the popular idea; in fact, it is merely a realization of the old adage, "Give a dog a bad name," &c. I have seen cases where fading has undoubtedly been due to the mounts, but these cases I will frankly own, in justice to the mount makers, have been few and far between, and have been owing not to the mounting-board itself, but to the pigment used in colouring the outer paper of the board. The prints I have mentioned are mounted on paper which was necessarily manufactured before the question of the purity of mounts ever arose

A third party is very strongly of opinion that the mountant is mainly to blame for the deterioration of silver prints, but I do not think this case has ever been thoroughly made out. It may be, and undoubtedly is, a fact that sour starch, if used to mount a print, would cause such print to fade, but the cause would be very evident, as the fading would show the lines of the brush with which the mountant was put on, and no photographer with any care for his reputation would allow stale starch to be used in his establishment.

Then, again, we are told that blood albumen is the main cause of fading; but the partisans of this theory forget that photographs printed on paper which is undoubtedly prepared with egg albumen fade just as often and just as quickly as those on paper made from blood or doubtful albumen. That each and every one of these causes may be in a minor degree the cause of fading I am open to admit; *but*—oh! that little but—when we take into consideration the fact that nearly all silver prints do fade, and that notwithstanding the fact that every possible precaution is taken to avoid their so doing from any one of these reasons, I think we must look elsewhere for the main cause.

I have carefully examined hundreds of specimens of faded and fading prints in the hopes of discovering the root of the evil, and for the benefit of not only myself, but the profession at large. I believe I am in a position to state that I have discovered the *bête noir* of the photographer, in the person of an old friend, and the name of that friend is *Albumen*. I have never yet seen, and never expect to see, a faded print on salted paper, and yet forsooth they are as much silver prints as those on albumenized paper; they have to undergo the same processes of toning, fixing, washing and mounting, and if the cause of fading be in either of these, why should the one not fade as quickly as the other?

In furtherance of my contention I would ask any photographer to look amongst any collection of old photographs, faded and fading, and he will find that the higher the albumen surface the more quickly the print produced thereon shows signs of fading. The two prints which I mentioned at the commencement of the present paper, and which have stood for so long, are upon albumen paper, it is true, but the albumen paper of thirty years ago was not as that of to-day. The albumen then was only employed to avoid the grain of the plain paper, and was used very sparingly, and, what is more, it was thoroughly coagulated by floating on a nitrate of silver bath of from 80 to 100 instead of as at present one of half that strength. If we could thoroughly coagulate, and change the nature of albumen, we should undoubtedly increase the permanence of the prints produced upon it, and I consider that my two prints, in common with many others of the same age, which have stood the test of time so well, go to prove this fact. If we look through our own collection we shall soon find an additional argument in favour of my contention, as prints of upwards of twenty years of age are in nearly every case in a better state of preservation than those of from four to ten years old.

Perhaps some one will say he can produce a print on plain salted paper that has faded; if so I should much like to see it. I have seen some in which the paper itself has assumed a yellowish tinge, but that is merely the sign of age, and not of the fading of the photograph. An engraving is not said to be faded when the paper on which it is printed discolours, and such discolouration is no more deserving of the title of fading, if so much so, as is the discolouration to be seen in carbon prints. I have no doubt that in making such an assertion I shall bring the manufacturers of albumenized paper about my ears; but I would ask them, if they contradict my statement, to adduce their proofs of its incorrectness. I am quite aware that they cannot produce a print of like age to mine on highly albumenized paper; but if any one, either maker of paper or consumer of the same, can produce a print on really highly albumenized paper, either mounted or unmounted, say ten or twelve years old, which does not show signs of fading, and not only of fading, but of deterioration in the albumen itself, I will admit that there may still be a chance for albumen. I am, however, confident that such a picture cannot be produced, and would be pleased to hear the opinions of other practical photographers on the subject.

Of course, the question arises, "If albumenized paper is the cause of the fading of silver prints, what are we to do in the future? The public have got so used to the surface of the albumen print, that they will not be content with a plain one." This may be so, but I think I see a glimmer of light on the subject in the fact that the platinotype is rapidly coming to the front, and with the platinotype the plain or matt surface.

PHOTOGRAPHIC COMPETITION.

Mr. W. P. Cogan says:— "Photographically, Ohmaha, U.S., is about the worst town I have ever seen. There are no amateurs there; they are all professionals (?), and one looks in vain for a photographer that follows the art for the love of it. They are all on the make, and money is the object. The 'rush and spoil' method seems to prevail here. The highest ambition of the average photographer is to get a *big box* and a *big lens*. No matter about the quality, quantity is what he wants. In the matter of work, people seem to want quantity also, until photograpy is about as cheap a thing as there is in the market. One finds little photographic literature here, and rarely does one find a photographic journal in the hands of a photographer. The few who do read photographic literature are the ones who are prospering and progressing in the art. As a consequence of the town being much advertised as enterprising, the tramp photographers think it their duty to come here in unlimited numbers, and, consequently, the people have had a surfeit of them. About two weeks ago I saw two young men working a street in the usual way, going from store to store and getting the attention of the people while they made an exposure. I saw that they scarcely got a half-dozen people in each block to take interest enough in it to step outside. They did not waste much time nor plates, but did their work expeditiously. I asked the operator, who appeared to be a bright, intelligent fellow, who understood his work, how he found the business here. He said, 'I have been at the business for some years, and I have never seen anything like it. The town is worked to death; and the last fellows who worked it just bulldozed the people.' To the travelling photographer who sees this it ought to serve as a warning to steer clear of Omaha."

The annual general meeting of the Photographic Club will be held on November 6th.

A New Battery Liquid.—Mr. J. Wilson Swan read a paper before Section A of the British Association, on "Chromic Acid as a Deplorarizer in Bunsen's Battery." When chromic acid became an article of commerce at a moderate price, it occurred to the author to see if he could not obtain a substitute for the nitric acid of the Bunsen battery. As the result of his experiments he finds that a solution, of the composition nitric acid 1 part, chromic acid 2 parts, sulphuric acid 5 parts, and water 5 parts, gives results equal to that obtained with nitric acid.

THE DRIFT OF AMATEUR PHOTOGRAPHY.

IN looking back over the results of amateur photographic work during the past four or five years, we cannot help thinking that an immense amount of time and material have been used up in finding the true scope and field for this development of our art. Yet we believe all this labour and material have been necessary to bring into existence a class of workers who are destined to have a very important effect upon the future of photography. These amateurs have had a most important influence upon every department of industry that has for its aim the supply of the materials and apparatus designed to facilitate photographic progress.

In former years the camera and its appurtenances were clumsy affairs, seemingly designed to furnish the amateur photographer with a complicated system of mechanical devices that required a course of instruction in machinery in order to manipulate them with any degree of certainty. To-day the camera box is much simpler, and the better class of instruments are so constructed that the minimum amount of intelligence only is needed to use them. Dry plates and printing papers are now so well made, and so easily manipulated, that almost anyone can obtain negatives and positives without any very large expenditure of brain power or time.

With the simplification of methods has come an increase in the numbers of those who practise photography as an amusement or hobby. As a collateral to this increase in the number of workers, we have had to witness a large amount of aimless work. Of any given number of amateur workers, how few there are who use the art with any definite object in view! Thousands of negatives are taken every week, and among them how few can be called pictures, how few have any story to tell, or any important object to carry down into the future! It is true there is a tendency in certain quarters, among a few of the societies, to give a direction to this kind of work, and we hail with joy this first evidence of a desire to give photography a standing among the arts that shall make it valuable to mankind.

There are hundreds of ways in which our beautiful art can be made to serve as a helpmate and handmaiden to the other arts and sciences. It is not our purpose to give a catalogue of these, but a few suggest themselves. The study of various trades and industries peculiar to this age, by making good pictures of the workers at their tasks, would give a series of records that may go down to the future with profit, and as the years roll by their value will become enhanced according to the care and faithfulness with which the camera shall secure them. The incidents of our home life, the dinner table and those around it, the library, the parlour, and, more interesting than all, the children at home and at school, would all give pictures that those who come after us will value more than we do; for it is too true that in the development of this great country little regard has been paid to old things, and only now we are beginning to realise that they have their value.

In the sciences also there is a vast amount of good work to do. The botanist needs better photographs of flowers and trees and shrubs, which, by the use of orthochromatic plates, can now be obtained far more faithful to nature than heretofore, the ordinary dry plate giving results that are positively untruthful to nature in the matter of lights and shades. The zoologist also has much need of good pictures of the animals, birds, and fishes in his museums, and also those that are seen in their native haunts. What better work could an amateur photographer set for a task than a record of many of our beautiful flowers, especially the wild ones that cover our hillsides and woods in the early spring? What better and more interesting work could be found for his camera and dry plates than the pictures of our fishes fresh from their native element? Indeed, under certain circumstances, the fish could be caught with the camera as he suns himself in the crystal stream. Birds and their nests, butterflies, moths, and other insects, curious and interesting to all who love nature, could each be made a *motif* for amateur photographic work.

Again, we need not confine our attention to animated nature. Look upon the hills, the rocky cliffs, the stratified escarpments that are to be seen in rambling through almost any section of the country. These all have some story to tell for the geologist, and would be admirable subjects for the camera.

The historian also needs many pictures for his records that photography, and photography alone, is fully competent to make for him. These pictures will be faithfully presented, and are not likely to be distorted as by the pencil or brush in human hands. Old homesteads, old landmarks, old houses that soon pass away in the tendency for modern improvements, should all be secured upon the photographic plate.

But we have said enough suggestive of subjects for the amateur's camera. We are sure hundreds of others will present themselves to those who are looking for an aim or drift for their photographic work. We are glad to notice this tendency of amateur workers, this desire to use our art with the object of making it tell upon the records of the country's history. The very beautiful series of pictures illustrating our great cities, first inaugurated by the Boston Camera Club, is a step in this direction. We hear also of the work of photographing our native trees in classes, which was begun by Dr. N. L. Britton, of Columbia College, several years ago.

Altogether there is a strong feeling among amateurs that they must specialise their work. The time has come when the recruiting of their ranks is not so much an object as the direction of the labours of the good workers among them. The recruits are no longer raw, but most of them are fitted to accomplish work that shall tell in the development of photography, and at the same time place it upon a better footing among the sciences.—*Anthony's Photographic Bulletin.*

LUMINOUS prints have been made, but we have not heard of luminous transparencies. A waste plate, fixed out, should be coated with Balmain's luminous paint, and used as a cover for a window transparency, instead of plain glass. The effect is good, both by day and night.—*Photographic Scraps.*

VIEWS FROM SOUTH AMERICA.—Our amateur friend, Mr. Guillermo Rodriguez, of Guatemala, South America, has favoured us with some wonderfully beautiful 8 by 10 views of the scenery on his estate. Senor Rodriguez became so infatuated with photography that he went to San Francisco to perfect himself, that he might have the pleasure of succeeding in his leisure hours. His business time is devoted to the cultivation of the chocolate tree. Some of the views of groves of these trees, and the profuse vegetation of the southern country, are very fine indeed. The most picturesque of the collection we consider is one which represents a negro in a cocoanut tree cutting down the bunches of the rich fruitage, while another is lowering the same to the ground with a rope. At the foot of the tree a number of the natives are engaged in opening the nuts and drinking the milk—a favourite diversion there. There are seven views in all.—*Wilson's Photographic Magazine.*

Notes.

There will be another Crystal Palace Photographic Exhibition next spring. These exhibitions have demonstrated that a large amount of space is necessary to permit full justice to be done to the public display of photographic apparatus.

The *Tablet* has favoured its readers with a grim photographic story which it declares "a well-known photographer will vouch for." The "facts" are these. The photographer had to photograph the corpse of a young girl, and during the ten minutes required for the exposure walked up and down the adjoining corridor. When he returned he noticed that a flower, which had before been between the hands of the corpse, was now resting on the coffin, which was on the floor by the side of the bed. Dismissing whatever thoughts the circumstance may have caused in his mind, he busied himself with packing up his instrument, but before completing his operations it occurred to him that he would take a second picture, and did so. On developing the two negatives he found that the position of the corpse was not the same in each; to use the "shilling thriller" words of the *Tablet*, "there were the two negatives before him, in their silent, unmistakable truthfulness, proving that between the taking of the two photographs the arm of the dead girl had distinctly moved. The mystery of the flower on the coffin was solved, but it was succeeded by a mystery more terrible still."

The story undeniably excites our curiosity, and we look to the "well-known photographer" to disclose his name as soon as possible, because there are a few points on which greater exactness would be desirable. As no mention is made of any indication of movement in the first negative, the falling of the flower must have taken place either at the very beginning or at the very end of the exposure. If the first were the case, no flower would be visible on the negative. We are not told whether this was the fact. If the flower did fall a quarter, mid-way, or at three-fourths of the exposure, the "silent unmistakable truthfulness" of the negative would have revealed the fact, for the outlines of death are so rigidly defined by photography that the least change is perceptible. The *Tablet* says that the arm of the corpse had distinctly moved between the two operations. What was the photographer doing that he did not keep watch after having his suspicions excited? Lastly, as he had "busied himself in packing up his instrument," is he sure he replaced it in exactly its first position? We do not desire to throw any doubt on the veracity of the well-known photographer, but should like him to tell the story in his own words.

Photographers are probably not quite alive to the importance of the quality of the glass in their studios. Some interesting experiments undertaken by Herr Herzberg, with the co-operation of Herr G. Schultze, chief engineer of the Berlin works of Messrs. F. Siemens, for the purpose of ascertaining the loss of light in passing through window-glass, reveal some curious results. Simple translucent, but not transparent, glass showed a loss of 27 per cent. of light. Cathedral glass, such as is used in stained-glass work as a basis, being clear but with a slight ground tint, showed a loss of 12⅝ per cent. Plain white Rhenish "double glass" gave a loss of 10 per cent. Plain thin mirror glass obstructed 10 per cent. of light. The two last, together with an interval of six centimetres between them, showed a loss of 21 per cent. Cathedral and Rhenish "double glass," together with the same interval, showed a loss of 23 per cent. A ground glass with cut stars, together with a white background, such as is found in house fan-lights, obstructed 60 per cent. of light. A new, clean piece of ground glass without stars, together with the dusty white glass background, as in the preceding experiment, showed a loss of 40 per cent. Whatever may be lost in regard to clean white glass, which no doubt greatly varies, there cannot be any doubt as to the loss when ground glass is used. Some years ago a taste set in for ground glass, but we fancy that most experienced photographers are now of opinion that it can only be employed with advantage under special circumstances.

It is curious, when the rage for illustrated papers is spreading, and every day the large army of artists, amateurs and professionals, is being added to, that so little has been written on the requirements of photography in relation to the reproduction of drawings. One sees the direction that Bristol board and absolutely black ink must be used, but here instruction begins and ends. It is, therefore, satisfactory to note in the *Art Amateur* (New York) an article on the subject. At the same time, it must be confessed that the writer does not touch what we conceive to be a vital point. The mistake which most amateur artists make is attempting gradation by the colour instead of by the size of the strokes. A light stroke and dark stroke, when photographed and transferred to zinc, will appear to be almost identical; but a thick stroke and a thin stroke will show in their true proportions. We have seen drawings where the shadows in the face represented in the drawing by light but thick strokes, have come out much heavier and coarser than the outline of the face, drawn in the original by a black but thin line.

Another common defect is a want of firmness in the drawing. Without great care the natural action of the acid on the zinc is to produce rottenness, and when the lines are feebly drawn or broken this tendency is intensified. A good many artists now-a-days favour a scratchy style, and a lack of boldness of outline. They attempt what they probably call "suggestiveness," and this is totally unsuited to photo-zincographical reproduction. It is almost impossible to take up an illustrated periodical without being struck by the prevalence of this mannerism. No doubt the woolly, sketchy, hazy style is favoured by feeble artists, as it covers much bad drawing, but this only makes the matter worse.

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PHOTOGRAPHIC OPTICS.

BY W. K. BURTON.

CHAPTER XI.—*(Continued.)*

SOMETIMES quite a number of prisms are used to gain greatly increased dispersion. An arrangement—the invention of the famous optician Browning—for the use of six prisms, is shown in fig. 58; the dotted line shows the direction taken by a ray of monochromatic light. Mention must on no account be omitted of the direct vision spectroscope, as this is a little instrument particularly useful to photographers.



Fig. 58.

By referring to what has been said in Chapter III. on the means of correcting chromatic aberration, and considering how we may *bend* a ray of light without *dispersing* it, it will readily be understood that, by a modification of the same arrangement, we may *disperse* a ray of light without *bending* it. By so doing, we may have a spectroscope with the collimating tube and the eyepiece in a straight line, in place of at an angle with each other. Only a limited amount of dispersion is, of course, permissible with this arrangement, or the spectrum would pass beyond the field of view.

The next two cuts, figures 59 and 60, show the arrangement of prisms for dispersing a beam of light without deflecting it. In each case the darker shaded prisms are of flint, the lighter of crown glass.



Fig. 59.

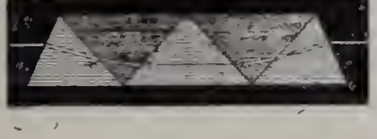


Fig. 60.

The chief use of the direct vision spectroscope to photographers is in examination of mediums for dark room illumination. Most photographic work is done by light of short wave lengths—blue, violet, &c. Sensitive films are, therefore, most easily worked in light of long wave lengths—red, yellow, &c. Colours that appear to the eye quite simple are often in reality compound. Thus, there are two kinds of red glass, to the eye as like each other as can be, but one of which transmits only red light and, perhaps, a very little green, whilst the other transmits a considerable amount of blue or purple also. The latter, it will be evident, is quite unsuited to dark room illumination. The two cannot, as has been said, be distinguished by eye, but they can at once when the light passing through them is examined by the spectroscope.

The spectrum extends in both directions beyond what can be seen by the eye, the rays of greater and less refrangibility than those visible to the eye being termed ultra-violet and ultra-red rays. Photography has been particularly useful in mapping these.

There is the objection to the prism spectroscope that the glass of the prisms absorbs—or *stops*—some of the invisible rays. Fortunately a spectrum can be obtained otherwise than by a prism. It can be got by the aid of a "diffraction grating." A diffraction grating is a polished surface—such as speculum metal—ruled with lines so close together that there are many thousands to the inch. This, on account of what is called *interference of light*, gives a very perfect spectrum, none of which is absorbed. The subject of the diffraction grating is rather too complex to treat of in detail here.

A SIMPLE SPECTROSCOPE.

A SPECTROSCOPE without a lens, fig. 1, devised by Mr. Philip Braham, consists of a parallel tube, fig 2, in which the direct vision prisms are placed, and a slit 2½ inches long, adjustable from an eighth of an inch to contact, like a parallel ruler, at a distance from the eye or prism end of over 13 inches. The two bosses on the centre of the taper-tube enable the slit to be placed on its stand horizontally or vertically to the light observed. Rectangular prisms or



Fig. 1.

mirrors can easily be attached outside the slit, and will give comparison spectra. The instrument gives a good solar spectrum, and by covering part with suitable glass or solutions, absorption spectra are seen, and can be compared with other spectra. Any number of prisms can be placed in the small tube, and a single prism used if that tube be bent to the necessary angle.

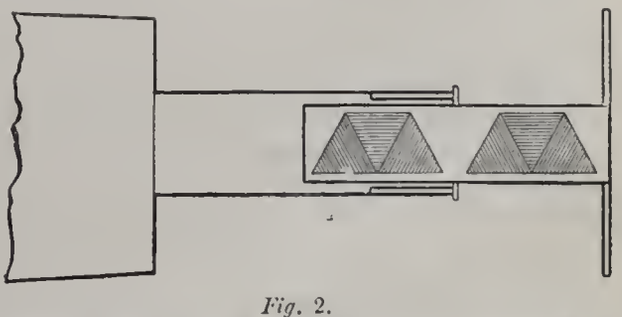


Fig. 2.

The advantage of this construction of spectroscope is its simplicity. The size of the slit enables the observer to introduce as many spectra as he pleases to observe. The dispersive power is under control—low dispersive power with dull light, high with bright light. The slit can easily be cleaned, and the instrument can be used by any amateur observer; it is also inexpensive. Although no lens is used in the instrument, yet the eye acts as one, and throws the spectrum on the retina. The instrument is thirteen or fourteen inches long, that the slit may be at about the distance from the eye of distinct vision.

AN ARTIST'S EYRIE.—Mr. W. L. Wyllie, the well-known marine painter, resides in a sort of eyrie overhanging the Medway near Rochester. The house is on a hill, and on the top of the house is a studio studded with port-holes, in which telescopes swing like miniature guns. With these he sweeps the river, and when anything especially sketchable is going on, the telescope enables him to take it. This plan is, no doubt, of great assistance to the artist, but we cannot help thinking that an instantaneous camera attached to each telescope would assist him still more. To release a drop shutter would in no way interfere with his sketching, and the memorandum thus preserved might at times prove of invaluable service. The pictures, of course, would be small, but enlargement is easy enough.—*The Artist.*

EXPERIMENTS WITH THE PYROCATECHIN DEVELOPER.

BY DR. CARL ARNOLD.

THE hope expressed by me some time ago about a reduction in the price of pyrocatechin, as soon as it can be produced in larger quantities, seems not to be realized, according to information I have received recently from Dr. Schuchardt, of Görlitz. This gentleman, at my request, very kindly had made at his factory a so-called technical —that is, not chemically pure—preparation, which, when tested by me, had almost the same action as the chemically pure preparation; but it cannot be produced for less that 0.8 mark per gram. Further tests proved that at a price difference of only 20 per cent., the preference has by all means to be given to the completely pure preparation, the latter showing after eight weeks in aqueous solution the same action as on the first day, while the so-called technical pyrocatechin, in consequence of the foreign admixtures, loses from day to day its reducing capacity in aqueous solution. While stating in my first article the reducing capacity of the pyrocatechin in comparison with hydroquinone as 15:1, it has now been shown that the reduction capacity is so enormously great, that the price of one mark per gram does not come into consideration at all, as from one hundred to one hundred and fifty plates of 13 by 18 centimetres can be developed with this quantity. The quantity of the carbonate of potassium can also be considerably reduced, if one possesses the necessary patience during development; this is of great importance with many plates, which frill easily in a solution containing 5 per cent of potash. Soda may also be applied in place of potash, but the negatives produced with the same never possess an equal sharpness, and the development proceeds much slower. It appears to me remarkable, that most of the formulæ for hydroquinone and pyro developers contain 8 to 10 per cent of potash, and that there is still no complaint about frilling of the plates. If such quantities of potash are applied with the pyrocatechin, or even a caustic potash solution is added afterwards, plates of very short exposure can also be developed with the same; but I have handled no plates yet—with the exception of the Vergara and celluloid films—which would not frill or wash off the supporting film. For these reasons the new developer cannot be recommended for plates of short exposure, but an accelerating preliminary bath might be discovered soon. An addition of sulphite of soda does not influence the durability of either the technical or pure pyrocatechin; it seems even to exercise a rather retarding influence.

For developing I keep in stock: *a*, a 1 per cent. solution of pyrocatechin; *b*, a 20 per cent. solution of carbonate of potassium. Both solutions keep in the light. Of these I apply for well exposed plates of 18 by 24 cm., 1 c.c. or 16 drops of *a*; 5 to 10 c.c. of *b*; 60 to 80 c.c. ordinary water.

For instantaneous views solution *a* can be increased to 5 c.c. But this is of less importance, as the increase of solution *b* can be increased in this case to 15 or 20 c.c. By a gradual addition of *a* and *b* the development of the picture can, of course, be accelerated or the high lights strengthened.

After my experience with the new developer to the present day, I believe that it will have a great future, and I would advise experimenting with the same. Still, whatever I have asserted relates only to the pure pyrocatechin I have received from the factory of Dr. Th. Schuchardt, of Görlitz. The properties of the new developer are as follows:—

1. The pictures possess a grey, excellent copying tone, and hardly lose in the fixing bath.

2. Formation of fog has never taken place during my experiments.

3. As soon as the negatives are in the developer they lose their sensitiveness to light almost completely. I develop, therefore, after immersion, in gas, kerosene, or candle light, at about one-half meter distance. Even in diffused daylight the development proceeds without any injury.

4. Even at 5 to 6 degrees Celsius no visible slackening of development takes place.

5. Whether exposed for two or thirty seconds, it is without influence upon the result, the development proceeding gradually.

6. The developer does not soil the hands.

7. The price, in consideration of the very small quantity used, is much cheaper than most of the other developers.

8. The simple composition of the developing solution, the easy solubility of its component parts in water, and therefore the possibility of producing highly concentrated solutions, and of measuring these from drop bottles.

9. The convenience of carrying only small quantities of the ingredients; 5 grm. pyrocatechin and 1 kilo. potash are sufficient for more than five hundred developments. Total expense, six marks; therefore for a plate 13 by 18, 1.2 pfennigs.

10. The developer should be used only once, the necessary additions to the old developer being sufficient for the preparation of a new quantity.

11. The developing can be done without motion. The moving of the dish, however, increases the development.

Suitable pyrocatechin forms pure white, scaly crystals, which dissolve colourlessly in water. By letting the solution fall in drops on the liquid containing the potash, a fine green colour will form, which disappears again when the liquids are mixed. The aqueous solution should be coloured only weakly yellow when set aside. Mixed developer will not keep.—*Photographische Mittheilungen.*

IN a paper read before the Academy of Sciences on the "Spectrophotography of the Invisible Parts of the Solar Spectrum," by Ch. V. Zenger, it is stated that a single prism of rock-salt, combined with two prisms of anethole, increase the dispersion ninefold, and the red part of the spectrum is six times more dispersed between A and D than by a prism of rock-salt.

WHAT DO WE SEE?—The old problem has been raised in the *English Mechanic*, "Why do we see objects right side up, when on the retina they are upside down?" One of the correspondents says:—"It appears to me that the most feasible explanation of why we see objects erect is that given by what is called the law of visible direction, by which we judge of the position of objects from the direction in which the rays of light proceeding from them enter our eyes. But if I understand the theory aright, it implies that it is objects themselves that we see, and not the pictures of them on the retina. The following quotation from Leibnitz is, I think, interesting:—'Supposing the sensorium of the soul to be extended . . . the question returns whether the soul be diffused through the whole extension, be it great or small, for more or less in bigness is nothing to the purpose here.' On this view the whole of space might be the sensorium of some being."

PHOTOGRAPHING THE RED END OF THE SPECTRUM.

Mr. F. McClean, M.A., forwards us a copy of his paper in *The Monthly Notices* of the Royal Astronomical Society, entitled "Photographs of the Red End of the Solar Spectrum from the Line (D) to the Line (A) in Seven Sections." The paper was accompanied by photographs representing the red end of the solar spectrum from Fraunhofer line (D) to Fraunhofer line (A).

They comprise just one half of the visible spectrum from the line (H) to the line (A).

"Dr. Rowland's published photographs of the solar spectrum," says the author—"excluding the ultra-violet spectrum beyond the line H—comprise the portion of the spectrum between wave-lengths 3,900 and 5,800 tenth metres (10^{-10} metres). The present photographs comprise from wave-length 5,800 (above D) to wave-length 7,700 (below A), or just as much again.

"The sections, numbered from VII. to XIII., into which the photographs are divided, correspond to the sections of Angström's normal solar spectrum—counting from the section containing (H) towards the red.

"The scale of Section VII.—containing the line D—is the same as the same section of Angström's Chart, but from this onwards the scale increases slightly along with the corresponding increase of the dispersion of the spectroscope employed. The spectroscope employed consists of a Rutherford Grating, ruled 17,296 lines to the inch, and about 1¾-inch square. The grating rotates, and the telescopes are fixed. The dispersion, therefore, increases as the secant of the angle of displacement of the grating from its central position. The increase in the scale of the photographs is about one-tenth from (D) to (A).

"The red spectrum photographed is that of the second order. But besides the principal photographs of the sections of this spectrum, subsidiary photographs are given, showing, in the same sections, both the red spectrum of the second order as before, and also the overlapping, green to violet, spectrum of the third order. These double spectra were taken successively through the upper and lower portions of the same slit, and they serve as tests of the freedom of the red spectrum from the overlapping third order spectrum.

"The positions of the leading divisions of the scale of wave-lengths are taken from Angström's Chart. From (D) to (C) the scale is placed directly on the second order spectrum, while from (C) to (A) the scale is first applied to the subsidiary third order spectrum, and that of the second order spectrum, obtained from it. Since the wave-lengths, at common points of the overlapping spectra, are strictly in the ratio of three to two, these double spectra thus furnish an accurate scale to the obscurer parts of the red spectrum.

"The present photographs are enlarged about 8½ times from the original negatives. It must be remembered that the photographs of the green to violet portion of the third order spectrum, included in the subsidiary photographs, are not given as finished photographs of that portion of the spectrum; they are only given for the special purposes explained above. Their definition has, so far, suffered in the endeavour to obtain the two overlapping spectra on the same photograph. Also, the object-glasses at present employed in the spectroscope fail in bringing to a definite focus the image of the spectrum situated above the line G.

"The principal photographs also need improvement in many respects, and they are only put forward in their present state because they form, substantially, complete photographs of the red end of the solar spectrum such as have not hitherto been produced."

This paper is illustrated by a very faithful drawing by Mr. Wesley of the A group of lines, taken from the photographs. The photographs themselves have been placed in the Library.

EIKONOGEN.

At a recent meeting of the Chicago Camera Club a discussion took place on the eikonogen developer, in the course of which—

Dr. Garrison said that he had not had time to try the new developing agent, but had examined it, and believed it to be or to contain a salt of iron, although one of his pupils had failed to find any trace of that metal. He meant, however, to force it to tell its own story, and hoped at a future meeting to give the results of his examination.

Professor Bartlett said he had made a few experiments, mainly with a view to test the statement of the maker, to the effect that with an eikonogen developer only half the exposure required for pyrogallol was necessary. This he had found not to be the case. He had given some very short exposures, and could only get the sky, even with the strength recommended by the maker; and with exposures long enough to give detail, although the eikonogen image appeared long before that of the hydroquinone, the latter overtook the former, and of the finished negatives it was impossible to tell the one from the other, although a clever professional photographer, Mr. O. P. Scott, said the eikonogen plate was softer and finer than that from the hydroquinone. With a view to ascertain whether it were a definite chemical compound or a mixture, he had crystallized some, and thought it was the former, although its affinity for oxygen was very great, and the crystals rapidly discoloured. It was perhaps a more rapid developer than hydroquinone or pyrogallol, but he did not think it possessed any other advantages.

Mr. Colgrove spoke highly in favour of the new developer, and showed a very fine negative by it. It had received about a normal exposure, and the development was commenced with a solution of the strength recommended by the maker, but he found that it flashed out in an unmanageable way. He immediately reduced the strength from twelve to two grains, and added a little sodium bromide, and the result was the negative now in the hands of the members.

Mr. Osborne and the secretary had both experimented with the eikonogen, and were of opinion that it was not only rapid in its action, but possessed several advantages over both pyrogallol and hydroquinone.

Mr. Douglass then had the optical lantern lighted, and passed through it a series of pictures made by Dr. Nicol and Mr. Harley with eikonogen, and by Mr. Forbes, developed with hyroquinone. The test was severe, as Mr. Forbes is *facile princeps* in slide making, but, says *The Beacon*, the eikonogen held its own, and the warmish colour, which, as has been already said, is the result of keeping down the sulphite, was much admired.

Daylight under Water.—M. Herman Fol reports to the Académie des Sciences the result of the researches that he has been making in the depths of the Mediterranean during the summer months, his object having been to certify how far daylight penetrates. His operations have been carried on in water of remarkable clearness between Corsica and the shores of the Alpes-Maritimes, at a distance of eighteen geographical miles from the nearest land. M. Fol used gelatino-bromide plates exposed during ten minutes, whereby he has found the limit of daylight in those waters to be at a depth of 1,518 feet—465 metres. This is 327 feet short of the limit assigned to daylight in the Mediterranean by the Germans, Chun and Petersen, some years ago.—*The Engineer.*

PHOTOGRAPHING AT MIDNIGHT.

A REMARKABLE photograph by Messrs. Valentine and Sons has been sent us by Messrs. Mawson and Swan, because the negative was taken on one of the plates of the latter. It consists of a view of Lerwick Town Hall, taken "at midnight in June last, by twilight only." Messrs. Mawson and Swan add:—"The clock in the tower tells the time at which it was taken, and the photograph is interesting as showing the actinic quality of the light at that hour of the night." The photograph is a tolerably good one, with some lack of detail in the deeper shadows; if the method of taking it had not been stated, it might have been mistaken, from the general appearance of the view, for a photograph taken in a bad light, just before rain. The architecture of the building is plain and heavy, suggestive of the cold North—of a part of these islands where, at midsummer, the sun dips but little below the horizon at midnight, so that when the air is clear, and but few clouds are present, it does not become dark enough to deserve the name of night.

APPARATUS AT THE PHOTOGRAPHIC EXHIBITION.

No. IV.

AMONG the specimens of apparatus exhibited by Messrs. Marion and Co., is a simply constructed but useful camera for making lantern slides; this camera is made in three sizes—namely, half-plate, whole plate, and 12 by 10 inches; the latter is adjustable to take plates of any smaller size. The instrument is represented in fig. 1, and its object is,

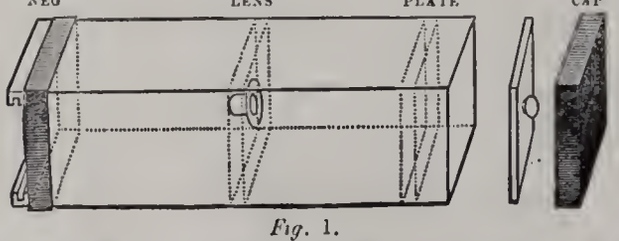


Fig. 1.

that supposing a photographer wishes to print without trouble his larger negatives as lantern slides, he simply places the negative at one end of the apparatus, and the lantern plate at the other, and all is ready for work, the lens being in its proper position and truly focussed. No dark slide or lens cap is required.

Fig. 2 represents Daniel's shutter, which is lightly made of oxidised metal; the upward stroke of the shutter is arrested by a thin india-rubber band, put there for the prevention of jarring, and to send the shutter back. Messrs. Marion thus describe the method of using the shutter:—For a time exposure the metal shield B should be down before the lens, and retained in its position by the arm C, then stretch the rubber band AA, and attach to the knob in the centre of round shield; this rubber band is the motive power; the band E stretched across the top of the shutter causes the rebound. Now, by pressing the india-rubber ball, the arm C releases the shield, which flies up and exposes the aperture of the lens, and remains up as long as the pressure of the india-rubber ball is continued. For very rapid exposures, it will be noticed that on the left arm of the shutter is a wire arm D, with loose attachment at the end; this must be taken off from the pin at the end of the arm C; thus it is and should be entirely disconnected. Now having set the shutter as above described, by pressing the india-rubber ball it swiftly mounts the shield and descends, thus completing the exposure. To increase rapidity lower the rubber band E, or, if still greater rapidity be required, an extra band, AA, should be attached to the shield. If, instead of an increase, a slight decrease of rapidity is desired, raise the band E.

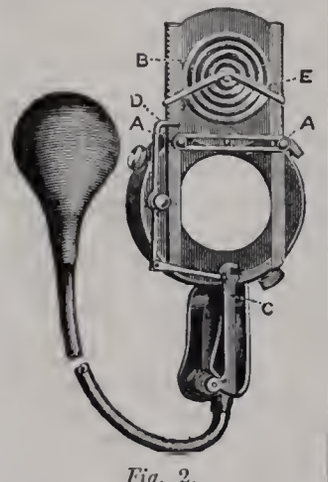


Fig. 2.

Fig. 3 represents Greenall's shutter exhibited by the same firm; it consists of two eccentrically shaped discs of ebonite, worked by means of a spring; this shutter opens and closes from the centre, and is of light weight. The following are the instructions given for its use:—To set the shutter, draw down the pin A to bottom of the slot. To fire with the hand, press the projection B towards D. To fire pneumatically, attach angle piece C to the side of shutter, squeeze the pear (having of course, first set the shutter), and the exposure is made. To increase the speed, turn the screw D in, and thus put greater pressure on the spring. To focus, pull the pin A half-way down the slot, as in wood-cut.

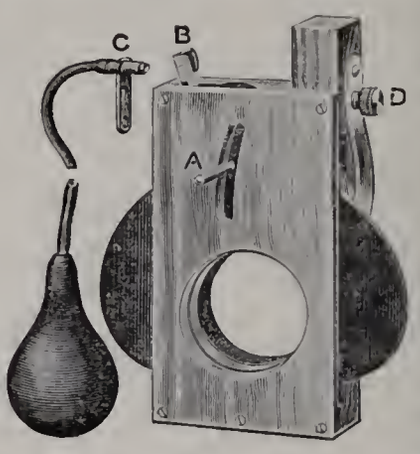


Fig. 3.

Fig. 4 represents the camera exhibited by Messrs. Marion and Co. under the name of "the perfect;" it is

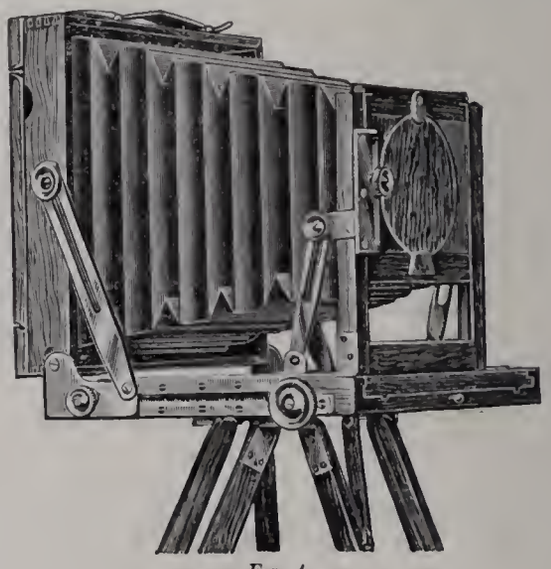


Fig. 4.

a well made instrument, and the arrangement enabling it to take lenses of very short focus, as well as lenses of average or long focus, is strong, and confers rigidity.

Fig. 5 represents a peculiar magnesium flash-lamp, invented by Mr. Leisk, and exhibited by Messrs. Marion

and Co. In the middle of the large flame is a disc, the rotation of which causes the magnesium powder to fly

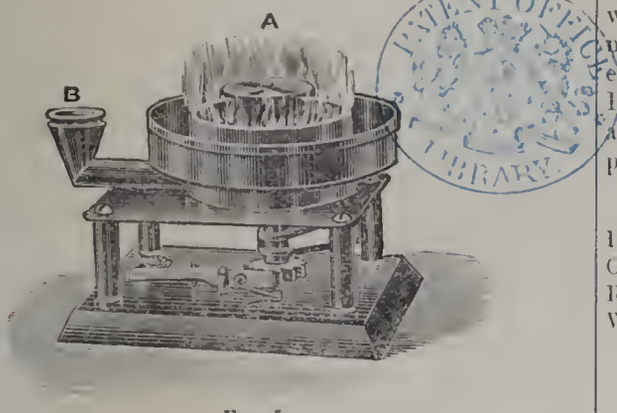


Fig. 5.

horizontally into the surrounding flame. The exhibitors claim that by this arrangement "a very large flame is obtained with only three or four grains of magnesium powder." As the Photographic Society has Herr Schirm's magnesium lamp also in the Exhibition, it would be interesting to spend an evening or more in carefully experimenting with these and other flash-lamps, to ascertain the amount of light obtainable by their means with a given weight from one sample of magnesium powder.

Messrs. Marion and Co. also exhibit among other things, Voigtlander's lenses, samples of eikonogen, and a woollen graduated background. The latter is so woven as to vary from a light grey to a very dark colour, and would produce such an effect as the background to Mr. Pringle's portrait, published as a supplement to this journal last week; but whether it was actually in use during the taking of that likeness we have not heard.

A New Focussing Glass.—The new focussing glass invented by Mr. Frank Bishop, of the firm of Messrs. Marion and Co., consists of two short tubes soldered side by side. One of these tubes is an ordinary focussing glass; at the end of the other tube is an india-rubber "sucker," like one of those by which candlesticks are sometimes attached temporarily by passengers to the glass of railway carriage windows. The whole arrangement will thus hold on to the polished side of the glass focussing screen, and can be pushed about thereon with a sliding motion by the hand. It seems likely to prove useful and convenient.

A Lens by Alvan Clark.—A special meeting of the Chicago Club was held at the Club Rooms, Tuesday evening, September 24th. Speaking of the Clark lens, Mr. Drescher said: "They are the invention of Mr. Alvan G. Clark, the celebrated manufacturer of telescopes, and are dissimilar from anything heretofore followed, and are as striking in their results as Mr. Clark's success in the telescope objectives has been. While these lenses are of the ordinary rapid rectilinear type, they are really wide angle, embracing an angle of 100 degrees, but are dissimilar from other lenses of this character in so far that they work with full aperture. They are almost free from spherical aberration, and cover their respective plates better than any lenses yet produced specially for this work. The lenses are uncemented, each lens of the combination being mounted for itself, and are therefore free from danger of gradual decrease in speed so common in many lenses, owing to the chemical change in the cement. The crown glass is on the outside. The mountings are unusually compact. While these lenses are intended to be used in all out-door work, they are also particularly suited to copying, enlarging, and photo-engraving work, and are, as well, superb for portraiture, particularly for groups. They all work with stop *f* 3, and are therefore adapted for all work requiring speed."—*Anthony's Photographic Bulletin.*

EXHIBITION OF PHOTOGRAPHS AT SIMLA.*

According to the official catalogue, fifty-eight pictures were exhibited this year. Of this number nineteen were not for competition, leaving only thirty-nine photographs, exhibited by eight amateurs, to compete for the prize of Rs. 100 offered by Sir Benjamin Simpson. The following abstract gives the names of exhibitors, and the number of pictures or frames shown by them:—

Not competing.	*No. of pictures.*	*Competing.*	*No. of pictures*
H. P. Robinson ...	... 5	Mr. Justice Horsfall	... 6
G. Ewing	... 7	Mr. Justice Parsons	... 2
R. Hotz	... 6	Capt. Spragge ...	... 8
W. Cotsworth ...	... 1	Capt. C. B. Judge	... 2
		Mrs. Eliot Lockhart	... 3
		Miss Coldstream ...	... 6
		Mrs. Webbe ..	... 6
		Mr. R. D. Percival	... 6

The average of quality was very low—so low, that I believe Sir Benjamin Simpson would have withheld his prize had he had any voice in its award. On second thought, I do not see how a higher standard could have been expected. Simla will always fail to collect the best photographs until it can produce men competent to discern merit where merit exists. This is a hard saying, but I am prepared to justify my words. That Mr H. P. Robinson's name is indelibly associated with the artistic progress of photography scarcely needs demonstration. Mr. Andrew Pringle, in his address as President of the Photographic Convention of 1889, mentions it as an undisputed fact, and even the babes and sucklings of our art lisp his name in praise. If then any man or any set of men show that they know not H. P. Robinson, I think we assume safely that they know little of our art and less of its aims and aspirations. Such a case is before us. At the Simla Exhibition just closed five of Mr. Robinson's best works were exhibited. They comprised "Carolling," "Feeding the Calves," "Wayside Gossip," "The Music of the Birds," and "He never told his Love." These pictures are as familiar as twice told tales to all students of art; they have been medalled wherever they have been exhibited, and their artistic merits have even been recognised by men who deny to photography the rank of an art. The Simla Fine Arts Society showed their acquaintance with our art and its professors, by speaking of the pictures as "English Scenes" by Mrs. Robinson. Further comment is unnecessary.

Mr. Ewing's pictures are those exhibited at Calcutta at the last two Exhibitions.

Mr. R. Hotz is a rising professional photographer of Simla. I use the word "rising" only to express the commencement of a prosperous professional career; the quality of his work can scarcely be better.

Though Mr. Cotsworth was not competing, the judges ticketed his picture "Commended." Mr. Justice Horsfall was the winner of Sir Benjamin Simpson's prize.

I should like to have given a prize to Mrs. Eliot Lockhart for her lovely photograph, "Washing Day in Portugal." Another picture by Mrs. Lockhart is also worthy of notice. It is an enlargement of a dog watching a cat, and has a family likeness to Mr. Cotsworth's "Preparing for Action," which was commended by the judges. Mrs. Webbe shows a number of views of Mussooree and Landour. Miss Coldstream, Capt. Judge, and Mr. R. D. Percival exhibit a lot of views. Capt. Spragge, the only other exhibitor, is an amateur of great ability.

* Abridged from the *Journal of the Photographic Society of India.*

MOLECULAR REFRACTION, DISPERSION, AND MAGNETIC ROTATION OF CARBON COMPOUNDS.*

BY DR. J. H. GLADSTONE, F.R.S., AND DR. W. H. PERKIN, F.R.S.

THE molecular refraction, or refraction equivalent, of chemical compounds has been the subject of many recent investigations. It is fully recognised that "the molecular refraction of a compound is the sum of the molecular refractions of its constituents." It is also well known that very fundamental differences of chemical structure, such as change of atomicity, or of the mode of combination of such elements as carbon and oxygen, cause a difference in the refraction value.

The molecular dispersion is the difference between the molecular refraction of a body for two different parts of the spectrum, for instance the solar lines A and H. It is found that another series of numbers may be obtained for each element or constituent, and that wherever a difference of chemical structure causes a difference in value in regard to refraction, it does so in regard to dispersion. The difference is generally to a greater extent in proportion to the actual amount.

The molecular magnetic rotation of organic liquids has lately been examined minutely, and this has revealed the fact that a corresponding series of values may be determined for their elements or constituents, and also that the same differences of chemical structure which produce changes of refraction or dispersion produce analogous changes in the power of rotating the polarised ray. This shows another point of connection between an electromagnetic effect and the velocity of light.

ARTISTIC INSTINCTS IN PHOTOGRAPHY.—A photograph is a closer following of nature than any picture can be, and the photographic view or portrait contains the elements, the material of a picture, but for want of selection, combination, composition, and, above all, for want of a human mind and soul acting on the materials, it is not a picture,—LUCY CRANE.

THE DETECTIVE FIEND.—On board the steamer a few days out from New York our stoker gave up to the heat and died. He was brought on deck to get what air there was, for we were in the Gulf stream, and even the passengers panted in the shade. Inside the smoking-room a party of men was playing poker, and an interesting jackpot was in the centre of the table. Red, white, and blue chips were poked forward, one after another, till spectators held their breath. Outside, the stoker was gasping at long intervals and waiting for death. At this moment the fresh young man with the detective camera came along. He is everywhere this summer. He is even in Paris and London, making views of respectable American citizens who are abroad for the purpose of having a middling good time, and not for the purpose of having their pictures taken. In fact, they would pay a small bonus not to have their pictures taken sometimes. Well, the breezy youth got ready, and with a good light on the face of the dying man, was about to enrich his collection, when a gentleman from New Orleans, who really had the best hand for the jackpot, saw the performance. He rose with a sigh, and throwing down his hand face-up, so as to lose the j.-pot, he went to the port-hole and said: "Young man, if you do that I will throw you and your cursed concertina into the hungry sea. I may be a wicked man. I play poker, and I am somewhat unregenerate, but if you dare to photograph that poor devil on the shores of eternity just to brag about it when you get home, you will in less than two minutes make the loudest plunk that the Atlantic Ocean has been the recipient of for some time." He then resumed his wicked game of draw.—*New York World.*

* Read before Section A, British Association.

Patent Intelligence.

Applications for Letters Patent.

16,138. E. TATHAM, 46, Lincoln's Inn Fields, London, "Gaseous Mixtures for the Production of Light."—October 14th.

16,406. H. BENEST, 54, Fleet Street, London, "Suspending Pictures."—October 17th.

16,492. P. ELLIS, 20, High Holborn, London, "Photographic Washing Trough."—October 18th.

16,528. J. STANWAY, 24, Caulden Road, Hanley, Staffordshire, "Lifters for Photographic Plates, Papers, and Films."—October 19th.

16,558. H. G. HEYBURN, 17, Lincoln's Inn Fields, London, "Photographic Cameras."—October 19th.

16,593. J. KELLER and G. CASTAN, 433, Strand, London, "Producing Optical Illusions by Means of Mirrors."—October 21st.

16,628. T. CHARLAN, 4, Corporation Street, Manchester, "Hanging Pictures and Roller Blinds."—October 22nd.

16,724. ALBERT KELLY and AZARIAH KELLY, 87, New John Street, West Birmingham, "Improved Gas Burner, the Light not going out when turned off."—October 23rd.

16,735. A. H. MOUNTAIN, 17, St. Ann's Square, Manchester, "A Diagram or Table, indicating at a glance the comparative duration of the periods of Light and Darkness during each Day throughout the Year."—October 23rd.

16,778. S. D. MCKELLEN, 3, Chapman Street, Manchester, "Photographic Cameras and Apparatus connected therewith."—October 24th.

16,788. W. TYLAR, 11, Cherry Street, Birmingham, "Dark-Room Photographic Lamps."—October 24th.

16,908. W. CHADWICK, 1, St. James's Square, Manchester, "Cameras and Dark Slides for the same."—October 26th.

16,909. C. SANDS and J. J. HUNTER, 20, Cranbourn Street, Leicester Square, London, "Fastening the Shutters of Dark Slides of Camera Backs, Film Carriers, Roll Holders, Changing Boxes," &c., to be known as 'Sands' and Hunter's' Improved Locking Spring."—October 26th.

16,955. M. JUSTIN, 38, Chancery Lane, London, "Camera Stands."—October 26th.

16,964. A. HAMERNICK, 20, High Holborn, London, "Automatic Rocking Cradles."—October 26th.

Specifications Published.

13,839.—*3rd September*, 1889. "Process for Obtaining Aluminium." HERBERT JOHN ALLISON, 52, Chancery Lane, London, Middlesex, Patent Agent. Communicated from abroad by "The Great Western Aluminium Smelting and Refining Co." (Incorporated), of Denver, Colorado.

The inventor claims:—

1. The process of obtaining the metal aluminium, consisting in treating a fused aluminous fluoride or fluorides, while in a molten metallic bath and protected from oxidizing agents, with a reagent whose elements disassociate at a temperature below the fusing point of the aluminious fluoride or fluorides, and having an element of such affinities that it displaces the aluminium in the fluoride or fluorides, but having no element adapted to unite with the aluminium.

2. The process of obtaining aluminium by treating a base of fused aluminous fluoride or fluorides, while in a bath of molten metal and protected from oxidizing agents, with a sulphide of silicon or equivalent reagent.

14,652.—*12th October*, 1888. "Photographic Cameras." WILLIAM HUGH RUBENS KELLY, The Manor House, Pooltou, Wallasey, Cheshire, Analytical Chemist.

This invention has for its object a photographic camera that will be, as much as practicable, self-contained. In its most improved form it will, says the inventor, carry its own plates, and automatically, or almost automatically, change an exposed plate for an unexposed one, so that views can be taken in quick succession. It can be carried under the arm, and the image found and focussed from the top, and then the exposure is instantly

effected without having to alter the position of the sensitive plate, focussing glass, or screen, in any way.

The inventor claims :—

1. In a photographic camera, the combination of a box or chamber to contain sensitive plates, and having a slit at each end thereof, a reciprocating plate carriage within a second chamber adapted to receive a plate dropped through one slit, and to transfer it again to the first chamber through the other slit when the position of the camera is reversed.

2. In a photographic camera having a moveable carriage for transferring the plates from one end of a chamber to the other, an externally operated winding device connected to the said carriage to effect a steady forward movement of the same, and a spring device adapted to effect its return.

3. In a photographic camera, the combination of an exposure shutter capable of movement behind the lens, and a reflector capable of rectilinear movement, and adapted to reflect an image on to the focussing screen, and of being drawn aside, either attached to the shutter or independently, in the manner described, whereby a smaller reflector will reflect a given sized image than is possible with the ordinary hinged reflectors.

4. The arrangement of a small movable mirror immediately behind the lens, as described, in place of the large hinged mirrors now in use, whereby a larger image can be reflected with a smaller mirror than is possible on the old plan.

5. The improved photographic camera taken as a whole.

15,503.—*October 29th*, 1888. "Producing Aluminium and its Alloys.' Leon Quentin Brin, Engineer, 6, Rue Wilhem, Auteuil, Paris, and Arthur Brin, Engineer, 59, Brompton Crescent, South Kensington, London, S.W.

The inventors claim :—

1. The herein described method of producing aluminium and its alloys in an electric furnace by the employment of a readily fusible aluminium-yielding flux, in conjunction with the thermic electrolytic and dispersive action of high potential electric currents.

2. In the production of aluminium and its alloys in an electric furnace, the employment of a molten aluminium-yielding flux as an electrolyte in conjunction with low potential electric currents.

3. In the herein described methods of producing aluminium or its alloys by electric or electrolytic action, the application of external heat to effect the fusion of the aluminium-yielding flux, and promote the electrolytic action of the current.

4. In the herein described methods of producing aluminium or its alloys by the reduction of aluminium from an aluminium-yielding flux by means of the electric arc, the employment of an inert gas to drive off and condense the sublimated metal.

17,494.—*November 30th*, 1888. "Glass Tablets or Inscription Plates." Clement James Butler, 14, Garrick Street, Covent Garden, London, Stained Glass Draughtsman.

This invention has for its first object the manufacture of glass inscription plates for such as wall or mural tablets. The process consists of a staining action on the glass at the back only. The second object is to preserve tablets so manufactured from climatic injury and damp.

The inventor burns in the design or inscription at the back of the sheet of glass by stated methods.

Eikonogen.—This new developing agent has certainly come to stay, at least until something better is discovered. The rapidity with which it works, the clear black and white negatives that are so readily obtained with it, reminds the worker of collodion days, and the iron developer. There is perhaps a little more care needed in judging of time in the longer exposures where small diaphragms are used in the lens. But for instantaneous work with large openings in the lens, eikonogen works with all the vigour of pyrogallol, and will give more detail in negatives of the same exposure than when using pyrogallol, without the risk of staining or fogging the negative.—*Anthony's Photographic Bulletin.*

Notices of Books.

Sun Artists. (Kegan Paul, Trench and Co., London, October, 1889.)

This, the first number of a new monthly periodical, contains, handsomely printed in photogravure, four of Mr. J. Gale's pictures—"The Sleepy Hollow," "A Foggy Day on the Thames," "Brixham Trawlers," and "Homewards from the Plough." These are most elegantly reproduced, and accompanied by an article on Mr. Gale's photographic works by Mr. George Davison. If the succeeding numbers equal the first, "Sun Artists" will be the most handsomely illustrated photographic periodical in this country.

The Photographic Quarterly. (Hazell, Watson, and Viney, London, October, 1889.)

This, the first number of a new periodical, is also handsomely turned out, and is a credit to photographic literature. It is edited by Mr. C. W. Hastings, contains several articles by good writers, and some fine Woodburytype prints. One of the latter is an excellent likeness of Mr. James Glaisher.

Correspondence.

THE "GIAH" CAMERA.

Sir,—Will you kindly allow me a small space in your paper to point out an orthographical error in a name given the new detective camera exhibited by Messrs. Mawson and Swan, at the Pall Mall Exhibition? In your issue of 11th October, a paragraph mentions that Mr. Winter, the inventor of this apparatus, has called it "Giah," that being the Welsh equivalent for the season of winter. Mr. Winter has evidently not sufficiently regarded the importance of "What's in a name?" He may be a Welshman, and possibly enough of the "Taffy" to enjoy and digest the native cheese "that would make excellent leather for the soles of boots," but it is manifest he is quite at sea with regard to the orthography of the language of the ancient Cymrw.

The Welsh word for winter is "Gauaf;" to the uninitiated in the Welsh alphabet, it would, according to English letters, be pronounced "Giao." "Y Gauaf" means "the winter," and shall I be presuming too much to suggest to the worthy inventor to adopt this alteration in the name of his camera? It is an apparatus so ingenious, so faultless in details, yet so easy of manipulation, and consequently likely to become very popular, that it seems a pity it should be launched forth on a hopeful career with its most appropriate name incorrectly spelt.

October 28th, 1889. A Welshwoman.

TUNBRIDGE WELLS AMATEUR PHOTOGRAPHIC ASSOCIATION.

Sir,—May I ask you to kindly favour us by announcing that our third annual Exhibition will be held on November 28 and 29, and that there are classes for amateurs and professionals, silver and bronze medals being offered for competition. Entry and forms, and all particulars, can be obtained of the Hon. Secretary, Joseph Chamberlain, 14, Calverley Park Gardens; B. Whitrow, 15, St. John's Road.

Joseph Chamberlain, Hon. Sec.

Intensifying Negatives.—Dr. Mallman, in *Photo. Rundschau*, states that negatives intensified with mercuric chloride may be blackened by old hydroquinone developer just as with pyro, after washing well with soda or ammonium sulphite. The result is more intense, and the negatives are of a brilliant blue-black tone which is valuable in lantern slides.

Proceedings of Societies.

London and Provincial Photographic Association.

The usual weekly meeting was held on the 24th inst., Mr. A. Haddon in the chair.

A question was asked: "What is the best method of producing negatives in misty weather?"

Mr. W. E. Debenham said it was a question of the illumination of the interposed air. He would use a short-focus lens.

Mr. W. H. Harrison suggested filtering the air through wet coarse canvas, as at the Houses of Parliament.

Mr. L. E. Morgan exhibited a camera. The back was made to revolve, so that horizontal or upright pictures could be taken by simply giving the back a half-turn. The shutter of the slides could be withdrawn from either the top or the bottom by reversing the slides.

Mr. J. Hubert then read a paper on "Bromide Enlarging" (see page 710). After reading the paper, Mr. Hubert proceeded to made an enlargement, which, not proving quite satisfactory, other exposures were made. This occupied some time, and it being late, it was agreed to adjourn any discussion on the paper until the following week.

Mr. A. Cowan passed round two negatives developed with two different samples of sulphite and soda—there was a marked difference between them; also a transparency showing the clearing action of bisulphite added to the hypo bath.

The Camera Club.

Thursday, October 24th, was the first lantern evening of the season at the Camera Club. Slides by members and friends are shown at these meetings, one of the regular Thursday evenings each month being devoted to the exhibition. On this occasion there was a large and varied collection of transparencies, about ten members bringing or sending up contributions. Altogether about 160 slides were passed through the lantern.

The chief exhibitor was Mr. T. M. Brownrigg, who exhibited and described a fine series, including views of the lake district of Italy and the South of France, and the Paris Exhibition. These gave much pleasure, and Mr. Brownrigg's humorous recital of his experience in photographing the pictures added much to the enjoyment of the evening.

Mr. Charters White showed microscopical work and some capital landscapes; Mr. Greene, mountain scenery from negatives taken on stripping films in a hand camera; Mr. Humphrey, Italian views; Mr. J. H. Williams, country views, including one or two charming cottage bits; Mr. Gowan, a varied set; Mr. Hansard, very fine photographs of the Alhambra, which were beautiful in colour; there were also pictures by Mr. F. Howlett and others. Mr. J. F. Roberts had the management of the lantern.

During the evening a small electric dark-room lamp was exhibited by Mr. Freshwater.

On Thursday, November 7th, Mr. Pringle will give an address, illustrated by photographs and lantern pictures; the subject is entitled "130 Exposures." Meeting at 8 p.m.

West London Photographic Society.

The members met at the Addison Hall on the 25th inst. to hear an address from the new President, Mr. Charles Bilton, B.A.

After some formal announcements by Mr. Hodges, the Secretary, a letter from Mr. William England, the late President, formally resigning his membership of the Society, was read. A discussion ensued, in the course of which the President remarked that he was sure all would regret Mr. England's decision, a sentiment in which the meeting heartily concurred. The Secretary was then directed to acknowledge the receipt of Mr. England's letter, and to convey to him the cordial thanks of the members for his services to the Society.

The President, in the course of his address, acknowledged the honour which the Society had conferred upon him in electing him to the post of President, and expressed the hope that, with the co-operation of the Council, the Society might be handed to his successor in an even more prosperous condition than it was at the present time. He acknowledged, on behalf of the Society, the services rendered by his predecessor, and he considered the Society had been fortunate in having so eminent a photographer for its first President. Mr. Bilton, continuing, said every individual ought to have a hobby of some kind, and all would agree that a more attractive and interesting one than photography could not be found. Photography tended to cultivate the qualities of patience and perseverance, and its pursuit promoted a love of the beautiful and grand in nature. Again, the practice of photography was suggestive, and led its followers to experiment, paving the way to future discoveries. Some might be led to study the law of optics, or the science of chemistry, subjects as delightful in their way as photography itself; the man who could follow the chemical changes which occurred would derive an enhanced pleasure from his work. He would also refer to the opportunities afforded of giving pleasure to others, lantern evenings being always popular, much appreciated, and well attended. Again, copies of pictures could be sent for the use of patients in our hospitals. He suggested that they adopt as their motto, "Aim as high as possible." The want of such a Society had really caused it to spring into existence. He assumed that many had been induced to become members in the hope of improving their knowledge, and considered that the Society should possess facilities for giving practical demonstrations; in this connection he was glad to announce that their Secretary, Mr. Hodges, had secured for them the use of a dark-room. The Society should also possess a library, the nucleus for which had been formed by the kindness of Dr. Emerson in presenting to them a copy of "Naturalistic Photography," which was, whether they agreed with his theory or not, a book—as Lord Bacon put it—to be "chewed and digested," with excellent results. All the journals devoted to photography should find a place upon the library shelves, not omitting the Year-Book and Almanac. Another duty of a Society applied to its individual members—he referred to the reading of papers. He would impress upon the younger members particularly, the desirability for each and all to attempt something in this direction. In the exhibition to be held in January, he trusted every member would be represented. In concluding, he wished to say that he looked upon the new rule respecting the annual retirement of the President as a most salutary one; it seemed to be the best means of preventing a Society from stagnating, and gave to each member a chance of being chosen to direct the affairs of the society.

Mr. Foxlee thought members might with advantage more freely avail themselves of the opportunity of obtaining information provided by the question box. He had found that the reading of questions in that way often led to animated discussions, from which much practical information might be derived.

Dr. How considered that the utility of the question box might be greatly enhanced if members putting questions would supplement them, whenever practicable, by producing the defective negative, paper, or material to which the question related.

The optical lantern was then put into requisition, and slides by Messrs. Power, Rickford, Scanlan, Horton, Kellow, and Wilson were exhibited; some studies of fishing boats by the latter were much admired.

The next meeting will take place on November 8, when Mr. Lyonel Clark will give a demonstration of his platinum toning process.

Hackney Photographic Society.

Mr. T. E. Freshwater gave a lecture on "India" on Thursday last. The slides were shown by means of the optical lantern by the President (Dr. Gerard Smith) upon a screen made of tracing paper, which gave a much clearer image than the ordinary screen. At the conclusion of the "Indian" lecture Mr. Freshwater put slides of insects through the lantern, and exhibited one from a flash-light negative, which showed but one faint trace of the usual flash-light failings.

Messrs. Carpenter, Hodder, Clark, and the President showed

some of their work. Mr. Carpenter's lantern slides from flowers taken on isochromatic plates were examples of the value of these plates. He developed them with eikonogen; the formula was—

A.—Eikonogen ...	...	1 ounce in 50 ounces of water
Sulphite of soda	...	2 ounces
B.—Caustic potash	...	1¼ ounce
Water ...	...	10½ ounces

For use, 1 dram B to 1 ounce of A; dilute if too strong.

Mr. Freshwater showed some fine butterflies, and received a warm vote of thanks at the close of the proceedings.

Photographic Society of Philadelphia.

A meeting of the Society was held October 2nd, with President Graff in the chair.

A paper on "Eikonogen" was read by Dr. Mitchell (in our next).

Referring to the statement that the solution was green in colour, Mr. Bullock remarked that the pure aqueous solution was pink, and that the green colour was induced by the sulphite of soda contained in the developing solution.

Mr. Walmsley spoke most favourably of the new developer, stating that he had used it without the addition of any alkali with excellent results.

Mr. Bullock thought this was owing to the presence of some carbonate of soda in the sulphite.

Mr. Wood had found difficulty in correctly timing the exposures of transparencies on slow gelatine plates, but with plates as rapid as Cramer's 50's, at a distance of ten to fifteen feet from the source of light, he had obtained excellent and certain results with about one second's exposure.

Messrs. Rau and Dillon questioned whether a desirable colour could be obtained with such rapid plates.

Mr. Supplee called attention to some plates he had recently seen coated with an opaque varnish for use in that species of etching in which a glass plate forming a negative was used, instead of a copper plate and the usual process of biting by acid. The process was similar to that in use for twenty or thirty years, in which a plate was coated with collodion, sensitized, exposed, and developed, and then employed as a surface on which to operate with an etching needle.

Notts Amateur Photographic Association.

At the meeting on Monday evening the 28th, in Cavendish Chambers, Market Street, Mr. G. A. Bull occupied the chair.

A mass of correspondence was read by the Hon. Secretary, Mr. P. E. Knight, relating to the forthcoming conversazione and exhibition to be held on Nov. 11, in the Castle Gate Lecture Hall.

Further additions of photographs for decorating the walls were acknowledged from Mr. J. Furley Lewis, and Mr. R. S. Armitage. The Hon. Secretary also announced the formation of an instruction class for beginners.

A set of twelve phototypes lent by the Ilford Plate Company, showing the terrible results of the explosion at Antwerp on Sept. 6th, were exhibited.

Mr. R. S. Armitage gave a practical demonstration on lantern slide making, and explained the different ways and means of obtaining the best results. By way of elucidating his remarks, he had frames of transparencies on view, lent by several firms. Mr. Armitage then proceeded to expose, by means of gaslight, plates of different makers, including Dr. Backelandt's water developing plates. The mounting and finishing of each plate was also practically shown.

Leeds Photographic Society.

The ordinary monthly meeting of the Society was held in the Leeds Mechanics' Institute, September 19th, Mr. Godfrey Bingley in the chair.

The Hon. Secretary (Mr. F. A. Warburton) read a short paper on "Some Technical Notes," stating that although he had nothing new to offer, a few notes of his own method of working might interest those present and promote some discussion. Referring to the subject of development, he said he did not agree with any developing formula in which two solutions were mixed in equal parts to form the developer; the chances were certainly against the developer as mixed suiting the subject and the exposure. The developer he recommended, and which he had used for some years, was that given by Messrs. Wratten and Wainwright with their instantaneous plates. The follow- is the formula with a slight modification, viz., using the pyro in solution with meta-bisulphite of potash.

No. 1.—Pyro		20 grains
Meta-bisulphite of potash		20 ,,
Water		10 ounces
No. 2.—Ammonia, s.g. ·880		1 ounce
Potass bromide		60 grains
Water		3 ounces
No. 3.—Potass or am. bromide		60 grains
Water		1 ounce

There was certainly nothing novel in the formula, but it would, he believed, strike every photographer that with solutions mixed in this form, a tremendous power was placed in his hands. Two grains of pyro per ounce was the most that need ever be used, and by diluting with water, any strength under this could be obtained. The ammonia solution was so strong that four drops to the ounce of the pyro solution were quite sufficient to start development, and two or three drops of the bromide solution would instantly check a too rapid development; indeed, if a Royal Commission were appointed to enquire into the best formula for a developer, he believed that this, or one very similar, would be recommended. In connection with the subject of development, it might be mentioned that a piece of rag fastened to the tap was a good method of preventing splashing of the water when washing plates or prints. A method of dividing a plate so as to take two pictures—one on each half—was then explained, and for a convenient size of plate to work, Mr. Warburton said he believed 7½ by 5 would be found the best. A simple form of view meter was next explained, and the use of a level attached to the camera recommended. Referring to the numbering of diaphragms or stops, nothing could be more convenient than the U.S. system. The great benefit of such a method of numbering was apparent when using more than one lens, for in this system all apertures had a relation to one another. In using a stop, Mr. Warburton said he preferred the smallest he could employ under the circumstances, and for general use U.S. 32 or 64 were the ones he used most. Referring to the subject of "backing" plates, he said there was no question as to the great advantage to be gained, and the following was a capital mixture for the purpose, drying easily, not powdery when dry, and instantly removed by a wet sponge before developing :—

Burnt sienna ground in water ...		12 ounces
Methylated alcohol		8 ,,
Liquid gum		3 ,,
Glycerine		1 ounce
Carbolic acid		1 drachm

In conclusion, he said he had told them nothing new, but if the few remarks he had made were of any assistance to any beginner in the art, the object of putting them together would have been gained. Since he had mentioned the word beginner, he might be pardoned giving beginners another piece of advice, viz., avoid cheap apparatus—far better go without—and avoid second-hand apparatus unless bought under the advice of someone who understands it, for, remember, the market is flooded with cheap trashy stuff; rather go to a respectable dealer, tell him your requirements, the amount you are willing to spend, and act upon his advice. It was a pity to be asked to look at some of the bargains (?) that some novices had bought, only to have to point out the very obvious reasons their late owners had for parting with them.

In the discussion which followed, the CHAIRMAN said he preferred, in place of a rag, a piece of flexible tube attached to the tap, with a rose at the end.

Mr. BRANSON, in referring to the subject of stops, said he always preferred to use the largest that circumstances would permit. It gave, he believed, a more brilliant picture. He was referring, of course, to doublet lenses; with a single lens he would prefer using a smaller stop.

Mr. DENHAM said he had used for years some such developer as the one recommended, and he seldom lost a plate in developing.

THE *Photo. Mittheilungen* describes a camera, the "Rhomboid," which, by an arrangement of mirrors and rhomboidal prisms directly behind the lens, shows the object on the ground-glass at the same time that it is being photographed. It is useful especially in microscopic photography of living objects.

PHOTOGRAPHS OF THE EYE.—Dr. Cohn, of Breslau, has made some photographs of the eye with the aid of a magnesium light—among others the eyes of a lady whose pupils excite astonishment by the difference in their dimension. Dr. Cohn says that this phenomena indicates the commencement of the softening of the spinal marrow caused by paralysis of the nerve which determines the dilatation or the contraction of the pupil.—*Bulletin Belge.*

FUMING ALBUMENISED PAPER.—I do not, says R. P. Harley, fume my paper; that is, I do not hang my paper up in a fuming box and expose it to the vapour of ammonia. My method, I think, is simpler, at least it saves me from wasting paper unnecessarily, as paper, when fumed in the usual way, must be used the same day; it does not keep. I use felt pads in my printing frames to place on top of the paper; this insures contact of paper and negative at every point; it also serves another purpose, which I will explain. The night before I intend to print, I take a tight box, which I have for the purpose; place in the bottom of it three or four sheets of blotting paper; these blotters I sprinkle with an ounce or so of strong ammonia, then place two or three more blotters on top; I then tumble in my felt pads as loosely as possible, and shut the box. In the morning the pads are thoroughly impregnated with the vapour of ammonia. For every print I use a fresh pad, returning those already used to the bottom of the box. This method, I find, answers every purpose of fuming, and at less trouble.—*The Beacon.*

AN ARTISTIC CRITICISM.—There was a time when the photographer was content if he managed to produce something which was recognisable as a likeness of man or of the world in which he lived. But that was long ago, when he was hampered by the chemical difficulties of his embryonic science: that was in the days of those terrible *cartes*, in which a long-suffering person, with feet, hands, and nose out of focus, stood bolt upright by a marble pillar, with one finger in a copy of "Paradise Lost," or another pointing with a frown at a roll of parchment, on which was inscribed "John Jones, Esquire." No such caricature will be found, or for many a year has made its appearance, in Pall Mall. So far from the portraits exhibiting any of the old conventionalism, most of them might serve as models for the painter, so far as posing is concerned, while many of the groups arranged to form a picture exhibit scarcely a trace of that stiffness, that suppressed agony, which was so marked a characteristic of the photographs in which the victims' heads were secured in what was facetiously known as "a rest." Colour, that oftentimes announced, but never grasped discovery, none of the specimens display. But in the ingenious arrangement of light and shade, the admirable taste shown, and the help which the new papers and the use of platinum "hot," "cold," and "warm" lend, have enabled the artist photographer to produce such admirable pictures that one almost fears lest the delicacy now attained might be damaged by chemical colours.—*The Artist.*

F. W. D., Coventry.—Your letter reached us too late to be of use.

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper & Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

C. J. L.—Your letter has been passed on to the agent first named.

NOTTINGHAM.—The faded blotches are so strictly local that we should be disposed to think they arose from accidental splashes of hypo, either on the prints themselves, or on the card mounts. On touching with nitrate of silver the spots turn yellow and brown, a pretty sure sign of their being caused by hyposulphite.

A. G. K.—Prussian blue is fast against acids, but is decomposed by alkalies. Is it possible that ox-gall caused the change of which you complain?

PHOTARGUS.—1. Zinc is undoubtedly injurious if left long in contact with silver prints. Washing troughs having a perforated zinc false bottom have often been known to transfer an impression to the wet prints, if not turned over frequently. 2. Your arrangement for simultaneous action of flash light and exposure is very ingenious, but the difficulty about the blinking of the eyes is almost inherent to this mode of working. The subject was mentioned at the last meeting of the Photographic Society by several who found it impossible to avoid closing the eyes at the moment of exposure. This gives a statuosque effect which is often apparent in such pictures. Supposing you were to flash off one small preliminary charge, and follow this up quickly with your grand illumination (three lamps), would not then the first blinking be got over in time for the general exposure?

G. M.—For extemporised plate-boxes use an ordinary wooden or strong cardboard box, blocked up to the required dimensions, and faced at both ends with Thompson and Norris's corrugated paper packing. Address, Britannia Row, N.

C. P.—A good clearing solution for pyro-developed negatives was given last year in one of the German journals. Its composition was 16 parts chrome alum, 4 parts citric acid, and 1,000 of water. Common alum is sometimes employed in larger quantity.

F. I. C.—The lecture was delivered at the Finsbury Technical College on 3rd May, 1887, but it does not appear to have been reported at the time.

L. A. M.—The possibility of using Crookes's radiometer for regulating exposures has more than once been suggested; but at the outset you will require some special method of marking the revolutions, for in the ordinary form of this instrument all four vanes are alike, and you would have great difficulty in counting the number of turns.

H. H.—We should be glad to hear what amount of success you had in Paris. There was no difficulty early in the season, but later some cameras were stopped.

L. B.—Ammonium iodide is the most readily decomposible, potassium is more permanent, but the cadmium salt is the best of all.

BITUMEN.—The process of M. Niépce de St. Victor, founded upon the earlier experiments of his uncle, M. Nicephore Niépce, upon bituminous substances, was specified in a patent, dated October 14th, 1852, for "Improvements in Transferring and Printing." The name of the inventor was not then given, but it was simply called "A Communication." Specimens were, however, shown some months afterwards in London (May, 1853), when the full particulars were filed.

CHEM. DEPT. and W. B.—Letters received about luminous paint. We thank our correspondents for the information given.

C. A. R.—We beg leave to acknowledge the receipt of your letter.

INST. C. E.—Card of invitation duly received, for which we tender our best thanks.

VERNIS.—The amber and chloroform varnish can be had of Messrs. R. W. Thomas & Co., Pall Mall. We seldom hear of its being used now, but agree with you in saying that its qualities are quite remarkable; quick drying, hard, and in every way reliable.

ONE IN A FIX.—Coat the canvas with bromide emulsion, and prepare an enlargement as upon paper.

H. B. B.—We will procure for you some of the true aurantia, and send it to your address by post.

A BEGINNER and T. L. B., received.

PATENT OFFICE LIBRARY

THE PHOTOGRAPHIC NEWS.

VOL. XXXIII. No. 1627.—*November* 8, 1889.

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THE EIKONOGEN DEVELOPER.

THE eikonogen developer is making a fierce fight for its right to live, and among those who advocate it are such experienced photographers as Mr. W. Willis, Mr. William England, and Mr. Leon Warnerke. The merits of the new developer are claimed by its supporters to be that it gives abundance of detail, is eminently suited for instantaneous exposures, and that the same solution can be used upon many successive plates. Mr. Lyonel Clark, on the other hand, has been testing its powers against pyrogallol by means of a Spurge's sensitometer and an approximately uniform gas flame, and reports that it is no better than the latter substance for developing purposes. Exact comparative experiments and standard tests are always of value; but, unless they be carried far enough, do not afford sufficient ground for safe generalisations. For instance, if Mr. Clark had said:—"These results apply to the particular brand of plates I used," it would have been seen that the question at issue was far from being settled, it being a fact that to obtain the best negatives, some brands of plates in the market require different treatment in development. Then again, the conditions as to temperature were not varied; at a given temperature one developer may work better than another, but not so at all temperatures. Another question is, whether it is fair to compare in photography the colour of the light coming from a gas flame, with the average colours of the light coming into the camera from different landscapes or sitters.

Care should always be taken not to generalise too hastily. At our suggestion, as already published in these pages, Mr. F. Goldby tried the solubility of eikonogen in glycerine diluted with water, also the influence as a developer of the mixture, with sulphite of soda added. The glycerine appeared to act as an admirable preservative of eikonogen. The solution made nearly a month ago, and kept in a stoppered bottle, which at the start was not more than three-fourths filled, kept of a bright green colour for more than three weeks, then quickly, in course of a day or two, turned brown; the bottle had been frequently opened, and once, in consequence of forgetfulness, the stopper was left out all night. If the apparently well-preserved green solution just described be largely diluted with water, it oxidises rapidly, so far as change of colour may be trusted as an indicating test. The doubt is whether colour may, in this case, be relied upon as a guide. The brown solution just mentioned, with caustic soda as the alkali, will give no image within ten minutes or a quarter of an hour, but on then washing the plate and applying a quinol developer, the image comes up all right. The eikonogen solution was made as follows:—

Eikonogen	55 grains
Sulphite of sodium	110 „
Glycerine	½ ounce
Distilled water	4 ounces

Had the proportion of glycerine been larger, the retention of the green colour might have been of longer duration. The solution, while green, was used for adding to a normal eikonogen developer to improve any image coming up with too little density. Mr. Leon Warnerke had some curious changes of colour in a solution of alkaline eikonogen developer, kept in his baggage during some recent travels on the Continent.

COLOUR SENSATIONS.

A PAPER read before the Franklin Institute by Mr. Fred Ives, published on another page, deals with the subject of colour sensations, and in relation thereto it may be stated that by mixing in suitable proportions the pure red, green, and violet of the spectrum, the physicist can match any colour to which the human eye is sensitive. A yellow colour is obtained by suitably mixing the pure red and green of the spectrum as frequently demonstrated in public by Lord Rayleigh; this result would not have been anteecedently expected, neither is it clear why the eye does not naturally recognise brown as dark yellow, just as it recognises blue as blue, whether it be light or dark. That a mixture of blue and yellow produces green as judged by the eye excites no surprise, but many stiffnecked people refuse to believe that suitably mixed red and green will produce bright yellow, until they see the fact demonstrated.

THE BERLIN JUBILEE PHOTOGRAPHIC EXHIBITION.

BY DR. H. W. VOGEL.

THE great jubilee exhibition in Berlin belongs to the past, and, since 1865, it was the greatest show of its kind that has taken place here. The pictures covered more than 10,000 square feet. That the United States were honourably represented I have written to you already. Pickering Brothers, Jackson of Denver, and Rowland of Baltimore, obtained silver medals. Regarding the exhibition itself, many interesting conclusions may be drawn from it. We are at a period of many new changes in photography, and new methods are more generally esteemed. I clip the following from the reports:—First, the general increase of platinum prints.

Berlin portraitists have taken little notice of this yet, and the fact is, almost only Berlin amateurs exhibited platinum portraits; but it was much more decidedly represented by exhibitors from other cities—Bieber, in Hamburg, and Pietzner, in Teplitz; Van Delden, in Breslau; Selle and Kuntze, in Potsdam; and in England, Winter, Sutcliffe, and Chamberlain. Pietzner proves by his silver prints, exhibited at the same time, that with regard to attraction, the platinum print is not the least behind the silver print, but the contrary is the case. We have always spoken in favour of this new and durable process. The exhibition has cleared the way for this work.

In England, the mother country of the platinum print, it has become more domesticated than with us.

In reproductions, the platinum print had only one representative, Dr. Albert, of Munich, which is rather astonishing, as Albert's results are actually wonderful, the platinum picture resembling greatly in richness of tone and colour the photogravure, which is generally considered as the finest art-reproduction process. Some were very likely still more surprised to find the pigment—carbon—print, which had been abandoned by many, and is at most applied now only for diapositives, to be represented in a pretty prominent manner.

Here may be mentioned, before all, the magnificent reproductions of Hanfstaengl, which rank first in artistic superiority. In size they are surpassed by the large folios of Koch in Neuwied, who applies pigment printing most strongly for enlargements, and has gained renown by his exhibit, the pictures showing, however, rather too much retouching. But amateurs also are zealous admirers of pigment printing. Wonderful landscapes, particularly some magnificent winter scenes, were exhibited by Sacré, of Geneva; further by Scholtz, of Gorlitz; Clement, of Yorkshire; and E. Vogel, junr.

The carbon print, in comparison with the platinum print, has the advantage of its manifold tones; but notwithstanding all its accomplishments we do not care to give it the preference. Chemically the carbon print is just as durable as the platinum print, but the former can more easily be damaged mechanically.

Surprising, also, in the exhibition is the preference for aristo paper, particularly among amateurs. Of portraitists, only one has exhibited in large style on aristo paper, namely, Buhler, of Mannheim, whose aristo landscapes have already met with general recognition in the *Verein zur Fordersing der Photographie*.

There is no question but that the aristo paper gives the sharpest reproduction of all the fine details of the negative, and even furnishes a brilliant print from rather weak negatives; only one thing is disturbing—that is, the strong gloss, and oftentimes the unhealthy-like tone. That aristo pictures do not surpass the silver pictures in durability is known.

The bromide of silver paper took, of course, a prominent part at the exhibition aside from these new papers, in the production of enlargements. While formerly this had been a specialty of three or four German firms, the enlarging process has become such an easy matter, after the introduction of bromide of silver paper, that even amateurs become experts. One of the most prominent is E. Körner, who, in the most simple way, makes the enlargements with the same objective and apparatus with which he made the negative, by putting the negative into the holder, and holding the latter, with the slide drawn, towards the light, while the objective extends into a dark room, projecting here the enlargement upon a screen placed opposite. This manipulation requires a careful determination of the time of exposure, on account of the changing daylight; but Körner's achievements are not to be doubted, as is proved by his pictures. Among the professionals Paul Meyer is prominent; his architectural views—enlarged on Stolze paper by magnesium—are first-class. But not all pictures of extra size at the exhibition were enlargements.

The magnificent architectural pictures of Schmitz, of Cologne, giving quite the impression of enlargements, are direct views on dry plates of 110 centimeters, from Westendorp and Gebhardt. The exposure of one of these pictures—a dark interior—with a Busch pantoscope took three days.

The remarkably grey-blue tone of the pictures gave rise to the belief that they were enlargements.

Our modern dry plate permits also of taking life-sized pictures direct from the person, of course at the expense of sharpness in the background. Some surprising exhibits in this branch were made by Byrne, of Richmond, who figured pretty prominently. Quite a peculiar field for enlarging is worked by Franz Kühn, of Berlin, namely, the enlargement upon linen. He has surpassed all the others in size in the life-size picture of the Emperor of Austria in full figure. It is evident that such pictures are preferred for painting in oil.

If the exhibition furnishes proof that photography has taken a new direction with regard to the positive process, something similar may also be said of the negative process in regard to the more and more extended application of the colour-sensitive plates.

In the beginning attention was paid to them only by reproducers. Their excellency for other things—for instance, landscapes—was convincingly proved several years ago by Goebel, Deldin, and Knetsch (the latter for azalin plates); the first named, by his magnificent panorama of "The Ruhr," giving the finest details of foliage and distance, which otherwise had always a more or less foggy appearance. But the yellow glass, which is indispensable for azalin plates, gave much offence, and it is only since the introduction of the eosin silver plate, which does not require the yellow glass for landscapes, that the application of colour-sensitive plates has become more general, and they have even made their way into portraiture, as proved by Salle and Kuntze's pictures, particularly portraits with many colours, such as uniforms. In reproductions, landscape, architectural and scientific photography, colour-sensitive views were well represented.

Firms for reproductions do not mention the application of the colour-sensitive plate in a business way any longer;

it is considered as a matter of course, not only in Europe, but also in the United States. Kurtz, from New York, sent some magnificent reproductions from European originals on azalin plates, whose excellency is even recognized by such art critics as Ludwig Pietsch.

Another important advance shown at the exhibition are the different processes with the printing press.

The "Lichtpressendruck"—under which name we comprise all methods of producing printing plates for the press with the aid of photography—was formerly considered a subject of the greatest secrecy.

The principle of photo-lithography was perhaps known; but heliography, copper-light print in lines, and photo-engraving copper-light print in half tones, was only occasionally mentioned, and all work in places of that kind was done with closed doors. Now the veil has been removed. The hope of Albert that the Lichtdruck would be introduced into every portrait gallery, and that it would be used for even one dozen pictures, has not been realized; but the fact remains that Albert, Husnik, and Obernetter have originated a new, easily executed printing-press process out of the old, incomplete Thessie process, which threatens to compete seriously with lithography.

Originated in France, the completion of the process was reserved for Germany, and it is the only printing process which, besides the Woodbury process, furnishes pictures deceivingly equal to genuine photographic prints.

Four text-books treating about this process have already been published. The exhibit of Stengel and Markert shows the manifold application of the process in a surprising way. Obernetter's photogravure process—copper lichtdruck—which differs from all the others, and is a substitution process, takes a peculiar position, having furnished already many promising results.

Of still higher importance for illustrated literature than the copper lichtdruck is autotypy, the light picture relief-etching in half tones for the letter-printing press. The introduction of the "Net," through which the picture to be reproduced is copied, and which divides the half tones, has solved the great problem.

Angerer and Goschl, the Autotype Company, of Munich, and Riffarth, of Berlin, prove the variety and capability of the process in a magnificent manner—not only in black, but also in variegated colours. It is certain that modern illustrated literature cannot exist any longer without the light picture—relief—etching. Even illustrations of comic journals like *Ulk* are made by Riffarth exclusively by relief etching. The exhibition has indeed offered a fine opportunity for admiring the great progress made in this branch. We regret only that Kurtz's excellent autotypes were missing at the exhibition.

We come now to portraiture. Qualitatively this was excellently represented. We were told that several of the "first" photographers were missing. We might be allowed to answer that these so-called "first ones" could have sent nothing better than we had on exhibition. There were not so many portraits exhibited as in 1865, but this fact is only a sign of the times. At that time portraiture was the principal branch of photography; all other branches took a back seat. Now it has changed. The public has been taught by the exhibition that photography exists for more purposes than portraiture, and that it plays an eminent part in the culture of our present time. Qualitatively the portrait branch was magnificently represented. Fechner, and Loescher, and Petsch, have gained new laurels. Fechner's exhibit astonished many. He had never made such a public show before. Bold light effects he in most cases avoided. Loescher and Petsch, on the contrary, show their virtuoso work here in their genre pictures in direct sunlight, their portraits on a quiet white or very dark background. For more than twenty-five years this firm has cleared the path upon the fields of artistic lighting. Fechner's portraits of Berlin artists remind us of Carjat, who was the man of his day in 1865. Chiefly commented upon by artists was the careful application of negative retouching in both exhibits, which nowadays has to cover everything. The photographer may assert as his excuse that he is forced by the public, but he will never be able to convince an artist of this. Therefore the criticism of many artists.

The quarrel about this point, the conflict between artist and business, will never be ended, the business part requiring likewise its rights. More about the exhibition in my next.

For some time past there has been produced for bleacheries a bi-sulphite of soda solution saturated with sulphurous acid by introducing gaseous oxide of sulphur (sulphurous acid) into concentrated soda solution, which contains a large quantity (50 per cent.) of concentrated and free sulphurous acid. These sulphite lyes have a strong concentration, show a considerable density (38 degrees Beaumé), and keep in corked bottles for many months. A good variety is furnished by Nashold in Aussig (Bohemia), which is used by me in the laboratory, and is very cheap.

The solid bisulphite of soda (acid sulphite of soda) is proportionally much dearer and less effective, having only concentrated and no superfluous free sulphurous acid. The acid sulphite lye, as we will name the preparation, is readily applicable to photography.

Mr. A. Linear has shown that acidifying the fixing bath with a mixture of tartaric acid and sulphite of soda is an advantage, the acid fixing bath preventing the yellow colouring of the film by the pyro developer, acting also against fogging with the hydroquinone developer.

For acidifying the fixing bath the above mentioned sulphite lye is serviceable, and has been used by me regularly for some time for the fixing of bromide of silver gelatine plates.

One litre fixing soda solution (about 1 :4, the concentration of ordinary fixing baths for dry plates) and 50 c.c. (or more) of acid sulphite lye are mixed. The fixing bath can be applied at once. The plates coming from the developer are well washed, and placed in this fixing bath, which can be used until it becomes brown (which takes several days). By an addition of sulphite lye the fixing bath can be improved again, until it begins to work slowly and the soda is exhausted.

The acid sulphite lye having proved just as advantageous as it is cheap to make acid fixing baths, and being serviceable for pyro, hydroquinone, and pyrocatechin developers, also presumably the eikonogen developer, its practical application is to be recommended.

At the same time, it may be mentioned here that negative plates developed with pyro and fixed in ordinary fixing baths, and getting from this careless treatment a yellow colouration of the film, can be saved securely with the acid sulphite lye. The washed negatives are placed in a dish with water, to which are added several cubic centimeters of the acid sulphite lye, with some muriatic or sulphuric acid, thus freeing considerable quantities of sulphurous acid. The yellow colouration is in a short time removed from this liquid, and the film is cleared.—*Anthony's Photo. Bulletin.*

SUGGESTED NEW DEVELOPERS.*

BY JAS. H. STEBBINS, JUN.

From long usage we have become accustomed to and thoroughly understand the properties of such developers as pyrogallol and ferrous oxalate. Within the last two or three years a new organic reducing agent was brought to our attention, namely, hydroquinone. This compound has now also become thoroughly known, so that it will be useless for me to say anything about it here. These three substances are practically the only organic reducing agents used at the present time, and it is my intention in this paper to suggest certain other compounds which may possibly be used for this purpose. Some of these compounds I dare say have been already tested, but others I am convinced have not, and I therefore offer them to you, with the hope of inspiring some with the desire to make original investigations in this direction.

Resorcin.—Isomeric—that is, having the same formula as hydroquinone, but possessing different properties, is resorcin. This substance, as I have already described in a previous paper, is prepared by using benzole disulphonate of soda with caustic soda, setting the phenol free with hydrochloric acid, and extracting with ether. It is a white crystalline body when pure, having the formula

$C_6H_4<^{OH}_{OH}$ and is, chemically speaking, a metadioxybenzole.

I have experimented with this substance, using carbonate of soda and carbonate of potassium, without, however, obtaining any satisfactory results. H. Tóth and Eder (*Phot. Corresp.*, Vol. 17, p. 191), however, say that in an ammoniacal or caustic soda solution it reduces gelatino-bromide plates quite well, although somewhat slower than pyro.

Pyrocatechin, $C_6H_4<^{OH}_{OH,}$ the third isomer of hydroquinone, is said by the same authorities (*loc. cit.*) to work quite well also. This substance crystallizes in rectangular prisms, belonging to the orthorhombic system, and chemically speaking it is an orthodioxybenzole. Eder and H. Tóth, in their experiments, used a 5 per cent. pyrocatechin solution, to which they added two or three drops of ammonia for every 20 cubic centimetres.

Phloroglucine, $C_6H_3{<^{OH}_{OH}}{-OH,}$ an isomer of pyrogallol, has also been tried by Eder, who states that even in a strong ammoniacal solution it works very poorly, as the reducing action is very slight. Perhaps in a caustic soda solution it might work better. This substance is best prepared by fusing resorcin with caustic soda. It crystallizes in hard rhombic prisms, having a very sweet taste. Some time since I made a few tests with phenylhydrazine chloride, and found that this substance in a caustic soda solution reduces chloride of silver very easily. I did not extend my experiments to bromide of silver, but have no doubt but that it will reduce the latter too. This compound may be prepared by reducing diazobenzole chloride with tin and hydrochloric acid, and it has the formula $C_6H_5.NH.NH_2HCl$. It crystallizes in little pearly plates, which are quite soluble in water, and altogether it is a very remarkable compound. While reading over the Berichte of the German Chemical Society some time since, I ran across an article by O. N. Witt (*loc. cit.*, 1888, p. 3468) entitled, "Reduction Products from the Azo-colouring Matters of the Naphthalin Series." This article describes a number of compounds, which I think may prove useful in photography, though I have not heard of their being used, or even experimented with, for this purpose. I will now give a brief *résumé* of the same.

Amido-β-naphthol-α-salpho acid.—This compound was obtained by reducing with stannous chloride and hydrochloric acid a yellow dye-stuff produced by the action of diazobenzole-chloride upon β-napthole-α-sulpho acid. The above amido-naphthol-sulpho acid crystallizes from the hot reaction mixture in little right-angled, indented, rose-red leaflets. It is very little soluble in boiling water, but a trifle more so in an aqueous solution of acetate of soda, from which, on cooling, it crystallizes out again. Alkalies and alkaline earths dissolve it very readily, and the solutions thus obtained, when left exposed to the air, turn rapidly orange brown. Oxidation products colour either the neutral or alkaline solutions of this acid yellow to brown. The most peculiar feature of this salt, as well as of those that are to be described farther on, is the fact that it reduces silver salts either in acid or alkaline solutions to extremely finely divided metallic silver. This peculiarity would, in my opinion, make the new compound an extremely valuable one for use in developers. Lack of time has prevented me from making tests in this direction, but I have every reason to believe that this compound, as well as some of the others to follow, can be made to take the place of pyro.

Amido-β-naphthol- -sulpho acid.—This compound is isomeric with the foregoing one, and may be obtained by reducing the orange dye-stuff produced by combining diazobenzol-chloride with Schäffer's β-naphthol-β-sulphonic acid. It is obtained from the reaction mixture in little white crystals. In small quantities it may be dissolved in boiling water without decomposition; and if the solution thus obtained be rapidly cooled down with ice, the amido-acid crystallizes out unaltered in little snow-white needles. By slow cooling of the aqueous solution it is decomposed, gradually turning brown. In alkaline solutions it behaves similarly to alkaline pyrogallol solutions. It likewise reduces silver salts to metallic silver.

Amido-β-naphthol-δ-sulpho acid.—This compound is isomeric with the foregoing one, and was obtained by reducing the dye-stuff produced by combining diazo-benzol-chloride with Cassella's napthol-sulpho acid, F. Crystallizes in glistening rose-red needles. The cold aqueous solution of this compound reduces nitrate of silver only after a few seconds, and not, like the beta acid, the very moment they are mixed,

Amido-β-naphthol-α-disulpho acid.—This compound is obtained by reducing the aniline-azo-derivative of naphthol disulpho acid R., known in commerce as "ponceau 2 G." Crystallizes in snow white needles, with silky lustre. It reduces silver salts immediately to metallic silver.

Amido-β-naphthole-γ-disulpho acid.—This compound is obtained by reducing a dye-stuff known in commerce as "ponceau G." It is isomeric with the previous compound, and crystallizes in snow white prisms. This compound reduces silver nitrate to metallic silver, but only after a few minutes' contact with the latter.

Orthonaphthylendiamine-β-disulpho acid.—This compound was obtained by reducing the dye-stuff produced by combining diazo-benzol-chloride with β-naphthylamine

* Read before the Society of Amateur Photographers of New York.

monosulpho acid, and known commercially as "Golden Brown." It is thus obtained as a yellowish white crystalline meal. It reduces silver salts, but the author gives no particulars concerning the same.

Orthonaphthylendiamine-δ-sulpho acid. This compound is isomeric with the foregoing one, and may be obtained by reducing the dye-stuff produced by combining diazobenzol chloride with β-naphthylamine-δ-sulpho acid. It is thus obtained as a grayish powder. It reduces nitrate of silver which has been acidified with nitric acid quite rapidly.

Orthonaphthylendiamine-ψ-sulpho-acid.—Isomeric with the previous compound. It may be obtained by reducing the aniline-azo-derivative of Dahl's sulpho acid No. 3, known as β-naphthylamine-γ-monosulphonic acid. Crystallizes in light brown, glistening leaflets. It reduces silver salts.

Without wishing to appear tedious by the description of so long a list of new compounds, I cannot close this paper without making a brief mention of two other substances from which I think good results might be obtained. I refer, namely, to para-phenylendiamine, which may be obtained by reducing paranitracetanilide with tin and hydrochloric acid; and to dimethyl-para-phenylendiamine, which may be obtained by reducing nitroso-dimethyl aniline with zinc dust. Both compounds, especially the latter, absorb oxygen from the air, and for this reason they might make good reducing agents.

At the time I read this paper before your Society, my manuscript was not completed, and illness shortly afterwards intervening, has prevented me from completing it till recently. A few days since, upon my return from the country, where I had gone to recuperate, my attention was called to a new developing reagent known as "eikonogen." Imagine my surprise when I learned that this new compound was nothing more nor less than amido-β-naphthole-β-sulphonic acid, which I described in the early part of this paper, over three months ago. I do not know to whom the priority of this discovery is due, or even whether it is patented, but, as I was the first to suggest its use as a developer in this country, I think I am entitled to some recognition for the same.

Notts Amateur Photographic Association.—A grand *conversazione* and exhibition of photos. and cameras will be held in Castlegate Lecture Hall on Monday, November 11th, Sir John Turney presiding. The programme will include selections of vocal and instrumental music, lantern display and shadowgraph, scientific instruments, works of art, and so on.

Detective Camera Work.—A Philadelphia tourist stepped off at North Yakima recently, says a letter from that Washington territory town to the St. Louis *Globe Democrat*. As usual there were scattered along the principal streets groups of Indians in full dress of buckskin leggings, red blankets, feathers, and green paint. The tourist wandered on until he came face to face with a chief. With an exclamation of satisfaction he pulled his Kodak fn front of him and uncovered the slide. In an instant the red man threw up his hands in front of his face and shouted, "Ugh! Ugh! Bad medicine. Picture no good. Bad medicine." The tourist only laughed and persisted. The chief stepped forward and pushed the camera to one side. The tourist gave the Indian a shove, and got a blow in return. Three or four white men came to the rescue of the Philadelphian, and several braves gathered about the chief and muttered, while one of the youngest laid his hand on a knife. There was a parley, which ended on the tourist putting up his Kodak and the chief mounting his cayuse and going down the street at full speed and with an occasional whoop, toward the reservation.—*The American Amateur.*

DIRECT PROCESSES OF PHOTO-ZINCOGRAPHY.

In the *Annual General Report of the Survey of India*, 1887-89, fowarded to us by Col. Waterhouse, he describes two processes of photo-zincography which have been tried during the year with the object of accurately reproducing maps in two or more colours, by obtaining the photographic image direct on the zinc plates, instead of transferring it from paper transfer-prints, which must always be more or less untrue to scale. In the first place, as many original drawings must be prepared as there are colours to be reproduced—*e.g.*, one for the names and outline in black; one for the streams and waterways to be printed in blue; one for the mountains to be printed in grey, and so on—and it is obvious that these originals must be most carefully prepared, so that the details on them may accurately correspond when the different prints are put together. Two methods have been tried; one with bichromate of potash, albumen, and arrowroot, the other with asphaltum.

The following is the description given of the bichromate process worked out by Mr. J. Harrold, the assistant in charge of the photo-transfer section.

In this, as in all other methods of obtaining the photographic image directly upon the printing surface, a reversed negative is necessary, but this is easily produced by the aid of a silvered glass mirror. The zinc used must be in *thin* sheets, so that perfect contact may be obtained in the printing frame between the plate and negative. The plate is carefully cleaned and grained as usual, then washed over with a strong solution of gum and decoction of nut-galls, such as is used for etching the zinc plates after the photo-transfers have been laid down. This is allowed to dry, and then washed off to remove all traces of gum. The plate is then again dried, and coated evenly and carefully by means of a piece of cloth folded into a long pad, with a solution of

Arrowroot sol. ... 40 c.c.	Arrowroot	20 grammes
	Bichromato of potash	9 ,,
	Water	700 c.c.

Bichromate of potash 5 grammes.

Albumen sol. ... 15 c.c.	Albumen	equal parts
	Water	

The coating left on the plate is exceedingly thin; the plate is dried off quickly at a moderate heat, and is dry in a few minutes. It is then exposed under the reversed negative for about six minutes in the sun for an ordinary line negative. The plate is allowed to cool, and soaked in cold water for about half an hour to remove the bichromate. The exposed surface is now carefully sponged to clear away all soluble or unaltered colloid matter remaining on it. After a good rinsing in clean water the plate is dried and inked with transfer ink, and in about fifteen minutes, as soon as this is dry, it is cleared off with turpentine. A few drops of water are sprinkled over the plate, and it is then wiped and rolled in with ordinary printing ink. The further application of the etching solution of gum and nut-galls seems unnecessary, except for cleaning the borders, but in any case, it should not be applied till the plate has been properly rolled in.

A plate recently prepared in this way has stood well for nearly 700 copies of a very fine subject, and far better than a transferred plate would have done.

The asphalt process worked out by Mr. A. W. Turner is as follows, and, as in the bichromate process, reversed negatives are necessary.

The sensitizing solution of asphalt is prepared by taking 4 ounces of the best Syrian asphaltum, grinding it, and then washing it well with ether in a bottle, pouring off the soluble portion, and adding fresh ether four times, with an interval of about an hour between each change. This leaves about 50 per cent. of asphaltum insoluble in ether; this is dried, and can be kept in stock. The object of washing with ether is to remove

the more insensitive components of the asphaltum. A 2 to 3 per cent. solution of this prepared asphaltum is made in benzole. It should be allowed to stand for an hour or two, and then carefully filtered. This solution appears to keep any length of time. The solution in turpentine throws down an insoluble deposit after a short time, but this may be prevented by the addition of chloroform or thymol.

A little practice is required to coat large plates successfully with the benzole solution, owing to its quick evaporation. Mr. Turner finds it best to lay the thin zinc plate on a sheet of glass of the same size, and pour the asphaltum solution over the plate in the same way as collodion, running it off very quickly at the right-hand lower corner. A considerable quantity of the solution should be left on the plate, sufficient to keep it liquid all over. The solution is then flowed rapidly back to the left-hand top corner, and put to dry on a stand on which the centre of the plate only is supported. The two ends hanging over form a natural curve to the plate that gives a very even coating. This method of drying has been adopted from a suggestion of Professor Husnik, of Prague, and is very efficient, no difficulty having been experienced in coating plates up to 32 by 24. The plate will be dry and ready to print in a couple of minutes. The asphalt coating, as thus prepared, is very sensitive, and in the sun an exposure of ten minutes is sufficient for a good, clear, line negative; in bright diffused light, twenty minutes to half an hour will suffice. If printed in the sun, great care must be taken that the plates are quite cooled down before beginning to develop. To make sure of this it is well to put the plates into cold water till cool, and then thoroughly dry them before putting them into the developing bath of turpentine. It was found that a very slight degree of heat in the plate affected the development considerably, causing the asphalt to dissolve away and appear underexposed.

The development is performed by placing the plates in a dish with sufficient turpentine to cover them well. The dish should be gently rocked till the image appears, and the plate is allowed to remain till all the soluble asphalt is dissolved. If well exposed, plenty of time can be taken with the development without danger of injuring the fine lines. When sufficiently developed, the plate is taken out, and immediately washed in a strong jet of water, commencing at the near edge of the plate, and following the turpentine as it is repelled by the water off the opposite side. The plates should be thoroughly washed in plenty of water for about five to ten minutes, and are then ready for etching and inking up in the same way as an ordinary transfer. After etching, as usual, with the ordinary nut-gall and gum solution, the asphalt image must be entirely cleaned off with benzole. Where any part of it remains it will refuse to take the ink.

The West Hartlepool Art and Photographic Exhibition opens on the 23rd of the present month. The entries are so numerous, that the committee can receive no more, as the space is already fully occupied. Prizes to the amount of £200 are being offered in the various classes. There are over 500 entries.

Holborn Camera Club.—The arrangements for November and December include the following:—Nov. 8th, lantern slide making, lecture by Mr. A. R. Dresser; Nov. 15th, demonstration on lenses and stops; Nov. 22nd, social evening and lantern display; Dec. 6th, reading of papers on photographic subjects; Dec. 20th, lantern display.

Royal Institution of Great Britain.—The general monthly meeting was held on Monday, November 4th, when Sir James Crichton-Browne, M.D., LL.D., F.R.S., occupied the chair. The special thanks of the members were returned to Professor Dewar, F.R.S., for his present of a portrait of the late Mr. Henry Pollock.

Mordanting with Chrome. G. Saget.—If we pour a solution of potassium bichromate into calcium hydrosulphite with an excess of lime, chromium oxide is at once precipitated. Cloth padded in bichromate and steeped in calcium hydrosulphite becomes green, and attracts all colouring matters which dye chromium oxide. At 40° degrees the action is immediate.—*Chemical News.*

PHOTOGRAPHY IN GERMANY.

BY HERMANN E. GUNTHER.

Bichromate of Soda—New Toning Bath for Aristo Paper—Photomicrography—Erythrosin and Silver—Gold Bath for Albumen Paper—New Photographic Society—Eikonogen Developer—Intensity of Light in Deep Waters—Exhibition at Groningen—Freshly Prepared Collodion.

The Use of Bichromate of Soda in Reproduction-Photography.—Professor Husnik points out, in the *Photographische Notizen*, that for the last three years he has used in his printing establishment for photo-lithographic and zinc-etching purposes, the bichromate of soda with satisfactory results. This salt is in technically pure condition, more than one-third cheaper than the bichromate of potassium, and, besides, it is much more soluble in water; so that, in using strong baths, or a large addition of albumen, gelatine, or dextrin, this salt can never crystallize out of the solution. As is well known, the potassium salt dissolves, according to the temperature, in ten to twelve times its volume of water, whilst the soda bichromate dissolves in about double the quantity of water. As the sodium possesses a much lower atomic weight than the potassium, in 1,000 grammes of the soda salt a larger quantity of chromic acid is purchased than in the equal quantity of the potassium salt, so that, consequently, much less concentrated baths are required by it to obtain the same result; this advantage being, however, partly compensated by the fact that the sodium bichromates of the trade are always hydrous ones, for the reason that the dyers, who have hitherto used only the potassium salts, have to undertake no alterations in the weight of the new salt for their formulæ. The bichromate of soda can therefore be highly recommended for all the different processes pertaining to reproduction-photography.

A New Toning Bath for Gelatino-Chloride Printing-out Paper.—Herr A. Stieglitz recommends, in Liesegang's "Amateur Photograph," the following toning bath for aristo paper, giving quickly beautiful blackish tones:—

Chloride of gold	0·25 gramme
Nitrate of uranium	0·25 ,,
Bicarbonate of soda	5 grammes
Distilled water	300 c.c.

The bath should be used at once, because it does not keep. The pictures should be printed very deeply, and before toning they should be washed in at least six changes of water. Fixing is done in

Hyposulphite of soda	1 part
Water	5 parts
Ammonia	several drops

The prints will be toned within two minutes.

Photomicrography.—At present, according to Dr. Zettnow, green-sensitised erythrosin plates are used for photomicrography, a green-coloured screen being inserted between illuminant and microscope. Dr. Zettnow uses erythrosin plates and a solution of

Nitrate of copper	160 grammes
Chromic acid	14 c.c.
Water to make up	250 ,,

With this solution a plane parallel glass vessel, with about one-half inch distance of the glass sides, is filled. Professor Eder uses eoside of silver plates for the same purpose. These are prepared by soaking ordinary gelatino-bromide plates for two minutes in the following solution:—

Solution of crystallized eosin (1 : 1000) ...	25 c.c.
Solution of nitrate of silver (1 : 80) ...	1 ,,
Ammonia	1 to 2 ,,
Water	75 ,,

The green-coloured screen consists of a mixture of indigo, sulphuric acid, and picric acid, the development being by preference carried out with the well-known mixture of pyrogallic acid and soda. The erythroside of silver is prepared by Dr. Zettnow as follows:—1 gramme of the colouring matter is dissolved in 200 c.c. of water, the solution heated up to 60° or 80° C., and then is added a solution of 1 gramme of silver nitrate in 10 c.c. of water. The precipitate is allowed to settle, and, after cooling, the solution is filtered. The washing of the precipitate on the filter is continued until the filtered liquid appears colourless. Then the filter is pierced, the precipitate being sputtered off and so much diluted with water that its volume amounts to 250 c.c.; 1 c.c. of the well shaken liquid, in which the finely divided silver compound has been evenly swelled, being therefore equal to 4 milligrammes of the originally taken colouring matter.

An Excellent Gold Bath for Albumenized Paper.—The following toning bath is recommended by E. Kiewning, an experienced professional photographer, as absolutely certain, giving brown to bluish tones, according to the degree of its concentration and the time the prints are allowed to remain in it:—

Water	600 c.c.
Chloride of gold	4 grammes
Potassium chloride...	60 ,,

This having been made up, add—

Shaved, chem. pure chalk (carbonate of lime)	20 ,,

The mixture is allowed to ripen for three or four days in the dark, and with occasional shaking; it is then ready for use. To tone one sheet of albumen paper, 10 c.c. of this solution are diluted with 200 c.c. of water. If it is desirable to tone quicker, only 150 c.c. of water are added. The bath tones well and evenly to the last drop, especially in summer at high temperature, where the use of carbonate of soda in the gold bath seems not to be recommendable on account of its rapid decomposition. The above toning bath will prove to be very useful.

A New Photographic Society in Berlin.—In consequence of disunion which has prevailed for some time in the Berlin Amateur Society "Verein von Freunden der Photographie," a new association of amateur photographers was founded on Saturday, October 26, in that town under the name: "Freie photographische Vereinigung" (free photographic association), consisting at present of fifty-two members. The President is Professor Dr. Gustav Fritsch; Vice-President, Dr. Pfeiffer; Secretary, F. Goerke; meetings are held on the third Friday in each month, at the Hôtel Janson, Mittelstrasse, 53, 54. The *Photographische Nachrichten* has been elected as the organ of the new society.

Once more the Eikonogen Developer.—By the manufacturers of the eikonogen, the following formula has been recommended with a view to shorten the time of exposure to one-half:—

Sodium sulphite	100 grammes
Potassium carbonate	40 ,,
Eikonogen	20 ,,
Boiling distilled water...	600 c.c.

According to C. Kindermann, this bath in the case of portraits taken in the studio, gives only unsatisfactory results, this being, however, at once altered if, for developing a plate of 7½ by 5 inches, one or at most two drops of a solution of hyposulphite of soda 1:10 are added to the bath. Most brilliant and exceedingly beautiful negatives with plenty of detail are thus obtained. The slightly yellowish fog which makes its appearance at the edges of the plate may very easily be removed in the fixing bath by gentle rubbing.

Intensity of Light in Deep Water.—In the *Photographisches Wochenblatt*, mention is made of some interesting experiments made by Dr. F. A. Forel, with a view to discover how far down into the sea the light of day penetrates in various seasons. For this purpose he used ordinary silvered albumen paper, which in a suitably constructed receptacle he submerged into the Lake Geneva. It was shown by these experiments that the limit of absolute darkness in summer was about 150 feet from the surface, and in winter at about 350 feet. By other experimentalists it has been shown later on, that with highly-sensitized bromide of silver gelatine emulsion the extreme limit of the action of daylight is nearly twice that which it was supposed to be by Dr. Forel—that is, about 660 feet.

Exhibition at Groningen.—The court photographer, Julius von Kolkow, who intends to read a paper about the progress of the photographic art-science, in the month of December, before the Society of Naturalists of the University at Groningen, purposes to hold a small jubilee exhibition on this occasion, and he invites all photographers, amateurs and manufacturers, English included, who are inclined to send him photographs or goods for this exhibition, to enter into correspondence with him at their earliest convenience. His address is:—Julius von Kolkow, Groningen, The Netherlands. We learn that the Ministry of State and War of the Hague, and also a number of photographic authorities in Germany, have already promised to exhibit.

Freshly-prepared Collodion, writes a correspondent of the *Pharm. Zeitung*, is always, in spite of the most careful treatment, at first slightly muddy, and requires therefore a certain time to clear. To accelerate the clearing process, the collodion should be mixed with well washed, arenaceous quartz made red-hot, and then cooled, and should then be thoroughly shaken. The quartz takes all the flakes floating in the liquid along with it to the bottom of the bottle, and within twenty-four hours the collodion will be clear enough for being decanted.

The British Association has appointed a committee to investigate the oxidation of hydracids in sunlight, and has made it a grant of £15.

The Occultation of Jupiter Photographed.—The occultation of Jupiter on the evening of Sept. 3 was observed here. The first contact was noted at 20h. 29m. 21s., and the first appearance of the planet at emersion was recorded at 21h. 25m. 30s. local sidereal time. I also secured several photographs with the 10-in. refractor, one of which shows the disc of Jupiter half-covered by the dark limb of the moon, which is very interesting. —William R. Brooks, Smith Observatory, Geneva, N.Y., U.S.A. —*English Mechanic.*

Camera Club Notices.—Thursday, November 14th, 8 p.m.—Major J. F. Nott, "Films," with a demonstration. Monday, November 18th, 8 to 9.30 p.m.—Mr. Roberts will be prepared with the lantern if any member or members send him advice to the Club that they would like to try slides. Thursday, November, 21st, 8 p.m.—Mr. Alfred Maskell, "The Progress of Hydroquinone." Thursday, November 28th, 8 p.m.—Lantern evening. Wednesday, December 4th, 8.30 p.m.—Soirée at the Galleries of the Royal Society of British Artists. Thursday, December 5th, 8 p.m.—Mr. A. Horsley Hinton, "The Standard of Excellence in our Art."

NOTES ON THE PHOTOGRAPHIC EXHIBITION.

[CONCLUDING NOTICE.]

THE specimens of reproduction, whether by pure photography or by some photo-mechanical process, present no special feature of novelty. As examples of the first, Mr. F. Hollyer's copies of paintings take the first rank, though. The subjects he has chosen are not easy, nor are they of the kind to which photography does justice. They comprise the "Beata Beatrice" of D. G. Rosetti, and four paintings by Mr. G. F. Watts, R.A. Mr. Rossetti's lackadaisical unhealthy-looking maidens gain nothing by their photographic dress, and the "Beata Beatrice" is no exception. Of Mr. Watts' pictures, "Cardinal Manning" (No. 475) is the most effective, and next comes "The Happy Warrior." Much of the poetry of "Good Luck to your Fishing" has disappeared, partly owing to the difficulty in rendering the low toned tints in the original. For the same reason, probably, the portrait of Matthew Arnold appears somewhat hard in outline and in texture. But, considering the difficulties, Mr. Hollyer's work is certainly as good as is possible. Mr. S. Julius Hirst shows an excellent copy of a head (No. 289) in oils, and the Autotype Company are responsible for reproductions, among others, of Frank Holl's portrait of Sir William Jenner, Val. C. Prinsep's Dr. Wilson Fox, a scene from the "Two Gentlemen of Verona" by Holman Hunt, and the same painter's "Early Christian Missionaries Fleeing from Druid Persecution." For the latter a medal has been awarded, and it is not too much to say that of its kind it is perfect. The Autotype Company has now established its reputation on so firm a basis that it is almost superfluous to praise the care and skill their work invariably manifests. Messrs. Boussod Valadon & Co. show superb examples of ordinary Goupilgravure, and two curiosities in colours, one being printed from a single plate, and the other printed from several. The first is a copy of a marine subject, and the second from a direct photograph of the Eiffel Tower. The latter has a somewhat raw effect, and it cannot be said that photography printed in colours has yet attained a place in art.

The Typographic Etching Company exhibit a very noteworthy example of what they term "English Photogravure," in a reproduction of Mr. J. Gale's charming picture, "Sleepy Hollow," to which the etching does full justice. Its merits have been recognized by the judges, who have awarded to it a medal. Mr. W. L. Colls is a conscientious worker in the higher form of photographic reproduction, and his versatility is shown in a photo-etching after Rosetti (No. 487), in "In the Prime of Summer Time"—an admirable picture by Dr. P. H. Emerson in all respects save one, the line of the load of hay in the cart continuing the line of the trees on the right in a rather confusing fashion—in an intaglio reproduction of a well-known picture of Sir Joshua Reynolds, and in a similar copy of a woodcut by W. J. Linton.

It will be seen that the above can scarcely be considered a representative collection of photo-mechanical printing processes. Possibly the rules of the Exhibition, to some extent, put a veto upon a good many specimens being exhibited, but even if this were not so it is doubtful whether many exhibitors would be found. The international competition which was initiated at the Inventories struggled on through an extended period, and its culmination at the Holborn Town Hall, where the prizes were awarded and the specimens shown, was not what could be called an unequivocal triumph. Properly speaking, photo-mechanical reproductive processes belong to the domain of printing, and therefore one does not look for many examples at Pall Mall. It would therefore be interesting to know in what position the Society regards itself with respect to photographic reproduction. It has given a prize—and a prize worthily bestowed—to the specimens of English photogravure already mentioned, but does it draw the line anywhere?

With the lantern slides these notes on the Exhibition must conclude. The specimens are more numerous than usual, and quite up to any previous standard. The medal has been awarded to Mr. F. P. Cembrano, junr., and while one has nothing to say against the justice of this award, the fact remains that other competitors run him very close indeed. Messrs. F. H. Evans, G. Smith, A. R. Dresser, A. Chancellor, H. Little, and Major J. T. Nott, show slides which have each some particular and distinctive merit; while microscopic work is adequately represented by Mr. T. E. Freshwater.

In taking leave of the Exhibition, one patent fact may be alluded to. During the five weeks the gallery has been open no exception has been taken, I believe, to the awards of the judges. This is almost unprecedented, as in most former occasions there has been a little undercurrent of grumbling. So also with the hanging of the pictures. Somebody of course must be skied, and somebody must be put near the ground, and it speaks well for the hanging committee that the unfortunates have accepted their fate, if not with satisfaction, at least without complaint.

WIDE ANGLE.

STEREOSCOPIC PHOTO-MICROGRAPHS.

AT last month's meeting of the Royal Microscopical Society:—

Mr. John Meade's communication was read on "Stereoscopic Photo-micrography," in which he claimed to have been the first to produce stereo-photo-micrographs. Specimens were sent in illustration.

Mr. J. D. Hardy said he had a photo-micrograph which he had made on the same principle about seven years ago. It was of the eggs of the domestic fly.

Mr. E. M. Nelson said that the plan of taking stereoscopic photo-micrographs in this way had been known for a long time. One way in which they were done was to cover up alternately each half of the objective, taking a photograph from each, the two being afterwards mounted as a stereoscopic picture.

Mr. Crisp said the subject had been exhaustively dealt with many years ago by Dr. Fritsch in his "Ueber das Stereoskopische Sehen im Mikroskop und die Herstellung, stereoskopischer Mikrotypien auf photographischem Wege" (1873), while Dr. Stein's "Das Licht" contained a good summary of the subject.

The President said he had brought with him for inspection three photo-micrographs of one of the new rotifers mentioned in his supplement—*Gomphogaster arcolatus*. They were unfortunately not good specimens, but though very indistinct, they were sufficiently like the drawing shown at a previous meeting to enable the creature to be recognized as the same. It was necessarily very difficult to get a good photograph of an object of this sort.—*English Mechanic.*

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—On Tuesday, November 12, at the Exhibition Gallery, 5A, Pall Mall East, at 8 p.m., the medals awarded will be presented, and papers read by Capt. Abney, C.B., R.E., F.R.S., on "The Density of a Negative after Intensification," and by Mr. W. E. Debenham, on "The Estimation of the Efficacy of Plate Backings."

PATENT OFFICE

COPYING PAPER PRINTS.

BY J. M. FORBES.

I think the two most essential requisites leading to success in copying, by aid of the camera, are a good lens and a good developer. Without these, all the preliminary care exercised in the adjustment of the camera and subject to be copied—the final focussing and the after manipulations—count for nothing. I do not overlook the importance of a good dry-plate for this work. That should be understood, and I take it for granted that our copying friends have already adopted their own particular brand. For myself, I use a quick plate for both landscape and copying, and know exactly what wet-nursing it requires.

The lens used for copying purposes should be a rapid rectilinear, of short focus, and stopped down until the image on the ground-glass shows equally clear definition at centre and margins.

And now for the developer. Feeling that whatever success has attended my efforts to correctly copy silver prints, photogravures, and engravings, particularly in the form of lantern slides, is largely due to the developing solution which I have used for a considerable time with uniform results, I take the liberty of ringing the mixture changes once more, and pass the bottle :—

Water	10 ounces
Soda sulphite	180 grains
Potassium carbonate	180 ,,
Hydroquinone	26 ,,

That is my one solution, pure and simple, used for both negatives and lantern slides. "When found," as Captain Cuttle would say, "make a note of." I gave my old friend, Mr. Pyro, the go-by in favour of spruce young Mr. Hydro *alias* Quinol, who, although *given to the bottle*, serves me faithfully and well.

This developer should never be used full strength. At a medium temperature it acts very quickly on a properly timed plate, even when much diluted with water. The first thing to be done is to convert a portion of it into old stock solution. Begin with a trial plate requiring, say, two ounces of developer. Take of new solution half an ounce, water an ounce and a half. If the plate is slightly undertimed it will take about fifteen minutes to develop fully, and the result will be much softer and finer than with a stronger developer. Save this mixture as old stock solution, and so label it. As an ordinary developer for negatives and lantern slides, I use one ounce and a half old and half an ounce new solution. This may be further diluted with water if great softness is required. If, on the other hand, pluck is the desideratum, old developer should be used alone. From this it will be apparent that when the subject copied is an old, faded photograph, or any picture with little contrast to it, old developer should be used alone; and if the action on the plate is rather slow, a dash of new solution will prove a healthy tonic. Again, when the subject is full of strong contrasts, such as you will find in many photogravures, an ample exposure and a weak developer, with little, if any, old solution, will give the best possible results.

So much has been written regarding the copying camera, and the adjustment of the subject to be copied, so as to get the best distribution of light, that I feel that I could add nothing under these heads which would be considered really new. Any distortion in the finished copy will be proof positive that the position of camera or subject has been at fault, and forcible, high-temperature expressions will not be the remedy. Each step of this work must be carefully taken. The copying orchestra, if I may use the simile, must be properly arranged, each instrument correctly played, and *time* and *measure* considered as important factors; and, pray do not forget, the first fiddlership should by all means be vested with my trusty friend, Herr Hydroquinone.—*The Beacon.*

Hints to Lantern Workers.—Mr. W. Jerome Harrison writes to *The Magic Lantern Journal*:—"There are two qualities of chlorate of potash at present in the market—a cheap German make, which can be sold at about fourpence per pound; and English-made chlorate, which costs from sevenpence to ninepence. My advice is to eschew the former. Once or twice I have found it of fair quality; but, as a rule, it is cheap and unreliable. Most workers with oxygen gas are troubled, more or less, by the tendency of the gas to come off in rushes, passing through the purifying bottles so rapidly that it does not get properly washed. I find that the addition of a little dry common salt steadies the flow of gas wonderfully. My present formula is—Chlorate of potash, 1lb.; black oxide of manganese, 4oz.; common salt, 2oz."

Long Distance Views.—At a meeting of the French Photographic Society M. Guilleminot showed two negatives of the same subject taken from the same point, one of them having a diameter of only one centimetre, whilst the other measured at least twelve. He gave the following explanations: Up to the present time distant views were only obtained by making use of a telescope, and taking up with a photographic objective the image as it comes from the eye-piece. It is not always easy to arrange the glass and the photographic appliance, and it is always very cumbersome. I have sought to do away with these objections, and I have succeeded in doing so in the following manner: I use a camera having a long focus and with a double body. On the front, I adapt an ordinary objective with a sufficiently long focus; the one that I used had from forty to forty-five centimetres. Used alone, it gave me the little negative which I now offer for your inspection. On the interior frame of my camera I placed a small objective of my short focus (four centimetres), and I arranged the whole so that the image produced by the large objective should fall on the surface of the small one, which then serves as an enlarging apparatus, and it is with this arrangement that I have obtained the larger negative. This mode of operation may prove useful in military photography, the apparatus being simple, solid, and will only have to contend against the effects of heat on the divers layers of the atmosphere.—*Bulletin de la Société Française de la Photographie.*

Illuminating Microscopic Objects.—At a recent meeting of the Royal Microscopical Society, Professor Abbe's paper, "Notes on the Effect of Illumination by means of Wide-angled Cones of Light," was read; the conclusions of which were stated by the author as follows:—"The resulting image produced by means of a broad illuminating beam is always a mixture of a multitude of partial images which are more or less different and dissimilar from the object itself. There is not the least rational ground—nor any experimental proof—for the expectation that this mixture should come nearer to a strictly correct projection of the image—or be less dissimilar to the latter—than that image which is projected by means of a narrow axial illuminating pencil. This latter image has the most favourable conditions in regard to similarity to the object, because in its production nothing is lost of the diffraction-pencil, but the peripheral portions, which in most cases are of relatively small intensity. All the other images with which it is mixed in the case of a wide-angled cone are liable to greater dissimilarity, compared to a strictly true image, because they depend upon a more incomplete admission of the diffracted light. And it is against all rules of reasoning to assume that a mixture, or superposition, of a variety of images, all of which are more or less dissimilar from a true projection, should be less dissimilar than that constituent which is the least dissimilar one, whatever this one may be."

Notes.

As we surmised last week, the narrative of the photograph of the moving corpse was considerably "written up" by the *Tablet*. The *Tablet* derived its information from the *Globe*, which gave a comparatively sober version of the affair. But, like most newspaper men when they touch upon photography, the writer makes a slip which clearly indicates that he knows little of the art. After relating how the photographer discovered that the flowers had fallen from the corpse, he goes on to say, "When with an effort he had dismissed the disquieting idea that immediately surged through his mind, he turned to the apparatus, and *found that the result was not altogether satisfactory*. Another exposure was necessary. That accomplished, he returned to the studio to develop the negatives." The italics are of course ours. It is satisfactory to find this week that the photographer in question was Mr. Barrand, who will no doubt see that no absurdity of this kind will creep into the story entitled "Dead" which will shortly be published, and which is based upon the curious photographic experience referred to. Mr. Barrand, writing to the *Globe*, says, "I may state that I took *immediate* and *effectual* steps to see whether, as the negatives suggested, the young lady still lived. The result is set forth in the story, "Dead." On the whole the forthcoming "thriller" has received a very pretty preliminary advertisement.

One of the most interesting sections of the Paris Exhibition in regard to photography is that devoted to anthropology. This is the second time that the latter science has been represented in an international exhibition, the first occasion being in 1878, when a collection was shown in a modest building on the Quai de Billy. Despite the awkward situation which may be imagined when we say that the house was approached by a bridge thrown over a steep street, the public found its way to the exhibition, and showed the greatest possible interest in it.

This interest, as exemplified by the present Exhibition, has in no degree abated, and an anthropological section will probably take a permanent position in future international scientific gatherings. Since 1878 the composite photographs of Mr. F. Galton have been introduced, and in the section referred to are represented by contributions from Messrs. Billings, Paul Nadar, and Mr. Galton himself. Mr. Galton has lately been applying his system to the study of phthisis, and shows a composite made up of a hundred phthisical subjects, and one of two hundred subjects not phthisical, in order to compare the result. Experience, however, does not seem to have confirmed the hopes he had conceived of these operations, and M. Paul Nadar points out that the images superimposed last acted more than the previous ones, and therefore gave to the resulting print a false aspect. A curiosity is shown by M. Nadar in the way of a composite of the portraits of five brothers, the result being the portrait, not of any one of the brothers, but of an uncle!

Turning from composite portraiture, other notable exhibits in the gallery are photographs of twelve busts of North American Indians, sent by the Anthropological Museum of Washington; six standing figures of the principal types of India, sent by Mr. Risley, director of the Ethnological Service of Bengal; fifty portraits of natives of Oceana; a whole host of photographs of Asiatic Russian tribes; and last, but not least, the entire collection of albums formed by Prince Roland Bonaparte. These albums contain most varied and most singular ethnological studies, the collection of 450 Indian photographs meriting special attention. The subjects are both isolated and grouped. Several of these are given in *La Nature* of last week, and are certainly most curious. On the whole, the impression conveyed in strolling through this section is, that of all sciences, anthropology owes most of its progress to the assistance rendered by photography.

The Photographic Exhibition continues to attract the public, although it has now been open more than a month. The lantern evenings have been very successful, and, what is equally satisfactory, the quality of the slides shown is in advance of previous efforts. There has been no lack of voluntary contributions, one of the most interesting series being that lent by Capt. Adamson, from photographs taken during his recent Arctic expedition. Photographic lantern slides are so peculiarly adapted to amateur work, that it is not surprising the material at the disposal of the Photographic Society this year is ample enough to satisfy all requirements.

It was not likely that the restless ingenuity of the Americans would allow the automatic camera to remain long at its present stage. The latest development is associating the flash-light with the apparatus, so that the sitting may be reduced to a minimum. The medium supporting the picture is celluloid, and the photograph issues vignetted on a white background. Another improvement is an attachment for producing variety in the pose. An arm extends each side of the lens, and the sitter looks at either arm according to the view desired. The American railway authorities see in this invention a very practical use, because if season ticket holders were photographed, and the photograph placed on the ticket, it would no longer be possible to pass the latter round a whole family. We do not know if season tickets are transferred in this way in England, but if so the plan would certainly answer. It has been suggested before, but the difficulty always has been that an additional expense was thrown upon the traveller, because he was not always prepared with his photograph. Now, no doubt, an automatic photographic apparatus will be fixed in every season ticket office, and the purchaser be photographed at the time he pays his money. Photographic season tickets are in common use on the continent.

PHOTOGRAPHIC OPTICS.

BY W. E. BURTON.

Chapter XII.—On Instantaneous Shutters.

It may be thought that the instantaneous shutter is scarcely an optical instrument, but the use of it is so closely connected with the use of lenses that I incline to introduce a chapter on it.

An instantaneous shutter is merely an instrument for giving a very short exposure; for allowing light to act through the lens for a shorter time than it is practicable to allow, using the cap by hand. Its object is to photograph such objects as must not get a long exposure, on account of their being in motion.

At first sight it would appear as if nothing could be simpler than to construct an instrument fulfilling all the conditions required in an instantaneous shutter, but in reality the conditions are complicated, and they are not very easily fulfilled. In fact, it might almost be said, as it has been of lenses, that some of the qualities desirable are incompatible, and that we must at times sacrifice one or more of the less important to secure the others, the result being an instrument, not hypothetically perfect, but useful in practice.

In the first place, the photographer must disabuse his mind of the popular, or at least by no means uncommon, idea that an "instantaneous exposure" is something definite. The terms "absolutely instantaneous," "snap exposure," and so forth, tend to raise confusion. As a matter of fact, an instantaneous exposure occupies a space of time which, if short, is quite as definite as a long exposure. It is, moreover, as desirable to be able to vary the exposure when it is a case of $\frac{1}{20}$, $\frac{1}{10}$, or $\frac{1}{4}$ of a second, as when it is 4, 10, or 20 seconds. For by far the greatest quantity of instantaneous work an exposure not shorter than $\frac{1}{20}$ second is short enough, but there are special cases when it may be desirable to give shorter exposures, say even as short as $\frac{1}{1000}$ second. This is leaving out of the question a certain department of work for which extraordinarily short exposures are desirable. I refer to illustrations of "animals in rapid motion," such as have been so successfully produced by Muybridge, and for which exposures much shorter than $\frac{1}{1000}$ second are necessary. This is a special work which needs a training in itself, and I do not pretend to be competent to give instructions in the matter. For such instantaneous photography, however, as is likely to come within the sphere of work of the ordinary photographer, professional or amateur, I consider that $\frac{1}{1000}$ second is the shortest exposure that will ever be needed.

Another matter to be considered in connection with an instantaneous shutter is that it allows a good *coefficient* of light. This is a matter a little difficult to explain, and I may say that neglect of it is one of the commonest faults in instantaneous shutters. The object of giving a very short exposure is to avoid the blurring which would arise from the motion of the object to be photographed during a comparatively long exposure. The period of the exposure is from the time that the shutter *begins* to open until such time as it is completely closed. As, with instantaneous exposures, we, as a rule, have to use a larger diaphragm than we otherwise would, or else are liable to under-exposure, it is eminently desirable that, during the period of exposure, the light should be allowed to act with as much force as possible; that is to say, that the opening of the shutter should not be such as to allow the light to act with only *partial* force during the exposure. Now with a very common form of shutter, one in which an opening of the diameter of the lens crosses the aperture of the lens—a common form of drop shutter, for example—the lens is *fully* open for only an infinitely short space of time, and the total amount of light allowed to pass through the lens during the whole exposure is only one-half of what it would be were the lens fully uncovered from the beginning to the end. The effect is the same, as regards reduction of the light received by the plate, as if a stop of half the area were used, whilst there is none of the advantage, in the way of greater "depth of focus" and better marginal definition, that would arise from the use of the smaller stop. Were we to use, in place of the shutter having the poor coefficient, one having the best coefficient possible, we could, with the same time of exposure—and therefore with only the same liability to blurring from motion of the object—either use a stop of half the area with possible great advantage, or, using the same stop, have a plate just twice as well exposed.

The manner in which a shutter effects the *distribution* of light on a plate is a matter needing consideration. It is, of course, known to all photographers that the illumination given by a lens on a plate is not equal—that it falls off from the centre to the edge of the plate. This falling off is not very evident when only a small angle is included; but it is when we come to include an angle at all considerable. Moreover it is, even when only a moderate angle is included, considerable, when we use a lens of the rapid landscape form full aperture, or nearly full aperture; and this is the form most likely to be used in cases of instantaneous work. It is, of course, undesirable that a shutter should, by its action, increase this inequality of illumination; but there are some forms of shutter that do so. Before entering on this subject we should say that shutters which work at the lens may be divided into three classes—namely, those that work in front of the lens, those that work behind it, and those that work between the combinations; and that these may further be classified under the heads of such as consist of a single opening crossing the aperture of the lens; those that consist of two openings crossing each other, so that the opening for exposure begins and ends at the centre of the lens; and those of the "go-and-return" nature, in which a flap is raised from in front of the lens and is again lowered, or in which one flap rises and another comes down very shortly afterwards.

Without entering into a detailed account of the action of these various forms of shutter in altering the distribution of light, I may give the following summary. Single opening shutters, whether behind or in front of the lens, do not modify the lighting as regards falling off from the centre to any marked degree; but, in the case of a vertical motion, give a somewhat longer exposure to the sky than to the foreground when in front of the lens; a somewhat longer exposure to the foreground than to the sky when behind the lens. The latter form of inequality is, of course, to be preferred to the other in the vast majority of cases.

In the case of a single opening working between the lenses, there is a slight additional falling off of light, produced at the top and bottom of the plate, or at the two ends if the opening be worked horizontally. The distribution of light as regards foreground and sky is not appreciably altered.

The case of two openings crossing each other is, perhaps, the most important to consider, as in this form of opening it is possible to get both the greatest disturbance of

distribution of illumination and the greatest equality of illumination, according to where the shutter is placed. In most cases of shutters made with openings crossing each other the shape of these openings is made such that the actual exposing opening is of a square form; whilst the shutter is opening and closing, as shown in the accompanying sketch, and there are decided advantages in this form of opening.



Fig. 62.

With the form of shutter under consideration, placed either in front of or behind the lens, the falling off of illumination at the margin of the plate is *very considerably increased*, so that it is never advisable to use such a shutter in either of these positions. On the other hand, if such a shutter be placed between the lenses, the result is a distribution of light even better than is got by using the lens with the same stop, and exposing by the aid of the cap.

There is an advantage in the opening beginning at the centre of the lens which is quite peculiar to it. It is that the loss of light due to the time occupied in the opening and the closing of the lens is partly compensated for by the fact that the opening acts as a stop *during that part of the exposure*. The result is that the picture shows the qualities it would were it taken with a *slightly* smaller diaphragm than that actually in the lens; but it is a great mistake to suppose that, when the shutter gives an opening in the centre of the lens, there is no further necessity for stops at all.

That a shutter should not have the effect of shaking the camera during the exposures is of course essential, and it is far more difficult to secure the complete absence from shaking than might be supposed, especially when a rapid exposure is needed.

I believe that there is only one way of securing absolute immunity in the case of very short exposures from any impulse conveyed to the camera, and that is by having two moving parts of equal weight moving at equal rates of speed in opposite directions at the same time. I leave out of consideration the arrangement which may be made in some very special cases where the shutter is supported on a stand separated from the camera. The two moving parts may be made in the form of rectilinear or similarly shaped shutters moving in straight lines, or of two circular dishes centred on the same pivot, and revolving in opposite directions at the same time.

In the case of a drop shutter actuated by gravity only there is but little tendency to shake till the exposure is over; but with every form of shutter in which one moving part is actuated by a spring or analogous contrivance fixed to the shutter, an impulse is given to the camera during exposure tending to shake it, and if the results are not practically detrimental, it is merely because the shaking produced is so slight as not to be appreciable. This is only to be secured by making the moving part very light.

Of "go-and-return" shutters pretty much the same thing may be said. It is not possible to so construct them that they do not communicate an impulse to the camera at the time of reversal of the motion, or, where two flaps are used, at the moment when the motion of the first one is stopped. It must, however, be admitted that the weight of the moving parts in certain modern "go-and-return" shutters has been so much reduced that the impulse produces no appreciable effect, whilst the compactness possible in shutters of this form is much in their favour. Farther than this, it is possible, when a "go-and-return" motion is combined with a revolving motion, to compensate the impulse given by the reciprocating part by unequally weighting the revolving part. This has been done in the case of a very ingenious shutter mentioned by J. R. Gotz.

(To be continued.)

EIKONOGEN.*

BY CHARLES L. MITCHELL, M.D.

Eikonogen is the name of a new developing agent recently placed before the photographic public. It is the patented invention of a Dr. Andresen, of Berlin, and is a chocolate-coloured powder showing a crystalline formation of small laminæ, and has no taste or odour. It is said to be non-poisonous. It is sparingly soluble in water, about eighteen grains dissolving in an ounce, and forming a solution of a bright glass-green colour. In chemical composition it is said to be an amido-β-naphthol-β-monosulphonate of sodium. It is claimed for this new developer that, while its developing action is much quicker than either pyro or hydrochinon, it brings out the most perfect detail in the picture, even though a very short exposure has been made. It gives a clear negative of a bluish-black colour, and is especially recommended for instantaneous work. It is also said to give excellent results in developing lantern slides and transparencies.

During the past week I have made some few experiments with eikonogen, particularly as a developer for lantern slides, and I propose to discuss briefly the results of these experiments. The developer used was a slight modification of the formula given by the inventor, Dr. Andresen, that having been found to be almost too strong to give the best results. It was prepared according to the following formula:—

No. 1.—Eikonogen	½	ounce
Sulphite sodium, cryst.	1	,,
Water	1	pint
No. 2.—Carb. sodium, cryst.	¾	ounce
Water	1	pint

For normal developer, take of No. 1 and No. 2 each one part, water two parts.

The results obtained with this developer have so far seemed to justify all that has been said in its favour. Two lantern plates were given the same exposure—a rather short one—upon a given negative, and then placed in separate dishes. To one was added the eikonogen developer mixed as above, to the other a hydrochinon developer prepared with phosphate and carbonate of sodium. With the eikonogen the image began to appear in about ten seconds, and in two minutes was fully developed, ready to be washed and fixed. With the hydrochinon developer the image began to appear gradually at the end of the first minute, and at the expiration of five minutes was not fully developed. It required nearly five minutes more to complete the development, and the resulting plate lacked density and detail, and was evidently much under-timed. On the other hand, the plate developed with eikonogen had good density, and was full of the most exquisite detail.

The colour of lantern slides produced by eikonogen

* Read before the Photographic Society of Philadelphia.

varies according to the strength of the developer. With the formula previously given the colour is a clear blnish-black in the deep shadows, graduating down to a beautiful grey in the lighter portions of the picture. If a developer is used containing one-half the quantity of No. 2, and twice as much water, and a longer exposure be given, the tone obtained is much warmer, and is of an olive brown or grey colour, very soft and pleasing. With both developers the most beautiful detail was obtained, and I consider that for lantern slides, this developer, when properly used, will give results far superior to those obtained with either hydrochinon or oxalate. These experiments were merely tentative, and more familiarity with this new agent, and possibly some modification in the formulæ, will be required before the best results can be obtained. It works quickly, does not stain the film, and can be used for a number of plates before becoming exhausted. Six lantern slides were developed with one ounce of this developer, and with the last plate it showed no signs of exhaustion.

As a developer for negatives and instantaneous work, eikonogen will probably prove as excellent as it has for lantern slides.

As far as its price and developing power are concerned, it is probably quite as cheap, if not cheaper, than pyro. It costs now about forty cents per ounce, and in developing power it will probably go much farther than the pyro, while as an additional attraction it does not become dark and discoloured, nor will it stain the fingers, and hence will be much preferred by the amateur.

As a developing agent I believe that eikonogen has come to stay, and where its use is fully understood, I believe it will be found to be the most formidable rival to pyro that has yet appeared.

An attempt to produce an iodide of nitrogen photometer has been brought under the notice of the Academy of Sciences at Paris, by M. G. Lion. This is based on comparison of the volumes of nitrogen produced in equal times, by the light examined. and by a light standard.

Use of Coloured Glasses in Photography. M. Delaurier.—M. Lippmann's researches on producing photographs having just proportions of light, remind the author of some fruitless attempts of his own to obtain photographs in their natural colours by making use of three glasses, red, yellow, and blue. In these experiments he found that light, on passing an orange glass, gave an equality of photogenic action for objects of whatsoever nature.—*Bulletin of the Chemical Society of Paris.*

The 1886 Solar Eclipse.—The Reports of the Eclipse Expedition of 1886 are now ready for publication, and will appear in separate numbers of the *Philosophical Transactions.* The first is by Capt. Darwin, Dr. Schuster, and Mr. Maunder, and is a report on the total Solar Eclipse of Aug. 29th, 1886; the second is by the Rev. S. J. Perry, on the Observations made at the Island of Carriacou; the third is by Capt. Abney and Prof. Thorpe, on the Determination of the Photometric Intensity of the Coronal Light; and the fourth is by Mr. H. H. Turner, on the observations made at Grenville, in the Island of Grenada.

The Ink Plant.—The discoveries that are made in the "slack" season are amusing. Thus it is stated that in New Granada grows a plant which is locally known as the "ink plant," and scientifically as *Coriaria thymifolia.* Its juice serves, without the slightest preparation, as ink. At first the writing appears red, but in a few hours it assumes a deep black hue. It is worthy of note that steel pens are entirely unharmed by this fluid, which is free from the corrosive properties of ordinary ink. Several sheets of manuscript, written with this natural ink, became soaked with sea-water on their journey to Europe, but, when dried, the writing was found to be still perfectly clear.—*English Mechanic.*

GRINDING FOCUSSING SCREENS.

BY F. H. VARLEY, M.I.E.E., F.R.A.S.

The ever necessary focussing screen, from the commencement of photography to the present day, seems to have kept its dull mediocrity, and to be so far unamenable to improvement. At its best, it is but a poor and unsatisfactory device for obtaining the correct focal distance of the lens from the plate. Its woolly and befogged image leaves the operator in a certain degree of doubt as to whether the best result in focus finding has been achieved.

Sharp definition with the ordinary ground glass is difficult, because of the broken and irregular surface upon which the image falls, as well as to the blur of light by dispersion from the numerous minute prismatic points studding the whole surface of the plate; the coarser the grinding is left, the greater is this defect. It would be very desirable if an opalescent film could be devised free from these objections. Attempts in this direction from time to time have been made, but, as the ground glass still holds its own, it is but fair to assume that the efforts to produce an opalescent film have not resulted in substantial success.

Now that more attention is being given to small cameras on account of their portability, together with the improvements made in photographic enlargement appliances, which enable small negatives to do duty for the larger and more cumbrous plates of former days, accuracy of focussing is becoming more and more important.

To revert then to the ground glass screen—to improve it as far as possible—may be, and indeed is, worth some care and attention. The finest ground glass usually met with is much too coarse, and may be improved very materially by a proper mode of fine grinding. Here let me say there is grinding and grinding; it is quite possible to obtain a surface which is in a state of semi-polish, pon which the image would be lost by transmission, and yet the surface may be almost as irregular as the apparently coarser ground glass. Fine ground glass is very different to this; its ground side should show a greyish-white but perfectly dead surface, but yet be so far transparent as to allow the tip of the finger, when pressed against the polished side, to be discernible.

This may readily be done by regrinding the surface with very fine but sharp-cutting washed emery made into a paste with water, and by moving in every direction a flat brass runner so as to cross and recross, and grind equally every portion of the glass surface.

The fine-washed emery obtainable at the principal clockmakers' tool warehouses, when re-washed, is suitable for this purpose. To do this, take, say, two ounces of emery and place it in a tall twelve or sixteen ounce phial, then pour upon it some weak gum water to nearly fill the bottle, cork up, and shake thoroughly until the whole of the emery is wetted and thoroughly mixed; then allow the bottle to stand aside that the emery may partly settle; the coarser grit will speedily fall through the viscous fluid, whilst the finest is still held in suspension. By pouring the gum water off into a suitable receptacle, and thinning it out by the addition of water, the finest emery, which is also of equally uniform grit, will be deposited.

The trouble and labour involved in preparing the ground glass screens will be more than amply repaid, and focussing will be found easier and more certain. These remarks apply chiefly to landscapes which give a sharp and clearly defined picture with all details and minutiæ crisply delineated. Such pictures will bear the trying ordeal of photographic enlargement.

CAPTAIN ABNEY ON HELIOCHROMY.

BY F. E. IVES.

CAPTAIN ABNEY, in a recent address before a section of the British Association,* made some brief remarks upon the subject of heliochromy, which are, in my opinion, so misleading as to call for correction. I quote as follows:

"The nearest approach to success in producing coloured pictures by light alone, is the method of taking three negatives of the same subject through different coloured glasses, complementary to the three colour-sensations, which together give to the eye the sensation of white light. The method is open to objection on account of the impure colour of the glasses used. If a device could be adopted whereby only those three parts of the spectrum could be severally used which form the colour-sensations, the method would be more perfect than it is at present. Even then, perfection could not be attained, owing to a defect which is inherent in photography. This defect is the imperfect representation of gradation in tone."

According to those recent text-books on colour which I have seen, only such light rays as are supposed to affect only one kind of nerve fibrils in the eye, or to excite only one of the fundamental colour-sensations, can be said to form or represent primary colour-sensations, and such rays are confined to both ends and a narrow strip in the middle of the visible spectrum.† If Captain Abney means to assert that in a process of this character only those rays of the spectrum should act which represent primary colour-sensations, he is certainly mistaken, and grievously misleading all those who accept him as an authority upon this subject.

It is certain that every ray of the visible spectrum should act, and act nearly in proportion to its power to excite the sensation of light in the eye. It would be ridiculous to expect that a process which reproduced the spectrum as three detached and widely separated patches of colour would correctly reproduce the infinite variety of compound colours in nature, some of which are made up chiefly, and most of them partly, of rays lying in other parts of the spectrum. There are some moderately bright colours which would reproduce like black by such a process.

But it is not easy for me to believe that Captain Abney means what I have inferred from his statement, although the expressions "parts of the spectrum" and "impure colour of the glasses" certainly support this inference. When he says, "those parts of the spectrum . . which form the colour-sensations," it is possible that he may mean the light rays, in proportion as they affect the different kinds of nerve fibrils, or excite the different primary colour-sensations in the eye. If so, he does not mean to divide the spectrum into three distinct parts, but aimed to state a fact which was first observed by me, and plainly set forth in my book, "A New Principle in Heliochromy," where I showed that each heliochromic negative must be made by the joint action in due proportion of all rays which affect the primary colour-sensation which it represents. It does not require screens of "pure colour" to do this—quite the contrary. Screens of pure colour are screens transparent to single regions of the spectrum only, and would not transmit all the rays that affect a single kind of nerve fibrils in the eye. The red, orange, yellow, and yellow-green rays all affect the nerve fibrils which produce the red colour-sensation, and all of them must therefore be transmitted more or less freely by the colour screen used in making the negative representing that primary colour-sensation. But the orange-yellow and yellow must also be transmitted to some extent by the screen used in making the negative representing the green colour-sensation.

The screens must, in short, be so graduated in colour as to secure, in negatives of the spectrum, curves of intensity like the curves of a diagram representing the action of the spectrum upon the three kinds of nerve fibrils in the eye, or upon the three fundamental colour-sensations; and it is a fact that such screens had been produced, and that correct heliochromic negatives had been made in considerable number, and with ease and certainty, before the beginning of this year.

The observation that the inability of photography to exactly represent gradations in tone would affect the accuracy of such a method of reproducing colours, of which Capt. Abney now makes so much, originated with myself; but I also showed that, by my method of proving the colour screens by reference to the curves of intensity in the spectrum negatives, the effect of this defect in the negative process could be so far compensated for that it would no longer seriously affect the result, if suitable sensitive plates were employed. To say that this method does not solve the problem because of this defect, would be equivalent to saying that photography has not solved the problem of reproducing light and shade.—*Journal of the Franklin Inst., November*, 1889.

* Reprinted in the *Scientific American Supplement*, 1889.

† "Helmholtz, Maxwell, and Rood, as well as many other physicists, have developed the theory of Wunsch and Young, and have adopted the same, or very nearly the same, trial of primary colour-sensations. These fundamental hues or primaries . . . represent three widely separated and very bright colours of the spectrum."—*Colour*, by A. H. Church, M.A., London, 1887, p. 67. See also Rood's *Modern Chromatics*, pp. 120-23.

THE QUININE SUPPLY.—The *New Yorker Handels Zeitung* gives some particulars about the quinine market. It states that quinine has suffered of late years a remarkable fall in price; the value per ounce has fallen from about 12s. to 2s. Since the year 1820, this product has been extracted from Peruvian bark. In that year Peru was the sole country of production of the yellow bark, of which the finest description only was used for the production of quinine, and the Government of that country made a monopoly of the product. The rise in the price of the bark was such at one period that quinine was sold at about 16s. an ounce. Later, thanks to the improvements that had been made in chemistry, a method was discovered of extracting quinine not only from bark of the best qualities, but also from inferior barks coming from countries other than Peru; the prices then fell to about 4s. the ounce. The increased demand upon the market resulted, however, in a fresh rise in price, which lasted as long as the industry had only the natural products of South America as a source for the production of the raw material—that is to say, until 1861, or thereabouts. About that time both England and the Netherlands commenced the cultivation of the cinchona tree in their Indian possessions. The commercial importance of the cinchona plantations did not, however, make itself felt until the year 1876, when 16,000 lbs. of bark coming from Ceylon were placed upon the market. In 1885, the shipments from Ceylon alone amounted to 15,000,090 lbs. weight. At the same time as that quantity of the raw material was increasing in so remarkable a manner, the proportion of pure quinine produced from the bark coming from the new plantations amounted to 8 per cent., while the yield of the South American did not exceed 1·5 per cent. It may be added that, by the old methods of procedure, it was necessary to work the bark for three days to extract the quinine, while now twenty-four hours are sufficient for the purpose. The annual consumption of quinine throughout the world is estimated at from 6,000,000 to 7,000,000 ounces, and the United States figure in this amount to the extent of about two-fifths.

A NEW PLATINUM TONING PROCESS.*

BY LYONEL CLARK.

The very great stability of the metal platinum, superior even to that of gold, has from the very commencement of photography naturally excited many workers to experiments, with the view of making it a basis for a positive printing process that was to defy the ravages of time. As far back as 1832 we find recorded experiments of Sir John Herschel on the action of light on salts of this metal; he was soon followed by Robert Hunt, amongst others, who has left a very detailed account of his numerous experiments in the pages of his well-known works on "Light" and "Photography." In more recent times Willis entered the field, and his experiments resulted in the well-known hot and cold bath platinum process, which will hand his name down to posterity as the father of all platinum printing. Of the numerous array of smaller workers I will not weary you; their efforts are to be found here and there in the earlier numbers of our own and foreign photographic journals.

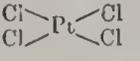
But I cannot continue without devoting a few words to the experiments of Mr. Burnett, of Edinburgh. This gentleman appears to have tried every salt of platinum as toning agents, and moreover appears to have specially advised the use of the platinous in preference to the platinic salts, and also advises their use as developers of images formed on uranic or ferric papers, thus closely foreshadowing the present platinum processes.

A careful study of all these experimenters' works shows, however, that the platinum salts are not practically reducible by the action of light, even when in the presence of organic substances; but if it be wished to obtain an image in platinum black, it is first necessary to form a provisional image, visible or not, and then, by means of a toning or substitution process, convert this provisional image into one formed of platinum.

Every kind of platinum printing at present known is subject to this law, which distinctly separates it from the ordinary types of positive printing in silver, whether direct or by development. In these processes the image is formed of silver which has been blackened by exposure to light, or rendered prone to reduction by suitable agents, and this blackening forms the image. In platinotype the image is formed of another metal, to be replaced later on by platinum, and by a substitution process analagous to that in which the silver image is sometimes partly replaced by the gold of the toning bath. Gold-toning is sometimes described as a *gilding* process, and it is assumed that the silver image is coated or *gilt* with a thin layer of gold, but I think that there can be no doubt but that it is a pure chemical substitution process, three atoms of the silver image being replaced by two of gold, the silver chloride, or oxychloride, that is so formed being subsequently dissolved out in hypo.

The well-known modern platinotype processes of Willis and Pizzighelli come under the above rule as toning processes, the only difference being that the metal of the provisional image is iron instead of silver, and at present all known platinotype processes may be classed together under the head *toning* processes.

The first gentleman who appears to have practically used platinum as a toning agent was a Frenchman named M. Carrauza, who described his process in *La Lumière*, Feb., 1856, and Photographic News, vol. i., p 251. He used a dilute solution of platinum chloride acidulated. Now, the commercial chloride of platinum is, according to Pizzighelli, chloro-platinic acid; the real platinic chloride is $Pt^{iv}Cl_4$, but is insoluble in water, and therefore hydrochloric acid is added, making the formula $Pt^{iv}Cl_4\ 2\,HCl$; it further contains $6H_2O$. Now in this salt, which is the common platinic chloride of commerce, sometimes called bichloride, a relict of the older chemistry, the platinum is tetravalent, that is to say, its molecule is formed of an atom of platinum united to four atoms of chlorine, and



therefore, when a substitution is effected, four molecules of a univalent salt—that is, a salt which is satisfied by a single atom—must be brought up to the platinum salt, and each take one atom of chlorine before the platinum can be reduced to the metallic state. Silver is such a metal, and if the atomic weights of this salt and platinum were the same, it would mean that four parts of metallic silver must be converted into the chloride before one part of platinum metal could be formed, and therefore the deposit would only be one-fourth as thick. Or, again, if their colouring properties were equal, after the substitution, the intensity of the platinum image would only be one-fourth that of the provisional silver image. However, platinum has, weight for weight, like gold, a greater colouring property than silver; and, furthermore, the substitution process is never very thoroughly carried out, but still there is a very decided loss of intensity in a print which has been thoroughly toned by platinic chloride. It is extremely probable that the free hydrochloric acid has also a deleterious effect on the image; for in the best toning formulas which contain platinic chloride, it is recommended first to neutralise the hydrochloric acid, and then re-acidify the solution, preferably with nitric acid. But even after this precaution, it cannot be said that there is any satisfactory process of toning by platinic chloride at present described.

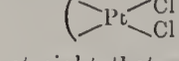
In comparing toning processes by means of platinum with those where gold is used, it must also be remembered that the platinum is much less easily reducible than gold, and Mr. Willis found, in his early experiments, that the salt was by no means to be precipitated like the chlorides of gold or silver. However, the fact that oxalic acid greatly aided the reduction of gold from its salts, had long been a known fact in chemistry, and its similar action on the platinic salts had also been noticed by Döbereiner (Schweigger's "Year-Book," vol. xvii. p. 122), who found that chloride of platinum in solution of sodium tartrate or oxalic acid separated out under the action of light in the form of a thin film. This fact appears to have also been known to Willis, who in his early experiments found that a hot solution of oxalate of potash instantly precipitated the platinum from the chloride when in the presence of a protosalt of the heavy metals, in his case ferrous oxalate being the one used.

But, as we have already seen, the platinic chloride demands that four molecules of ferrous oxalate shall be converted in order to liberate one molecule of platinum, and since the ferrous oxalate has to be formed by the agency of light, it follows that the proof must be very much over-printed in order to get enough of the ferrous salt to make the image of sufficient intensity.

It was at this point that Willis introduced his great improvement, which made platinotype a practical process.

* Read at a meeting of the Camera Club.

He found that platinum was capable of forming a second series of chlorides, in which the metal acted as if it were divalent. Such a chloride is known as platinous chloride, $Pt^{I}Cl_2$—, in which we may suppose that where two of the bonds of the platinum atom are satisfied, each with a chlorine atom, the other two mutually satisfy each other.



It is evident at first sight that with this salt it will only require that two molecules of any univalent metal be presented to the platinum salt, when they will take up all the only two chlorine atoms in it, and liberate the metal, and therefore with this salt we only require half as much reduction to produce an equal effect as it would were the platinic chloride used. We may further assume that the two bonds that are satisfied by each other are in an unstable equilibrium, and can easily be dissociated, and thus accelerate the rupture of the complete molecule, and render the ultimate precipitation of the metal more speedy. I think that there can be no doubt that experiment and practice have proved the correctness of the above theories, and I hold that platinum toning only became a practical possibility from the day that Willis employed the *platinous* instead of the *platinic* salt.

(*To be continued.*)

Correspondence.

A CLAIM.

DEAR SIR,—Having observed recently several suggestions for the use of bisulphites, or "acid" sulphites, mixed with "hyposulphite of soda" (thiosulphate of sodium) for fixing and clearing photographic plates, I wish to direct attention to the fact that this mixture or composition for above and allied purposes forms the subject of a patent taken out by me and completed on December 23rd, 1887, No. 17,693, and entitled "*Improvements Relating to Means for Fixing and Clearing Photographic Pictures or Images.*"

Since the foregoing date the state of my health has largely conduced to the delay in introducing this compound and its functions to photographers. The material, however, will be issued shortly in convenient form by the Platinotype Company, until which time I will not trouble you with further particulars, which would probably savour of an advertisement.

November 2nd, 1889. HERBERT B. BERKELEY.

"SUN ARTISTS."

SIR,—Your kind notice of "Sun Artists" contained a slight error. We only propose to publish quarterly at present, not monthly. Will you be so good as to correct this in your next issue and oblige.—W. A. BOORD, Hon. Sec. "Sun Artists."

November 4th, 1889.

PHOTOGRAPHIC CLUB.—Subject for discussion on Nov. 13th, "Copying and Enlarging."

SOLAR RADIATION.—The British Association Committee on Solar Radiation reported that the actinometer devised by the late Professor Stewart for the continuous measurement of solar radiation, which was described in the report of the Association for 1887, is now ready for the preliminary trials, the internal thermometer with a flat bulb of green glass having been made since the date of that report. The construction of this thermometer occasioned a good deal more trouble than had been anticipated. No attempt has at present been made to render the instrument self-registering, as it would obviously be unwise to incur the outlay which any construction for this purpose would involve, only the result of preliminary trials were such as to encourage a hope that the instrument might be really useful if rendered self-recording.

Patent Intelligence.

Applications for Letters Patent.

16,970. W. TYLAR, 12, Cherry Street, Birmingham, "Collapsible Focussing Chamber for Photographic Cameras."—Oct. 28.

17,117. SYDNEY PITT, 24, Southampton Buildings, London, "Improvements in the Manufacture of Photographic Plates." W. Reece, Barbadoes.—Oct. 29.

17,318. F. MIALL, 13, Shelgate Road, Battersea Rise, London, "Cameras."—Nov. 1.

17,359. A. S. L. ABRAHAM, 47, Lansdowne Gardens, South Lambeth, London, "Cameras and Finders."—Nov. 1.

17,406. S. V. DARDIER, 1, Portland Mansions, West Kensington, London, "Improvements relating to Permanent Coloured Photographic Prints Obtained by Direct Printing from Negatives."

Specifications Published.

15,993.—*5th November*, 1888. "The Preservation of Peroxide of Hydrogen." CHARLES THOMAS KINGZETT, F.I.C., F.C.S., Past Vice-President of the Society of Public Analysts, of 96, Amhurst Park, London.

Peroxide of hydrogen is used for bleaching, oxidizing, and other purposes, but is, as is well known to chemists, liable to undergo spontaneous decomposition into water and oxygen, so that its strength diminishes when kept. This may be more or less obviated by the addition to it of camphor, camphoric acid, thymol, phenylacetic acid, or sulphophenic acid. The addition of such substances to peroxide of hydrogen is described and claimed in the specification of a former patent granted to me—No. 276, in the year 1887. It may also be more or less obviated by the addition to it of bisulphate of potassium or bisulphate of sodium, as described in an application for patent made by me—No. 15,994—in the year 1888. I have further discovered that it may also be obviated by the addition to such solutions of a small proportion of acetic acid, alcohol, chloral, chloroform, or glycerine. I have ascertained by a practical investigation that, by adding a proportion of one or more of these latter substances, the peroxide of hydrogen may be preserved more or less from deterioration in strength. I have found that although larger or smaller quantities may be used, one per cent. by weight serves very well for my purpose, and, of the various preservative chemical agents I have named, I prefer alcohol.

In illustration of the preservative influence exercised by alcohol, I may mention that by the addition of 1 per cent. by weight to a solution of peroxide of hydrogen, I have limited the loss in strength in one case to $7\frac{1}{2}$ per cent. during a period of 202 days, and in another case to 11 per cent. during a period of 97 days, the latter observation having been made during part of the hottest summer weather, when peroxide of hydrogen is most prone to decomposition. As a check against these results, quantities of the same solutions of peroxide of hydrogen, without the addition of any other substances, were kept during the same periods, the losses in strength being respectively 39 per cent. and 54 per cent. What I claim is :—

The preservation of peroxide of hydrogen by the addition to it of alcohol, acetic acid, chloral, chloroform, or glycerine.

THE French Government has made Mr. Wm. England an Officer of the Legion of Honour, for his services as Juror in the Paris Exhibition of 1878, and as Vice-President in the present one. He is the first English photographer who has received the honour.

THE EIKONOGEN DEVELOPER.—Digesting the various opinions on the merits of eikonogen, we find that it appears to be scarcely equal in energy to pyro or hydroquinone, that the intensity of resulting negatives is rather wanting, but on the other hand, prints have more sparkle than negatives promise, and time required for printing is shorter. The claim that eikonogen allows shorter exposures has yet to be substantiated; so far experiments do not show this to be a fact. It keeps its colour better than either of its older rivals, and therefore can be used for several negatives.—*Scraps.*

PATENT OFFICE LIBRARY.

Proceedings of Societies.

The Camera Club.

On Thursday evening, October 31st, at a meeting of the Camera Club at Bedford Street, Strand, London, Mr. A. Stroh presided.

Mr. J. H. Williams exhibited a lantern picture on one of the new Ilford alpha plates, taken with three minutes' exposure six inches from a paraffin flame.

Mr. George Davison exhibited samples of the new flexible celluloid films, made by the Eastman Company, to be used in roller slides, and said that such films were expected to be in the English market next February.

Mr. H. M. Elder, M.A., then read a paper on "Eikonogen," in the course of which he said that he had bought his first sample of Messrs. Marion and Co., and was glad to see that the proportions in which the developer was to be made up were stated in accordance with the metrical system, a system which he hoped that all photographers would use. The instructions said that Dr. Andresen, of Berlin, invented eikonogen, which statement was certainly not accurate, for the substance was described very fully, in 1881, by Professor Meldola, who, however, did not point out that it could be used as a photographic developer. Eikonogen was also stated to be patented, but he had been unable to find any specification thereof; Messrs. Mariou were a highly respectable firm, and would not describe things as patented which were not so. Perhaps the use of eikonogen as a developer had been so protected, but he had been unable to find the patent. Eikonogen is, he said, derived from benzine, C_6H_6, and he added some more information about it of the kind given by Professor Liveing, as already published in these pages. He then made some remarks about organic developers, saying that from its molecular constitution he should not expect pyrocatechin to be a developer, and he had utterly failed when he tried to use it as such. Dr. Eder, however, was said to have succeeded with it; he (the speaker) did not know how. When quinol is used as a developer, it may fairly be assumed that the initial change is that it loses hydrogen and becomes quinone; then yellow and brown humus-like products are formed, which stain the plate. He thought that hydroxyquinol would probably answer if tried as a developer. Pyrogallol, when developing, breaks up initially into acetic acid and carbonic acid; then brown humus-like bodies are formed, which it is almost impossible to investigate. Andresen tried several of the derivatives of benzine, and found several of them to be good reducing agents; then he tried some of them which had been acted upon by sulphonic acid, perhaps because such compounds are more soluble in water; and finally he tried that which is now known as eikonogen, a very interesting chemical body derived from naphthaline. The speaker then entered into the molecular constitution of organic substances suitable for use as developers, illustratiug his remarks by means of diagrams on the blackboard; these diagrams, he explained to the members, were not pictures of the molecules themselves, but were graphical means of showing the reactions of the bodies. Eikonogen was described by Meldola in vol. xxxix. of *The Journal of the Chemical Society*. Afterwards a German chemist found out how to make it in an easier and simpler way. In developing he (Mr. Elder) thought that eikonogen breaks up into phthalic acid—as bodies of the naphthaline group usually do—and probably into carbonic acid. He believed that something of that sort must take place. He had roughly examined eikonogen, and found it to contain sodium, the amido group, sulphur, and the naphthaline group; so he thought that Professors Meldola and Liveing were perfectly right in what they had said about it. He had tried eikonogen on Eastman's stripping films, and had come across what he thought to be a very serious action thereon: it seemed to rot the films to a considerable extent, so much so that it was almost impossible to manipulate them afterwards. One of his negatives, also, was covered with small pinholes. The developer worked with cleanness and brilliancy. He had used it to produce lantern slides, and with good results, but was unable to obtain sufficient density; the pictures were of fine tone. Andresen claimed that it had great keeping powers; it would keep, perhaps, as well as pyro with sulphite, but not without. He had read funny and contradictory statements about eikonogen in photographic papers. Andresen said that eikonogen was not poisonous; he (the speaker) did not know if such were the case, and should not like to try.

Mr. Lyonel Clark then read a paper upon the same subject, and said that with his first sample of eikonogen he at first implicitly followed the instructions given by the vendors in making up the solutions. On opening the package he found the eikonogen to be of a browny madder colour, like road sweepings, and not white and crystalline. After its solution in sulphite had been kept two weeks, he could not get even intensifying density; afterwards it became thick and useless; its rapid oxidation he took to be a fact pointing to its possessing great reducing powers. In some of his experiments he compared it with pyro and ammonia for short exposures, and afterwards for its intensity-giving powers, and used for the purpose a Spurge's sensitometer of quarter-plate size. His source of light was a gas flame, turned up to a constant height; between it and the sensitomer he placed a sheet of ground glass to diffuse the light evenly. The experiments were carried on in the daytime, for then the pressure of the gas might be expected to be most uniform. One result of his experiments was that he did not think that eikonogen gave more detail than any of the other developers in use when caustic alkali was added. When the carbonated alkalis were employed, he obtained slightly different results. The pyro gave detail lower down in the scale than did eikonogen, and, weight for weight, he believed eikonogen to possess less reducing power than pyro. Under stated conditions the new developer will give more density than pyro; it will develop a plate very satisfactorily without any addition of alkali; with an alkaline carbonate it gives more detail in the high lights; bromide is useful in cases of over-exposure, It is a satisfactory developer when highly lighted subjects have been before the camera. He had developed six negatives successively in the same solution, giving five minutes to each; towards the last there was a slight falling off in density, but practically the negatives were all the same. Eikonogen seems to have no staining action whatever. In one of the negatives there was a curious eating away of the film, but he did not know that it was due to the eikonogen.

Mr. Chapman Jones had made a few experiments with only one sample of eikonogen, which was of the colour of sea sand; he had endeavoured to get the utmost amount of detail with it without regard to the time occupied; it did not make his films tender, for they could be rubbed with cotton-wool. He sometimes used 10 grains to the ounce of eikonogen, 30 to 40 grains of sulphite, and nothing more. By adding carbonate of soda he obtained more detail, and his best results had been obtained with—

Eikonogen	15 grains
Sulphite of soda	30 ,,
Carbonate of soda	15 ,,
Bromide of potassium	½ grain
Water	1 ounce

It gave more detail when he tested by means of a graduated screen, than did the pyro developer he had been in the habit of using.

Mr. A. Cowan exhibited some results obtained by Mr. H. M. Hastings with the eikonogen developer, consisting of two negatives taken from the window of a railway train running at a speed of sixty miles an hour; the speed was timed. A Newman's shutter was used, and some sharp views obtained. Mr. Hastings had eight or ten ounces of eikonogen developer with him, and he used it again and again on three or four different days, until he had scarcely enough left to flow over the plate; it worked a little more slowly towards the last, but that was the only difference. Mr. Cowan here exhibited a newly received sample of eikonogen—white and crystalline—also a solution of it and potash in water, which solution was nearly white. He said that it did not discolour much after developing many plates. His own opinion was that eikonogen equalled pyro, and would develop almost any number of plates: also that it did not stain

the fingers. For positives he thought it to be the most valuable developer they had. A mere trace of bromide in it was sufficient for development purposes.

Mr. FENTON had found eikonogen very satisfactory for landscape work. He then exhibited the negatives which Professor Liveing had previously brought under the notice of the British Association.

Dr. CHARTERS WHITE had used a sample which looked like iron rust; itdeveloped lantern slides beautifully, but he thought that he should keep to quinol.

Mr. WILLIAM ENGLAND had been using eikonogen for instantaneous pictures, also several other developers, and there was no question about it that eikonogen gave the most detail.

Mr. GEORGE DAVISON said that Mr. W. Willis preferred eikonogen, and thought that it produced negatives better than he had ever obtained before.

Mr. NOEL-COX had found it to be an uncertain developer, and once it had actually given a red colour in the high lights; he had also obtained good negatives by its aid.

Mr. L. E. CLIFT had once obtained red negatives, free from fog, with quinol and ammonia.

Mr. GRIMSHAW stated that he had had a stock solution of eikonogen which kept good a long time, then suddenly turned black; he supposed because of the action of fumes of ammonia.

The CHAIRMAN remarked that a friend of his had obtained specimens of eikonogen both from Berlin and London, and was of opinion that they had been spoilt before reaching him, because they were sent in tins which were not air-tight. His success varied much with different samples, but he preferred pyro and quinol, especially the latter. Perhaps the new developer might improve upon acquaintance. Not much had been said in its favour that evening.

Mr. ELDER said that he had seen no tendering of the Eastman films until they were placed in hot water; the same films were even and tough with pyro. Once in a lantern slide he had seen something a little like red fog, but he thought it to be due to ammonia in the hypo.

Mr. COWAN remarked that Dr. Andresen said that eikonogen negatives were much better if bisulphite of soda had been added to the hypo fixing solution. This plan had, he (Mr. Cowan) thought, been patented by Mr. Berkeley years ago.

Mr. ELDER responded that there was some risk in adding acid to the hypo, and that bisulphite of soda was a strongly acid salt.

Mr. LYONEL CLARK said that various speakers had mentioned the results of isolated experiments, but nobody present but himself seemed to have tested the powers of eikonogen as a developer. Mr. Pringle had told him that his solution of sulphite and eikonogen had gone wrong; his (Mr. Clark's), after a limited time, had done the same, but the bottle was only half full. No doubt good negatives could be obtained with eikonogen by using much of it, or giving long exposures, but even then the same results could be obtained with pyro.

Mr. COX had been present at some careful comparative experiments, in which eikonogen exhibited a slight advantage over pyro and a great deal over quinol.

The CHAIRMAN remarked that in time eikonogen might be proved to have its advantages. Stripping films developed with quinol seemed to stand any amount of rough usage; he had rubbed the paper off with a towel.

Next Thursday evening, November 14th, Major J. F. NOTT will read a paper before the Camera Club on "Films."

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE ordinary weekly meeting was held on the 31st ult. The discussion on Mr. Hubert's paper having been adjourned from the previous week, Mr. A. HADDON was asked to again occupy the chair.

Mr. C. H. COOKE showed some negatives belonging to a friend, taken on Carbutt's films; they were covered with semi-opaque spots. He was unable to account for this.

Mr. P. EVERITT believed the spots were due to friction from the films having rubbed against one another.

A question from the box: "What is the best colour for the walls of a dark room?"

The CHAIRMAN said white.

Mr. W. E. DEBENHAM would give preference to yellow.

Mr. A. MACKIE would choose yellow, there being less chance of any stray actinic rays being reflected.

Mr. A. L. Henderson being present, the CHAIRMAN, on behalf of the members, expressed the pleasure they felt at his return to England.

Mr. A. L. HENDERSON, in thanking the members, said for the first six months after he left England he was too unwell to attempt any photographic work, and Melbourne and Sydney were visited without any result photographically. On landing in New Zealand, he felt much better, and obtained some excellent examples of photography. Mr. Henderson said anyone who had the time to pay a visit to New Zealand would be well repaid. The scenery was beyond description. He had several albums of views, which he would bring down to the meeting on the 14th inst. He would also exhibit a photograph taken by a photographer in New Zealaud, showing a pink tinge in the cheeks of a sitter; this, he was assured, appeared during the development of the negative. Mr. Henderson said he should be pleased to halve this photograph with either of the members, with a view to submit it to a colour test.

The adjourned discussion on Mr. Hubert's paper, "Bromide Enlarging," read before the members the previous week, was then proceeded with.

Mr. P. EVERETT asked what advantage Mr. Hubert found in using an 8-inch focus lens, as he noticed in a maker's catalogue a 3-inch focus lens specially recommended for enlarging purposes.

Mr. HUBERT said by using a long-focus lens better marginal definition was obtained.

The HON. SECRETARY said he would prefer a lens that covered the whole of the negative.

Mr. W. E. DEBENHAM asked what was the advantage in using iodine varnish for thin negatives.

Mr. HUBERT said he got a stronger image when this varnish was used.

Mr. W. E. DEBENHAM spoke of the different results obtained by using either a weak or a strong light.

The HON. SECRETARY said in many instances the picture was improved by using a weak light. He would also use a reduced light with a paper requiring only a very short exposure; by this means the exposure was more under control.

Mr. A. L. HENDERSON said with a negative lacking density he would stop the lens well down.

The HON. SEC. said the insertion of a small stop when lime light was used would alter the whole arrangement.

The CHAIRMAN asked if it was the experience of the members that in using a hydrokinone developer a second and third time, the high lights of an enlargement became stained.

Mr. HUBERT said this was so; the white changed to a disagreeable yellowish brown.

A question was asked whether results with the different illuminants employed in enlargiug—lime, oil, gas, and daylight—had been compared.

Mr. A. MACKIE said practically the results from a weak or strong light, when a proportionate time was used, would not be the same. A weak light with some negatives would not give any result at all.

Mr. T. BOLAS said that a weak light would produce a hard effect, while a strong light would give a softer picture. He should be in favour of a strong light. With a very dense negative he would make a transparency in carbon first, and then enlarge from that.

Mr. A. L. HENDERSON said that while in Columbo, some of his plates were exposed to a temperature of 95° for several days, there being 75 per cent. of moisture in the atmosphere; this he learned from the published reports. Developing the plates with the ordinary developers, reversed action was set up; this was overcome by flooding the plates with a 5 grain to the ounce solution of carbonate of lithium previous to applying the pyro and ammonia. It would be found, if iodide of potassium were used instead of bromide in the developer, that the image would be visible through the back of the plate first.

Abney Camera Club.

A meeting of the above club was held November 1st, when Mr. F. W. Hart, F.C.S., read a paper on "The Use of Magnesium in Photography."

After a discussion in which Messrs. Adkins, Hibberd, and Leeds took part, some groups of the members and friends were taken by the aid of four flash-lamps.

The Secretary's address is 29, Bouverie Road, Stoke Newington.

North Middlesex Photographic Club.

On October 28th—Mr. Humphries in the chair—Mr. S. Herbert Fry gave a lecture and demonstration upon "Bromide Paper and Enlarging." In the course of an hour's address, he touched upon the salient points of the process, remarking that his object was to give the benefit of his personal experience, and not to give the members an elaborate essay. A portrait negative enlargement was then made and developed, and the method of vignetting and exposing in the draperies illustrated.

Afterwards Mr. C. Lang passed up a landscape negative which Mr. Fry enlarged to 15 by 12, and then demonstrated his method of printing-in clouds from a second negative.

West Kent Photographic Society.

A meeting was held in the Board Room, Bexley, on October 30th, Mr. Dresser in the chair.

Mr. H. S. Starnes was duly elected a member of the Society.

In an address by the Secretary on "Matt Surface Silver Paper," he said he wished to bring this neglected process under the careful consideration of those amateurs who had not yet tried it, and proceeded to lay the advantages possessed by this paper over many others, before them. He dwelt upon the artistic quality of the results to be obtained, and upon the large range of tones at command, by means of which the exact colours of many objects could be faithfully reproduced. He also recommended this paper for its comparative permanency. Several examples of the different tones observable were handed round.

Mr. Harris, who instanced several examples of the superiority of the plain paper, had made a number of tests, and invariably found the plain paper come out well. He also handed round various prints on paper sensitized by himself.

The optical lantern was then set to work, and Mr. Dresser passed the members' slides through, showing a number of hand-camera shots.

Next meeting on November 13th.

Bath Photographic Society.

October 30th.—Mr. Pumphrey, President, in the chair.

Business: "Discussion on Stops, and their Value in Photography."

The Chairman, in opening, pointed out that advantages were at times gained by admitting a large amount of light through a given lens, especially if the subjects were near at hand, as in portraiture and instantaneous work. The flatness of field in such cases would be greatly restricted, as the principle of a stop is to reduce the marginal rays of light, and by admitting those of greater parallelism, flatten the field. This was clearly illustrated by diagrams, showing the course of parallel and oblique rays before and after insertion of a stop.

The following points were dealt with:—Primary use of stops to flatten field; secondary to give proportionate exposure. To do this it became necessary for the diameter to bear a definite relation to the focal length of the lens. The plate should be of definite sensitiveness. A definite standard of light and a ready means of measuring small lapses of time should be provided. The parent Society's standard of stop was referred to, *f*/64 meaning that the diameter of *f*/64 stop is equivalent to an opening 1/64, the focus of the lens. The speaker deprecated the system of shifting from one make of plate to another without good reason, as it led to uncertainty. As a measure of time, mechanical means must be resorted to, for no one would expose by hand so short a period as one-twentieth of a second, much less one-sixtieth. A time-shutter, controlled by a spring and ratchet wheel, was shown, which works at one-sixty-fourth of a second, or anything of longer duration, up to three seconds. The iris diaphragm was also brought under notice.

Mr. Braham said that photographers, like others, must study nature for information. He contrasted the mechanism of the human eye and the eyes of animals with a lens, the iris being the natural stop or diaphragm, adjustable more or less according to the power exercised by muscular action. He sketched the passage of rays forming an image in a pin-hole camera to illustrate the smallest diaphragm available.

Mr. Austin J. King gathered from the Chairman's remarks that for landscape work a small diaphragm was the best to employ. He wished to know why it was not the practice to employ the smallest stop the subject admitted? There were, he believed, special reasons to the contrary.

The Chairman generally worked *f*/32, which gave a sharp picture, and if the nearest object was thirty yards off, there was no occasion to alter the camera.

Mr. W. M. Ashman, Hon. Secretary, in reply to Mr. King, said that in portrait work small stops diminished the brilliancy and rotundity of the image; here flatness of field was neither essential nor desirable. In the case of certain out-door subjects a medium stop was regarded by many as yielding a more natural representation; the large stop gave an idea of atmosphere; with a very small stop the effect was map-like.

Mr. Perren used the largest stop compatible with good definition. He thought the results better.

Mr. Rudge enquired whether a diaphragm might not, in the case of oblique rays, merely check the passage, and cause them to be forced with the more parallel rays through the aperture.

In reply, the Chairman said that if such were the case colour would be produced.

Mr. Briscoe said a new stop had been suggested by Mr. Zimmer to work diagonally in the lens tube, the object being to diminish the light entering from the sky.

Mr. Harbutt spoke of a disc of perforated zinc for use in front of a lens as a stop. The perforations acted similarly to one opening of larger size. Another member corroborated this experience, and had seen such a diaphragm used between lenses.

The question of circular *versus* rectangular stops was also considered, the Chairman, Messrs. Braham, Harbutt, and the Secretary giving their views and experiences as to whether openings of equal area were similar in effect upon the plate, or otherwise.

The next meeting will be held on November 27th.

Liverpool Amateur Photographic Association.

A meeting was held on 31st October, at 3, Lord Street, Mr. A. W. Beer in the chair.

The following gentlemen were elected members of the Association:—Mr. T. C. Morris, Mr. J. O. De Wolf, and Mr. J. H. Swift.

Announcement was made that Mr. H. P. Robinson, of Tunbridge Wells, had kindly promised the loan of his valuable collection of pictures on the close of the Exhibition at Pall Mall. The pictures will be on view in the Rooms for a month or six weeks.

Mr. J. S. Brown gave a paper entitled, "From Cairo to the Cataract," illustrated by a number of excellent lantern slides.

After this a selection of slides was projected on the screen. These had been developed by hydrokinone on the new Ilford plates, showing the peculiar warm colour obtained by different exposures to gas-light. Explanations were given by Messrs. William Tomkinson and F. A. Sheerewater.

A smoking social concert will be held on Friday, the 15th November, at 7.45. There will also be a lantern evening on Thursday, 21st November, at 7 o'clock.

Photographers' Benevolent Association.

At the meeting held on the 11th ult., Mr. W. M. Ashman was elected on the Committee. On 25th ult. and 1st inst., the Committee were engaged in considering the revision of the rules of the Association, with a view to enlarging the scope of its action and the rights and conditions of membership. At the latter meeting, the Committee dealt with an application for assistance, and made a grant to meet the case.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

THE usual meeting was held on Nov. 1st, the President, Mr. F. W. EDWARDS, occupied the chair. Mr. Aland was elected a member of the Society.

The business of the evening consisted of a demonstration of "Development."

Mr. EDWARDS brought with him plates which had been exposed on an oil painting. One of the plates was an Ilford ordinary, while the other was an Edwards' isochromatic. They were both developed in the same dish, the developer being the formula (pyro) issued by the Ilford firm, and both turned out good negatives.

In the discussion which followed, the PRESIDENT expressed himself strongly in favour of using the developer at full strength to start with, as by this means he obtained pluckier negatives. If he found that over-exposure was the case, he immediately threw off the developer and swilled with water, continuing development with a developer with little ammouia compared to the normal standard.

Some fine positives on ground glass—the work of Mr. Dowling—were handed round, and elicited commendation.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting was held at the Masonic Hall, Surrey Street, on the 5th inst., Mr. B. J. TAYLOR in the chair.

A practical demonstration of lantern slide making was given by Messrs. F. J. Hibbert, Furness, and Brown.

Mr. HIBBERT also exhibited the Acme camera by Watson, and a new portable frame for portraits, which could be also used as a bracket for drawing-room decoration.

The negatives of the winners of the annual prizes were handed round.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE November monthly meeting was held in the Queen's Hotel on November 1st: Col. PLAYFAIR occupied the chair.

The routine business of the evening having been disposed of, Dr. HARMAN BROWN read his paper on the "Eye considered as a Camera." The organism and functions of the eye were illustrated by dissections of bullocks' eyes, and by a model lent by Messrs. Husbands for the evening.

The next meeting will be held on December 6th, when Mr. H. A. H. Daniel will read a paper.

PHOTOGRAPHIC CLUB.

THE annual meeting was held at Anderton's Hotel on Nov. 6, when the following officers were elected for the ensuing year :—

Trustees—Messrs. W. Ackland and T. Charters White. *Librarian*—Mr. C. D. Hesse. *Curator*—Mr. H. M. Hastings. *Committee*—Messrs. W. F. Benham, F. P. Cembrano, H. E. Davis, E. W. Foxlee, J. Haes, A. Mackie, J. B. B. Wellington, and J. W. Zaehnsdorf. *Recorder*—Mr. E. Clifton. *Hon. Sec. and Treasurer*—Mr. F. A. Bridge, East Lodge, Dalston Lane, N.E.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—On Thursday, November 14th, Mr. A. L. Henderson will exhibit his albums of photographs collected during his recent tour in Australia and elsewhere. This is also a lantern night; visitors invited.

CHAMBER OF COMMERCE.—The Committee met on Monday afternoon last, and appointed the full working Photographic Committee; it also determined on a meeting to be held on the second Monday in December, to discuss the question of copyright.

THE PHOTOGRAPHIC NEWS "YEAR-BOOK."

CONTRIBUTORS—old and new—are thanked for the excellent variety of articles they have sent in for the YEAR-BOOK, and those friends who have not yet sent in their manuscript are urgently requested to let it reach our office by next Tuesday morning.

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper & Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

A BEGINNER.—The nearest to Putney is the West Surrey Amateur Photographic Society (Mr. J. Gale, President), which meets at Mallinson Road, Wandsworth Common. Write to the Hon. Sec., Mr. John Watkinson, of 42, Honeywell Road, Wandsworth, S.W.

T. L. B.—We have no recollection of the American novelty of 1879 which was described in the YEAR-BOOK under the name of "Crystal Ivorytype," and cannot say how the transparent compound was made. It might have been something like Burgess' eburneum process, without the zinc-white pigment introduced; if so, it was mainly composed of gelatine.

A. H. J.—The formula given in your letter is quite right—KH_2PO_4. It is the acid phosphate, and not the salt corresponding to the ordinary commercial phosphate of soda. With doubled atomic weight for oxygen, the hydrogen, potassium, and phosphorus remaining the same, your old calculations would have to be somewhat modified; this is inherent to the progress of science.

L. M.—The proportion of bichromate to gelatine is varied according to circumstances, generally between five and ten per cent. The ammonium salt is said to be the most sensitive.

T. T.—Ferrous iodide is formed by the action of iodine on metallic iron; there is no higher iodide corresponding to ferric chloride. The alcoholic solution of the former was used with collodion by Mr. Fox Talbot for his famous instantaneous exposures.

LUMEN.—The following particulars respecting Balmain's paint may be of service to you. Mr. W. C. Horne, of 6, Dowgate Hill, E.C., is now sole representative of the patentees, Messrs. Ihlee and Horne, formerly of Aldermanbury. From him the luminous paint ground in oil may be procured at four shillings per pound; there is also the dry white pigment to be had, suitable for mixing as a water-colour, at a somewhat higher price; or you can get for two shillings a little can of paint and priming, which would probably be enough for your preliminary experiments. By calling at the office you may see a large series of samples illustrating the various uses to which the paint may be applied. Some very effective photo-transparencies painted at the back with the luminous pigment were exhibited at one of the *soirées* of the Royal Society.

H. B. B.—We sent you last week a sample of aurantia, and beg leave to wish you a pleasant journey, with the most beneficial results.

H. WILCOX.—Enquire of Messrs. Swift and Son, 81, Tottenham Court Road, W.; or of Mr. W. Wray, North Hill, Highgate, N.

J. A. C.—By going back further we have found the patent. It is No. 4,624, dated April 2nd, 1886, in the names of Stanley and Sarjeant. The statement is not absolutely identical, but the principle is clearly indicated at page 3, and the foot-note in the book mentioned in your letter of 1st instant.

EXCELSIOR.—If you have not yet tried eikonogen, we should advise you to make a few experiments, with the directions given and the same proportions rather more diluted.

J. S. P.—Reply sent by post, and the negative returned on the 31st ult.

H. B. (Nottingham).—Please leave the matter in our hands for another week, as we have not yet found time to go and see the inventor and enquire fully into the subject. The half-lenses reversed for making the hand stereoscope, as shown in the figure on page 157 of the YEAR-BOOK, is quite a simple matter.

H. B. (Brixton).—We should be better able to judge if permitted to see the manuscript account.

QUANDARY.—A final coating with collodion is usually found quite sufficient to effect the object in view; but, if not successful, try also an additional light dressing with encaustic paste.

W. L.—We should advise you to apply direct to Sir James N. Douglass, F.R.S., Trinity House, E.C., who would surely respond to such enquiry by giving the information desired, together with the name of the manufacturer.

Other correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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PATENT OFFICE LIBRARY

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PHOTOGRAPHY AND OPTICAL ILLUSIONS.

LIGHT moves in straight lines; yet, in a diagram in one of Mr. W. K. Burton's articles printed in these pages a fortnight ago, it appeared to move in a beautiful curve; that diagram is herewith reproduced, fig. 1, and it contains an optical illusion, for the dotted lines between the prisms are straight.

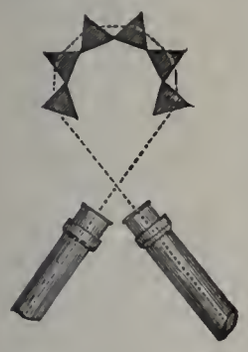


Fig. 1.

In coming down on a diligence zigzag roads in mountainous regions, as from the Furka Pass to the Valley of Andermatt, now and then a level, or even a slightly uphill track, seems to the eye to be reached; the driver knows better, and the traveller finds himself apparently going up-hill

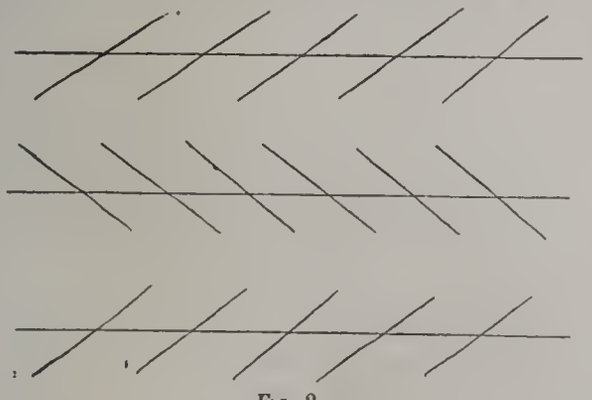


Fig. 2.

with the brake on the wheels of the conveyance. An illusion of the same nature is represented in fig. 2, in which the three horizontal lines are parallel to each other, yet the middle line appears to the eye to be neither horizontal nor parallel; but it is both, as may be proved by measurement. The inclined lines in this diagram may be supposed to represent, with more precision than in nature, the lines of the hills sometimes in view of the spectator in the mountains, and crossing his track.

English photographic apparatus is usually made to meet home requirements, and he who orders a spirit level for fixation upon his camera is, by some home photographers, considered a novice, because they know that any building in the view will afford the requisite guide for levelling the camera when focussing; such objectors have had small experience in regions where no truly horizontal or vertical lines come into the scene in a stretch of open landscape. The same practical men consider it superfluous to have a lens of excessively great focal length for a small plate, yet there are regions in which the air is clear enough for such lenses, and where no foreground is obtainable within a distance of one or more miles.

An illusion of the kind pictured in fig. 2 exists near Folkestone, where some of the inhabitants will occasionally take visitors to see how a small stream from a distant valley flows uphill to the Bail Pond on the top of the cliffs—a kind of permanent miracle enduring through the ages, ever since the original miraculous formation of the stream by the good St. Eanswythe herself. In the last generation, a medical man resident in Folkestone was so exercised in mind by the anomaly, that he made barometric observations of the level of the water at different parts of the stream.

The good St. Eanswythe had a church inside the Castle fortifications, as was the custom in those days, and the supply of water being short, she, with a number of pious nuns, armed with prayers and candles, went down into the valley; on their return the water followed them uphill for a mile or more to the Castle, and has continued so to run ever since. The King of Northumberland fell in love with this sainted daughter of an alternately Pagan and Christian king of changeable disposition, but was not encouraged, so he marched to Folkestone at the head of a few hundred men, and "popped the question" from outside the walls of the fortifications. St. Eanswythe gazed upon him from above, and suggested that they should each pass the night in prayer, and that the one whose prayer was answered should have his or her way in the matrimonial matter. He agreed, and she prayed that a log of timber too short to reach from one wall to another to form part of the roof of her new chapel

would elongate sufficiently during the night; this was done, and next day the sight of the piece of timber was too much for the king; he thought it to be useless to try force against a woman like that, so marched back to Northumberland with his merry men all.

Some photographers think their rectilinear lenses to be good if they give straight architectural lines. If such lenses represent the pillars outside the British Museum and other such buildings as cylinders with parallel sides, those lenses do not give straight lines, for the columns bulge out at a little distance from the ground, as represented in exaggerated fashion in figure 3, otherwise they would not in large buildings look like true cylinders to the eye. The Greeks were aware of this optical illusion, and allowed for it wherever necessary in the construction of their temples.



Fig. 3.

COMPETITIVE ORTHOCHROMATIC PLATE PHOTOGRAPHS.

SOME time ago, Messrs. B. J. Edwards and Co. offered the following prizes for the best negative in each class taken on Edwards's Isochromatic Plates, irrespective of size :—Class A. *For the Best Landscape*—First prize, £25 ; second, £5 ; third, £3 ; fourth, £2. Class B. *For the Best Instantaneous Photograph*—First prize, £20 ; second, £5 ; third, £3 ; fourth, £2. Class C. *For the Best Interior*—First prize, £10 ; second, £3 ; third, £2.

The judges were Messrs. H. P. Robinson, Andrew Pringle, and J. Traill Taylor, and the following were their awards :—

Class A. *(Landscape)*—1st prize, £25 or value : Mr. F. W. Edwards, "View at Woolpits, Guilford, Surrey," taken on Instantaneous Isochromatic Plate, without screen. 2nd prize, £5 or value : Mr. Frederick D'Arcis, "View in Arundel Park, Sussex," taken on Instantaneous Isochromatic Plate, without screen. 3rd prize, £3 or value : Mr. C. A. Brightman, "View of Cascade, Lanthony," taken on Medium Isochromatic Plate, without screen. 4th prize, £2 or value : Mr. A. G. Clark, "View of Anstey's Cove, Torquay," taken on Medium Isochromatic Plate, without screen.

Class B. *(Instantaneous)*—1st prize, £20 or value : Mr. Lyddell Sawyer, "The Penny Ferry," taken on Instantaneous Isochromatic Plate, without screen. 2nd prize, £5 or value : Mr. Ralph W. Robinson, "Feeding the Ducks," taken on Instantaneous Isochromatic Plate, without screen. 3rd prize, £3 or value : Mr. H. Dudley Arnott, "Fishing Boats and Steam Tug," taken on Instantaneous Isochromatic Plate, without screen. 4th Prize, £2 or value : Mr. Alfred Price, "Entrance to Yarmouth Harbour, with Vessels and Tugs," taken (late in October) on Instantaneous Isochromatic Plate, without screen.

Class C. *(Interiors)*—1st prize, £10 or value : Mr. E. Brightman, "The Cloisters, Gloucester Cathedral," taken on Medium Isochromatic Plate, without screen. 2nd price, £3 or value : Mr. William Ellis, "Drawing Room, Birch House, Hayward's Heath," taken on Medium Isochromatic Plate, without screen. 3rd price, £2 or value : Rev. F. C. Lambert, "Parthenon Room, Archæology Museum, Cambridge," taken on Instantaneous Isochromatic Plate, without screen.

The Mr. Edwards who won the first prize is in no way related to any member of the firm of Messrs. B. J. Edwards and Co., but is the well-known worker in platinotype. All the pictures were taken without a yellow screen ; most of the photographs sent in were platinotype, and the majority of the prize pictures were platinum prints. The judging was done on the original negatives, which were all untouched ; the prints were examined by the judges before the negatives. Some few of the prints exhibited which were highest in technical excellence were not the most pleasing as pictures. The foliage and the illumination in Mr. Lyddell Sawyer's "Spring Morning" were exceedingly well rendered.

EXPERIMENTAL PHOTOGRAPHIC WORK IN THE INDIAN SURVEY OFFICE.*

THE principal experimental work done in the Photographic Office during the year, besides the direct printing on thin zinc plates by the collochromate and asphalt methods already described, has been with the view of obtaining reversed positives or transparencies direct in the camera, as well as by conversion of negatives taken in the ordinary way. If suitable transparencies could be obtained in some such simple manner, it would be a great saving of time and trouble, and avoid the difficulties inseparable from the preparation of transparencies by the carbon or pigment printing process, more especially in hot weather.

The experiments have been for the most part made by Mr. J. T. Meade, who worked up and tried all the methods hitherto published, including Poitevin's, Sabatier's, Foxlee's with wet collodion, and Brooke's and Carrell's with gelatine dry plates. The only method that seemed likely to be of really practicable use is that formerly used in the French *Depot des Fortifications*, of which a description was published in 1881 by M. V. Roux, and in the *Bulletin de la Societé Francaise de Photographie*, vol. xxvii., p. 130, by Captain Biny of the French Engineers.

The following is a sketch of the method as found most suitable for working in Calcutta. It is necessary first of all to give the glass plates a good coating of albumen, in order to hold the films down while in the acid baths. The plate is then coated with bromo-iodised collodion, and sensitised in the usual way. The exposure in the camera is rather shorter than for ordinary work. It is developed with iron, but not too much, and not intensified with silver, washed thoroughly, and then intensified in the usual way with acid, pyrogallic acid, and silver solutions made as follows :—

1.—Water	... ...	1,000
Pyrogallic acid	... ...	5
Citric acid	... ...	25
Alcohol	... ...	10
2.—Distilled water	... ...	500
Silver nitrate	... ...	10
Acetic acid	... ...	40

When sufficiently intensified the plate is well washed, and then placed, film upwards, on a black-board and exposed to diffused daylight for a time varying from ten seconds to a minute or more, according to the brightness of the light, until the unexposed yellowish parts of the negative gradually change to a purplish grey; a few trials will show exactly the tint required. Some chloride of zinc may be added to the collodion, so as to form a small quantity of chloride of silver in the film, which will change colour when exposed to light, and give a better index to the proper exposure.

The plate is then taken into the dark-room, washed, and immersed quickly with one movement in a bath composed of—

Bichromate of potash	 30
Pure nitric acid	 300
Water	 700

This operation may be performed in a weak diffused light. The plate should be carefully watched in the bath, and when the negative image is seen to have entirely disappeared, or dissolved away by the nitric acid, which takes place in a few seconds in a fresh bath, it should be removed

* A part of the Government Report forwarded to us by Colonel Waterhouse, Director of the Photographic Office.

immediately and quickly washed with a strong jet of water to remove all traces of the nitric acid before proceeding with the development of the positive image.

The plate should now show a positive image in a pale straw colour, while the parts which have been dissolved will appear of a brick-red colour, owing to the formation of chromate of silver.

Before proceeding farther it is better to dissolve off the chromate of silver by means of the following solution:—

Bichromate of potash (saturated solution) ...	30
Alcohol	30
Pure nitric acid	30
Water	400

The solution of bichromate of potash is placed in a glass beaker and the alcohol added to it, which causes a precipitate. The nitric acid is then added by degrees, stirring all the while. The precipitate re-dissolves, and an odour of apples is evolved. The water is then added. This solution should not be allowed to remain on the plate longer than is sufficient to clear off all the red chromate; and, if too strong, it may be reduced with water. The plate is then thoroughly well-washed and re-developed with pyrogallic acid and silver. The solution of pyrogallic acid is composed of—

Pyrogallic acid	25
Citric acid	25
Alcohol	50
Water	1,000

The solution is first poured over the plate, then poured back into the developing cup. A small quantity of a weak solution of nitrate of silver at 1 per cent., acidified with acetic acid, is added, and the mixture poured again on the plate, when the positive image gradually begins to gain strength. The additions of silver solution should be carefully made, and the re-development not carried too far. When finished, the plate is washed, and fixed in the usual way with hyposulphite of soda or cyanide of potassium, and thoroughly washed. Should the ground appear slightly veiled, it can be cleared by the application of a weak solution of iodine and iodide of potassium in water, followed by treatment with weak cyanide or hypo-solution, as in the ordinary photo-zinco process. When clear, the plate can be further intensified, if necessary, with bichloride of mercury or bromide of copper in the usual way.

For half-tone subjects the method is the same, but the nitric acid bath should be much weaker, the formula being then—

Bichromate of potash	12 grammes
Pure nitric acid	75 c.c.
Water	700 ,,

Less silver should be used in re-developing the positive image. The amount of exposure to light requires to be very accurately judged, and upon it and care in re-developing, the success of the result depends. Captain Biny recommends a re-development with iron and very weak silver solution, pyrogallic acid being apt to give dense, hard results.

The methods above described appear perfectly practical, and will be very useful for obtaining reversed transparencies, for maps, &c., for use in the photo-etching process. A small specimen map produced in this manner gave a very sharp, clear result, and in this respect superior to the usual run of work produced from the carbon transparencies, on which there is often a considerable thickness of gelatine which prevents close contact in the printing frame.

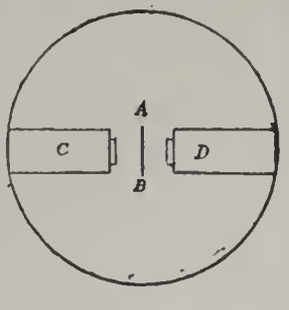
The method might also be found of advantage in reproducing maps in two or more colours from a single original drawn in black. It is much easier to produce the requisite separate clichés for each colour by scraping the lines off a transparency than it is to paint them out of a negative.

THE INFLUENCE OF MAGNETISM UPON A PHOTOGRAPHIC PLATE.

BY FRIESE GREENE.

Having been invited to publish the details of the experiment I performed before the Photographic Society, in which magnetism produced an effect upon a very quick photographic plate, I have pleasure in giving the particulars.

I had two electro-magnets, C D, screwed to a ring of soft iron, fourteen inches in diameter, so as to form virtually a horse-shoe magnet. Between the poles the sensitive plate A B was placed. The battery was one of Dale's construction, consisting of twelve cells of about three pints capacity, with carbon and zinc plates; the carbon cells were charged with solution of potash and hydrochloric acid, and the zinc with chloride of zinc.



One of Lumière's plates was soaked in water, and the excess of moisture then removed by blotting-paper. A strip of platinum foil was laid along each end of the plate, with the edges of the foil projecting. A plate of plain glass was then laid on the sensitive plate to protect it, and was prevented from touching it by the platinum foil at the ends; it also served to check evaporation. I then bound up the two plates with paper and oilcloth, to protect them from light.

An intermittent current was passed through the damp film, and the contact was made by means of the projecting pieces of platinum. The magnetism set up by the current was allowed to act for two minutes, after which the plate was developed, and a dark spot about one-eighth of an inch in diameter appeared on the plate with a halo round it about as big as a shilling; the spot was near the side of the halo, not in its centre; the darkening of the plate never took place exactly between the poles, but was higher up.

I have obtained this result about a dozen times, and find that Lumière's plates answer best for the purpose. What peculiarity there may be in the making of these plates I do not know; they fog rapidly under the action of ammonia.

Mr. Philip Braham has tried the experiment with two sensitive plates, face to face, and obtained the effect on both at the same time.

The Jubilee of Photography was celebrated by the Moscow Photographic Society, and its President, Mr. Esoutschewski, sent the felicitations of his Society to the Photographic Society of France.

Rejlander's Photographs.—The Camera Club, in its *Journal*, states that it would like to hold an exhibition of Rejlander's now scattered pictures. The inspection of such a collection would be a great treat to everyone, and those who are willing to lend any such photographs—however few they may possess—should inform the Hon. Sec., Camera Club, Bedford Street, Strand, London.

PHOTOGRAPHY IN FRANCE.

FRENCH PHOTOGRAPHIC SOCIETY—BERTHON'S SYSTEM OF FOCUSSING—EXPOSURES WITHOUT A LENS—AUTOMATIC EXPOSURE OF PHOTOGRAPHIC PRINTS—EIKONOGEN DEVELOPER—PLATINUM TONING PROCESS—HYDROKINONE BATH AS A COLOUR SCREEN.

Berthon's System of Focussing.—The author of the paper on this subject has taken up an idea already carried out by others in another nearly similar form, of uniting the focussing adjustment with a sort of telemeter composed of two rules jointed on a central pivot, by the aid of which the to-and-fro movement of the lens is effected simultaneously with the adjustment of the rules to the angle necessitated by the distance of the object to be focussed. At the precise moment when an object of known dimensions is exactly included between the two extreme points at the ends of the rules, the lens is found to be focussed, and the button of the exposure shutter is brought into action. This method is very ingenious, but it requires the knowledge—at least, approximately—of the height of some object included in the field of vision of the lens. The inconvenience of the method is that it entails further complication, and more mechanism. It would appear at first sight that the use of a small lens having a focal length equal to that of the photographic objective permits us to come at the result with greater certainty. The focussing would be as quickly arrived at, and the working of the shutter would be neither slower nor more difficult.

Calculations for Exposures for Photography without a Lens.—The author of this communication has favoured the Society with a table of calculations showing the length of exposure required when, in place of a lens, only a simple hole is used to form the image, as it is found difficult, when using openings varying from $\frac{3}{10}$ to $\frac{7}{10}$ of

TIME OF EXPOSURE IN PHOTOGRAPHING WITHOUT A LENS.*

Apertures, in fractions of a millimetre.	Focal length in centimetres.	Time of Exposure for Various Intensities of Light, as indicated by the Photometer.									
		10	9	8	7	6	5	4	3	2	1
		m s	m s	m s	m s	m s	m s	m s	m s	m s	m s
$\frac{3}{10}$ 9×12m 18×24	10 centim.	20	22	25	29	33	40	50	1. 6	1.40	3.20
	11 „	24	26	30	34	39	48	1	1.19	2	4
	12 „	29	32	36	41	48	58	1.12	1.36	2.25	4.50
	13 „	34	37	42	48	56	1. 8	1.25	1.53	2.50	5.40
	14 „	39	43	48	55	1. 4	1.18	1.37	2. 9	3.15	6.30
	15 „	45	49	56	1. 3	1.14	1.30	1.52	2.29	3.45	7.30
	16 „	52	57	1. 5	1.13	1.26	1.42	2.10	2.53	4.20	8.40
	18 „	1. 5	1.11	1.21	1.32	1.47	2.10	2.42	3.36	5.25	10.50
$\frac{4}{10}$ 21×27m 27×33	20 „	1. 2	1. 8	1.17	1.28	1.52	2. 4	2.35	3.26	5.10	10.20
	22 „	1.15	1.22	1.33	1.46	2. 4	2.30	3. 7	4. 9	6.15	12.30
	24 „	1.30	1.40	1.52	2. 7	2.29	3	3.45	5	7.30	15
	26 „	1.45	1.55	2.11	2.29	2.54	3.30	4.22	5.49	8.45	17.30
	28 „	2. 2	2.14	2.32	2.53	3.24	4. 4	5. 5	6.46	10.10	20.20
$\frac{5}{10}$ 30×40m 45×58	30 „	1.52	2. 3	2.20	2.39	3. 5	3.44	4.40	6.12	9.20	18.40
	32 „	2. 8	2.20	2.40	3	3.32	4.16	5.20	7. 6	10.40	21.20
	34 „	2.24	2.38	3	3 24	4	4.48	6	8	12	24
	36 „	2.42	3	3 22	3.50	4.28	5 24	6 45	9	13.30	27
	38 „	3	3.18	3.42	4.15	4.58	6	7.30	10	15	30
	40 „	3.20	3.40	4.10	4.44	5.32	6.40	8.20	11. 6	16.30	33
	42 „	3.40	4.20	4.35	5.12	6. 6	7.20	9.10	12.12	18	36
$\frac{6}{10}$ 50×60m 90×1m	44 „	3.20	3.40	4.10	4.44	5.32	6.40	8.20	11. 6	16.30	33
	46 „	3.38	4	4.32	5. 9	6	7.16	9. 5	12. 5	18.10	36.20
	48 „	4	4.24	5	5.40	6 38	8	10	13.19	20	40
	50 „	4.24	4.50	5.30	6.14	7.18	8.48	11	14.39	22	44
	52 „	4.37	5	5.46	6.33	7.39	9.14	11.32	15.22	23. 5	46.10
	54 „	5	5.30	6.15	7. 6	8.18	10	12.30	16.39	25	50
	56 „	5.17	5.48	6.36	7.30	8.46	10.34	13 12	17·35	26.30	53
	58 „	5.50	6.25	7.17	8.17	9.41	11.40	14.35	19.25	29.10	58.20
$\frac{7}{10}$ 1m×7·60m	60 „	5.20	5.52	6.40	7.30	8.51	10.40	13.20	17.45	26.20	53.20
	62 „	5.42	6.16	7. 7	8. 5	9.27	11.24	14.15	19	28.30	57
	65 „	6.16	6.53	7.50	8.53	10.24	12.32	15.40	20.52	31	1h 2m
	68 „	7	7.42	8.45	9.56	11.37	14	17.30	23.18	35	1h 10m
	71 „	7.25	8. 9	9.16	10.31	12.29	14.50	18.32	24.41	37	1h 14m
	74 „	8	8.48	10	11.21	13.16	16	20	26.38	40	1h 20m
	77 „	8.44	9.36	11	12.24	14.29	17.28	21.30	28.44	43	1h 27m
	80 „	9.30	10.27	11.52	13.29	15.46	19	24	31.38	48	1h 35m

* The mean sensitiveness taken as a standard has been that of the Lumière plates, blue label.

a millimetre, to come at the exposure necessary in order to obtain a negative.

Generally speaking, this method, which has its uses for reproduction of monuments, works of art, and so on, will be employed by artists and others desirous of obtaining a photographic record, and they may find themselves much embarrassed on the question of the length of exposure necessary. Thanks to the calculations made, of which I submit a specimen, anyone can immediately settle the exposure requisite, allowing for a considerable variation in the focal distances—say from about 4 to 32 inches—and for different degrees of luminosity, from full light (10) down to an intensity of one-tenth of that standard.

We know that working without a lens permits us, without change of position, and by a simple drawing out of the camera, to obtain pictures of very varying dimensions; thus, whilst we have a proof of 9 by 12 cm. at a distance of 10 cm., it suffices to lengthen the camera to 20 cm. to enable us to cover a plate of 18 by 24; 80 cm. distance will give us a proportionally larger image, and so on.

This is sufficient to show the use of a method which offers such advantages, and which, although not yielding sharpness equal to that given by lenses, produces results which are sufficient for their purpose from the artistic point of view. Thanks to the table appended, it may be seen at a glance within what limits one ought to operate, and it is found, for example, that if after having made a general view of a subject at a focal distance of 18 cm., it is desired to reproduce some detail of the same view on a much larger scale, the time required (in a full light, 10) will be 9 minutes and 30 seconds, whilst the view first taken will only have required 1 minute and 5 seconds; other things of course being equal. We cannot too highly recommend in this connection the plate pierced with openings of various sizes, indicated in the table, and made with the greatest care by the house of Dehors and Deslandres. It is seen from an examination of the table that the size of the openings varies with the focal distances, which permits us, without injury to sharpness, to abridge the exposure in proportion as the camera is extended. Thus for distances varying from 10 to 80 cm. we pass successively openings of $\frac{3}{10}$ to $\frac{7}{10}$ of a millimetre, including those of $\frac{4}{10}$, $\frac{5}{10}$, and $\frac{6}{10}$. It is hoped that this small but useful work will render service to the method as yet but little known—and consequently too little practised—of photographing without a lens.

Machine for Automatic Exposure of Photographic Prints.—M. Dessendier has endeavoured to explain this machine, which we saw at work at the Universal Exhibition. We say endeavoured, for it is difficult to make the movements clear without setting it in action. What is most interesting in this instrument, which is still too complicated to be admitted as one for current use, is the employment of a photometer, based upon the action of light on a mixture of chlorine and hydrogen gases. M. Dessendier has completely solved the problem of making the action proportional to the intensity of the luminous rays. Thanks to the photometer, he regulates the movements of a motor which has for its object the changing of the sensitive paper under the negative when the printing is completed.

We do not know whether this method may render useful service thus applied, but in any case, we have the Dessendier photometer as an instrument which may be applied to the purposes of works of observation and scientific registration.

Development with Eikonogen by M. Audra.—The author of this interesting communication showed the results of his experiments. He is, on the whole, favourable to the new agent, the principal characteristics of which he points out. He considers that for portraiture it may prove to be the best developer. The following is the formula that he recommends:—

No. 1.—Water	... ...	1,000 c.c.
Sulphite of soda (pure)	... ...	75 grammes
Eikonogen	... ...	15 ,,
No. 2.—Carbonate of soda	... ...	150 ,,
Water	... ...	1,000 c.c.

At the time of using, three parts of No. 1 are mixed with one part of No. 2. M. Audra produced also samples of a new kind of eikonogen in white crystals, the solution of which is still more colourless than that of the product which he employed in his experiments. The new product is brought before the Society by M. Schæffer, the consignee for France. Many bottles were distributed as samples amongst the members of the Society for the purpose of trial. The prints submitted by M. Audra in support of his communication are a proof of the qualities of eikonogen.

Platinum Toning Process.—M. Gastine sends to the Society prints toned with platinum by a process which he describes. The toning bath is thus composed:—

Chloride of sodium	... ... 20 grammes
Bitartrate of soda	... ... 10 ,,
Water	... ... 300 c.cm.

The solution is made with heat, but not exceeding from 50° to 55° Cent. From 5 to 7 c.cm is then stirred in of a solution of bichloride of platinum at 10 per cent. Cold water is then added to make up the quantity to one litre.

In place of bitartrate of soda a mixture may be employed of 5 parts of tartaric acid with 4½ parts of bicarbonate of soda. The prints thus toned are doubtless more durable than those toned with gold, but experience will test this.

Hydrokinone Bath Employed as a Colour-Absorbing Screen.—M. le Commandant Joly, being struck with the colouration which he has observed in an old hydrokinone bath placed in full light, thought that the liquid should possess the property of absorbing violet light, and he has experimented with this in comparison with various other absorptive screens. He has photographed the spectrum of the electric arc, interposing screens of bisulphate of quinine, of neutral chromate and bichromate of potassium, of uranium glass, didymium glass, and lastly, of old hydrokinone baths, one of which had been used for development.

The observation of the results shows that hydrokinone absorbs the violet and blue rays; bisulphate of quinine, absorbing only the ultra-violet invisible rays, has no photographic value. Bichromate of potassium allows only the yellow and red rays to pass. According to the degree of concentration of hydrokinone, we may succeed in bestowing upon the solution the necessary amount of absorption to produce a screen useful in orthochromatic photography.

Leon Vidal.

CONSTANT FOCUS AND DEPTH OF DEFINITION IN PHOTOGRAPHIC LENSES.

BY WILLIAM A. CHEYNEY.

Since the introduction of detective cameras we have heard and read much about lenses having a fixed or constant focus for all objects at all distances from the lens, from four feet upward, and this has lead to claims being made, for the lenses of different manufacturers, which have been surprising and at variance with all known laws of optics.

This condition of affairs induced me to make a series of experiments, with a number of lenses made by different manufacturers, in order to convince myself as to what extent these statements could be relied upon; the result of which I give you as follows.

There is no such thing as a constant focus for any lens; the plane of absolute sharpness varies for every point, at which the object may be, between an infinitely distant point and the lens.

That there is a plane of absolute sharpness, in all well-corrected lenses, there can be no question, and the determination of this plane only depends upon the extent to which the image on the ground glass is magnified.

There is, however, a distance through which the ground glass may be moved, and yet the error in the sharpness of the image cannot be detected by the human eye; this distance varies inversely as the ratio of the diameter of the aperture of the lens (the diameter of the opening in the diaphragm used) to the equivalent focus of the lens (the distance from the optical centre of the lens to the ground

glass, when an object infinitely distant would give an absolutely sharp image).

This grows out of the fact that the human eye cannot detect an error in sharpness when the error is not greater than $\frac{1}{250}$ of an inch.

To illustrate this, I present Fig. 1.

Here we have the cone of light from a lens working with an aperture of *f*/8 represented by the lines *b d* and *b e*, and the position of the plane of absolute sharpness by the line *a b c* (being the position of the ground glass). Now when when the ground glass is pushed up to the position indicated by the line *f g h i* we have what would be a mathematical point at *b*, increased to a blurred spot having a diameter represented by the line *g h*, and whenever the

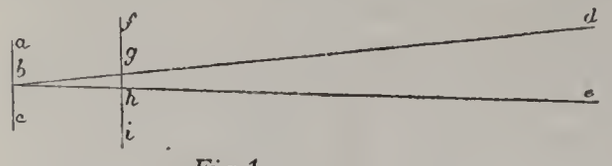


Fig. 1.

length of this line *g h* is $\frac{1}{250}$ of an inch or less, it will be impossible for the unaided human eye to detect the error.

But I stated before that this movement of the ground glass varies inversely as the ratio of the diameter of the aperture of the lens to the equivalent focus thereof, and in order to show this, I will call your attention to Fig. 2, given below.

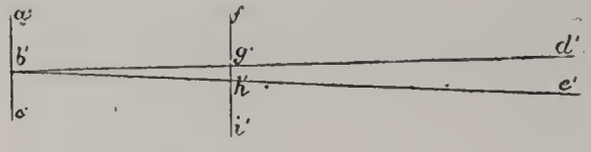


Fig. 2.

In this figure we have the cone of light from a lens working with an aperture of *f*/16, and the conditions are the same as in the former example, excepting that, while the line *g' h'* is equal to the line *g h*, it will be twice as far from the point *b'* as *g h* was from the point *b*.

Now these conditions are true for a point back of the ground glass.

Here let me say, that this distance from the point in front of the ground glass to the one behind it, between which the error in sharpness is inappreciable, gives rise to what is known as depth of focus in a lens, which is here shown to vary according to the ratio between the diameter of the aperture and the equivalent focus of the lens, and which depends for its existence upon the inability of the human eye to detect the error.

This accounts for the fact that our beautiful little negative, in which we have taken advantage of all the depth of focus of our lens, when it comes to be enlarged gives an unsatisfactory picture, Why? Because we have enlarged the error of focus until the eye is able to detect it.

Still there are some of us who do not desire to make enlargements from our negatives, and for the benefit of those I will go further with the results of my experiments.

I found the following rule to be true by actual experiment with lenses of nine of the most reliable manufacturers, as well as by computation :

Multiply the diameter of a aperture of a lens by the equivalent focus thereof ; divide the product by the greatest imperceptible error, and to the quotient add the equivalent focus. The sum will be the distance of an object upon which a lens should be accurately focussed in order that all objects beyond a point one-half of the above distance shall be apparently in focus.

Thus let *f* equal the equivalent focus, *a* equal the diameter of aperture, and *e* equal the greatest allowable error ; then *d* will equal the distance of an object upon which, if the lens be accurately focussed, all objects beyond *d*/2 will apparently be in focus :

$$\frac{a \times f}{e} + f = d$$

Or, say we are using a lens with an equivalent focus of eight inches and the *f*/8 diaphragm, then we have—

$$\frac{1 \times 8}{\frac{1}{250}} + 8 = 2{,}008 \text{ inches} = 167 \text{ feet } 4 \text{ inches.}$$

Now, if we focus upon an object 167 feet 4 inches from the lens, all objects beyond 83 feet 8 inches will be in apparent focus.

Or, again, if we use a lens the equivalent focus of which is four inches, and use the *f*/16 diaphragm, we have—

$$\frac{\frac{1}{4} \times 4}{\frac{1}{250}} + 4 = 254 \text{ inches} = 21 \text{ feet } 2 \text{ inches.}$$

And here, if we focus on an object 21 feet 2 inches from the lens, then all objects beyond 10 feet 7 inches will apparently be in focus.

As the result of the foregoing, I give the following table :—

Equivalent Focus in inches.	Diaphragm.	Distance of Object Focussed Upon.	All Objects in Focus Beyond.
8	f/8	167 ft. 4 in.	83 ft. 8 in.
8	f/11·31	125 ft. 8 in.	62 ft. 10 in.
8	f/16	84 ft.	42 ft.
7	f/8	126 ft. $1\frac{1}{4}$ in.	63 ft. $0\frac{5}{8}$ in.
7	f/11·31	94 ft. $8\frac{11}{16}$ in.	47 ft. $4\frac{13}{32}$ in.
7	f/16	63 ft. $4\frac{1}{8}$ in.	31 ft. $8\frac{1}{16}$ in.
6	f/8	94 ft. 3 in.	47 ft. $1\frac{1}{2}$ in.
6	f/11·31	70 ft. $9\frac{3}{4}$ in.	35 ft. $4\frac{7}{8}$ in.
6	f/16	47 ft. $4\frac{1}{2}$ in.	23 ft. $8\frac{1}{4}$ in.
5	f/8	65 ft. $6\frac{1}{4}$ in.	32 ft. $9\frac{1}{8}$ in.
5	f/11·31	49 ft. $3\frac{1}{16}$ in.	24 ft. $7\frac{17}{32}$ in.
5	f/16	32 ft. $11\frac{5}{8}$ in.	16 ft. $5\frac{13}{16}$ in.
4	f/8	42 ft.	21 ft.
4	f/11·31	31 ft. 3 in.	15 ft. $7\frac{1}{2}$ in.
4	f/16	21 ft. 2 in.	10 ft. 7 in.
3	f/8	23 ft. $8\frac{1}{4}$ in.	11 ft. $10\frac{1}{8}$ in.
3	f/11·31	17 ft. $10\frac{1}{16}$ in.	8 ft. $11\frac{9}{32}$ in.
3	f/16	11 ft. $11\frac{5}{8}$ in.	5 ft. $11\frac{13}{16}$ in.
2	f/8	10 ft. 7 in.	5 ft. $3\frac{1}{2}$ in.
2	f/11·31	7 ft. $11\frac{3}{4}$ in.	3 ft. $11\frac{7}{8}$ in.
2	f/16	5 ft. $4\frac{1}{2}$ in.	2 ft. $8\frac{1}{4}$ in.

By an examination of the foregoing table, two facts are seen : (1) That, while the focus shortens in an arithmetical progression, the distance of the object in focus decreases geometrically, thus showing the reason that short-focus lenses have a greater depth of focus than those of long focus ; and (2) that the distance to the object in focus decreases directly as the diameter of the diaphragm is smaller, thus demonstrating the cause of the increase of depth of focus by the use of smaller diaphragms.

And, finally, you should know that the lenses used in these experiments were of the kinds known as rectilinear or moderate angle, wide angle and landscape, or single combination lenses.—*Journal of the Franklin Institute.*

PATENT OFFICE

HAND CAMERAS.*

BY W. ASBURY GREENE.

I MUST begin by disclaiming the title given in the *Club Journal* to the subject which I am to introduce this evening. I meant to say something upon hand cameras, but not to dwell upon the "detective" class, the use of which I have no desire to advocate. However, as the subject has been somewhat forced upon me, I am not sorry to take the opportunity it affords of calling attention to the abuses which are growing out of the unscrupulous employment of the "detective" camera.

Wherever one goes now-a-days, the amateur detective is on the prowl with his camera dressed up as a brown paper parcel or a set of the "British Poets," or enclosed in the black leather box which has become familiar to every one, and is a disguise no longer. By many of these persons, unfortunately, nobody and nothing is held sacred, and in some quarters, thanks to their ill-directed enthusiasm, amateur photographers are getting to be regarded as an intolerable nuisance.

I should like to quote here a passage from Dr. Emerson's much criticised work—one, however, about which I am sure there will be no question:—"We may remark that the name 'detective camera' is, in our opinion, undesirable. Photographers ought not to have it even suggested to them that they are doing mean, spying work with their cameras." Since those words were written the use of the detective camera has become much more common, and I fear the charge is only too often not merely suggested, but vigorously pressed home.

A few weeks ago I was crossing the Channel in rather a rough sea, and there was consequently a great deal of misery on board, especially among the ladies. This was considered by one of the passengers a capital opportunity for using his "detective," and he moved about taking shots at the wretched victims of *mal de mer* in the most shameless way, though taking care to conceal what he was about as far as he could. I do not think there can be two opinions as to the meanness and miserably bad taste of this performance. A story went the round of the papers a short time ago of a cad who was snapping a portrait of a French lady about to bathe, when, unfortunately for himself, he was perceived by her husband, who smashed the apparatus and thrashed the operator. Now I think that all our sympathy should be with the Frenchman, and not with the wretched "Peeping Tom," who richly deserved the chastisement he got. There is no advantage for legitimate work in concealing the camera in a box. On the contrary, it may be made much more compact and portable if the box is dispensed with; and, therefore, if the camera must be disguised, we may take it broadly that it is intended to be used in an unjustifiable way. Whatever the law on the subject may be, it is as mean a theft to steal a caricature of a person against his will and without his knowledge, as to pick his pocket of a handkerchief which he has unguardedly left hanging out of it. It will be well that we who have the true interests of photography at heart should recognise the discredit which these amateur detectives are bringing upon our art, and that we should do all that is in our power to discourage such an abuse of the camera.

But for the hand camera there is, I believe, a great and wide field of usefulness. It can be used in places inaccessible to the worker with a large camera, and will secure fleeting effects which would have passed long before a tripod could be unlimbered, and the fixed camera got to work. To the artist and the traveller, therefore, it has peculiar recommendations from its portability and its readiness for immediate action.

It is too much the fashion for the fixed camera worker to sneer at the production of the hand camera man. It is no doubt a very simple thing to snap the shutter and secure whatever happens to be in front of the lens at the moment of exposure. It removes difficulties and complications to have a fixed focus, and no swing back, and to be troubled with no intricate exposure tables; and as far as mere technicalities go, I admit that the man possessed of a camera with all the latest movements, swings, levels, and fads, may legitimately pride himself on having produced a negative in spite of his apparatus, and is so far superior to the hand-camera man who is handicapped by none of these improvements. But from the art side of the question I hold that both are on the same level, and the man who can select and secure the most picturesque scene is the better artist, whatever camera he uses. Each class of camera, of course, has its appropriate use, and to neglect the hand camera on expeditions where the tripod cannot be conveniently carried or fixed would be as great a mistake as to prefer it to the fixed camera in the opposite case.

I have used a good deal in the Alps, with great satisfaction to myself, a quarter-plate fixed focus camera by Shew. With this I generally use an Eastman roll holder, and the whole is so light and compact that it is never a nuisance, even on the longest expeditions. I find that after a little practice one learns to shoot straight, and to tell fairly accurately what will be on the plate, so that a finder is not necessary, and the space, small though it may be, that this would occupy can be saved.

The ease and rapidity with which views are taken with a hand camera are likely to cause one to make many exposures which prove more or less failures owing to unsuitability of light, or which turn out on examination of the print to be otherwise unworthy of reproduction. To the hand camera man I would say: Suppress these; only show your successes, and do not be led into the common mistake of producing dozens of prints faithfully representing every single negative you took, and in which the few good pictures are buried in the bulk of rubbish. To do this gives the enemy cause to blaspheme, and does a great deal to discredit hand camera work generally. But minimise the rubbish as far as possible by reserving your fire. Do not be led to take shots at everything you come across simply because you have a four-dozen roll in your holder. Consider whether the subject will make a picture, and select the best point of view. If you get home with a vast heap of plates to develop, many of which are of no earthly good, be sure that you will fall into a slovenly and perfunctory mode of development which will prevent your getting any really good negatives out of the batch.

With regard to the size of the picture to be taken in the hand camera it will, I think, be found that quarter-plate is the most convenient size. For lantern slides it is desirable to have a little margin, so that the best part of the negative may be selected. As for the still smaller cameras, and those of the Kodak pattern, which produce a circular picture—a shape unsuited to almost every possible class of subject—I consider them useless for all practical purposes. An objection is often taken to the insignificant size of the quarter-plate, and an idea is prevalent that absence of

* Read at a meeting of the Camera Club.

minute detail, owing to the rapid shutter exposure, will prevent any satisfactory enlargement being made, and the same cause will militate against the production of really good lantern slides, and whether this be so or not, it is generally assumed that negatives taken on paper are useless for either of these purposes. This, I am persuaded, is a mistake; and the fact that at several exhibitions, both in the case of enlargements and lantern slides, those made from negatives taken in a hand camera on Eastman stripping films have carried the day against others, whose origin was a glass plate exposed in a fixed camera, seems to confirm my view.

I myself have nearly always used the Eastman stripping film in a roller slide, and have been generally successful in the stripping process, which seems to be a crux to many. The reason of failures there I believe to be a want of patience, which induces operators to dispense with the rubber or the collodion, or both, or to shirk some other of the necessary details, which undoubtedly are irksome. However, it is unnecessary to say anything more on that subject, for we have reason to hope that very shortly now the long-promised transparent film will be in our hands, and stripping become as obsolete as the boiling castor oil process. With a transparent film working in the Eastman roller slide, which, to my mind, approaches as nearly as possible perfection as a dark slide, the hand camera man will have little left to desire in that direction.

For those who prefer to use glass plates there are convenient changing backs which are said to work well, and for cut films our ingenious friend, Mr. Ferrero, has invented a back which seems to answer its purpose admirably, but I have had no personal experience of either.

Upon the very important subject of the lens I must leave it to others to speak who possess more optical knowledge than myself.

Though I am well aware of the drawbacks attending the use of short-focus lenses, I still use one of 4½ inches; for I believe that the advantage of the fixed focus for all objects within a short distance is so great as to outweigh the objections to the short-focus lens in the case of a hand camera, bearing in mind that it has often to be used in a hurry, or in situations where careful adjustment is an impossibility.

One of the most serious of these objections is the exaggerated rendering of the proportion between near and distant objects, but it is possible to reduce the evidence of it to a great extent by careful selection of the foreground.

I fully, however, admit that much better work might be done with a longer-focus lens working at a greater aperture than mine. If the difficulty of accurately focussing can be got over without adding to the size and weight or complexity of the camera, I would gladly adopt it.

In concluding, I must apologise for the poverty of these remarks, both in quantity and quality.

My object has been simply to start the subject, and incidentally to denounce the abuse of hand cameras. I fear I have been able to say nothing to you that is new, and little that is practically useful; but I hope that an interesting discussion will follow, which will atone for the deficiencies of the paper which started it.

Mr. J. Tripplin, of 5, Bartlett's Buildings, London, one of the jurors at the Paris Exhibition, writes that Mr. William England has not been nominated au Officer of the Legion of Honour, but an "*Officièr d'Academie.*"

Patent Intelligence.

Applications for Letters Patent.

17,519. M. A. Wier, 115, Cannon Street, London, "Apparatus for Taking a Succession of Pictures in a Photographic Camera."—November 4th.

17,522. V. J. E. Damoizeau, 47, Lincoln's Inn Fields, London, "Photographic Apparatus."—November 4th.

17,548. F. Beauchamp, Hope Cottage, Chadwell Heath, Essex, "Cameras."—November 5th.

17,555. H. W. B. Bruno, 297, Camden Road, London, "Cameras."—November 5th.

17,590. W. T. Warburton, 6, Lord Street, Liverpool, "Mounting Photographic Prints."—November 5th.

17,708. T. R. Dallmeyer and F. Beauchamp, 4, South Street, Finsbury, London, "Cameras."—November 6th.

17,729. T. Kerr, 52, Grosvenor Park Road, Walthamstow, "Detective Camera."—November 7th.

17,767. W. H. Warner, 17, Southampton Buildings, London, "Washing Photographic Films, Prints, and Plates."—November 7th.

17,773. E. H. Farmer, 24, Southampton Buildings, London, "Improvements in Photography."—November 7th.

On the Choice of Photographic Lenses.—In the *Deutsche Photographen-Zeitung* the following instructions are given to determine the exact opening of the objective used, with or without the stop; it is a modification of the so-called Steinheil method:—"Focus on a very distant object; then in the dark room replace the focussing screen by a sheet-iron plate, having in its centre an opening of about one-eighth of an inch; behind this opening place the flame of a lamp; light passing through this aperture forms on the front lens of the objective a luminous ring, which is precisely equal to the active opening of the objective. As it is difficult to see this ring directly, on account of its feeble light, it is photographed by placing the sensitive plate against the lens.

An Instrument to Prevent Frilling.—At the last meeting of the Photographic Society of Berlin, Captain Himly presented a little instrument which he calls "anti-friller," and which has for its object to fasten down the edges of the gelatino-bromide film to prevent frilling. He describes it as follows:—"Most perfumery bottles have a cork perforated by a tube with a screw head. When the top is taken off, the fluid comes out by drops. I solder to the bottle top a small box of tin, about one and a half of an inch long by one half of an inch broad, closing in the sides a little to retain the flannel or sponge inserted. The flask is fitted with a solution of caoutchouc in benzine, and the stopper put in, when, on tipping it, the sponge fills with the solution. It can then be run around the edges of the plate, thus securing the film. The fixing proceeds a little more slowly at the edges thus treated. The sponge or flannel should be renewed from time to time."

Photographic Studio at the Hamburg Police Office.—The *Deutsche Photographen-Zeitung* contains a note on the photographic arrangements which have of late been made by the Hamburg Police Department for making use of photography at its headquarters. The studio is located in the Town Hall, and two operators and one printer are occupied in it. Pictures in cabinet size only are made of persons who are released from prison, or who have been punished for repeated vagrancy. The head and shoulders only are taken, and generally two portraits are made—one with head-covering, and the other without. Scenes of crimes or accident are also photographed by the operators of this establishment. The difficulties are not very great, for, as the rapidity of the operation is more considered than the quality of the lighting, the photographs are always taken in full light and with a good, rapid portrait lens. At the time the person enters the studio, the dark slide of the camera is already withdrawn, and before the sitter is aware of the fact, the exposures, as a rule, are made. In cases where the portraits obtained are to be circulated quickly, they are printed on bromide paper, and reproduced by phototypography.

THE FLASH-LAMP IN THE STUDIO.

BY C. BRANGWIN BARNES.

The magnesium flash-light, which gained for itself a considerable amount of popularity last year, bids fair to make further strides in favour during the coming winter. It is quite a common occurrence, at the present season of the year, to be compelled to decline to take sitters owing to the bad light; and as in many instances these sitters never return, this is a loss to the photographer, who makes little enough in the winter without turning away cash when it is offered; but with the flash-lamp at hand the disciple of the camera need never refuse a sitter, however black the clouds or yellow the fog. The general idea, so far as I have been able to gather, seems to be that the flash-lamp is not so successful in portraiture as in other directions; but I hope, by means of the present paper, to convey the impression that such is not in reality the case.

The flash-lamp I prefer is one in which the magnesium powder is blown *upwards* through three circular hollow flames of gas, though I should not like to condemn any other form or make of lamp, and in giving the following directions as to the method of taking flash-light portraits in the studio, I leave it entirely to the taste or fancy of the reader to select his own particular make of lamp or lamps, only bearing in mind the fact that with a single flame, be it of gas or spirit, he will hardly be able to obtain a sufficient amount of exposure.

The lamps should be fixed with a large curved reflector behind them, on a shelf at a height of eight feet from the ground, and inclined forwards at such an angle as will throw the light directly upon the subject to be photographed. The whole should be enclosed in a case provided with a door through which to light and change the lamps, and a chimney to carry off the smoke, which, if allowed in the studio, would, after a couple of exposures, cause further operations to be suspended; the front of the case should be of fine ground-glass, and fully three feet across either way; it may be either round or square, according to fancy, although I would recommend the latter shape. This should be placed on the shadowed side of the studio, and about six feet in front of the background. The sitter should be placed at least three feet in front of the background, by which means no shadow will be thrown thereon, and on the reverse side of the sitter there should be a reflector placed at a corresponding angle to that of the flash-lamp. This reflector, which plays a very important part in the production of good portraits, should be about 6 feet in height by 3 feet in width, and should consist of a light wooden frame covered with white American cloth. This cloth is made with two surfaces, one dead and the other highly glazed; but the latter will be found the best for the purpose. The most successful results will be found to be those in which about five-eighths of the face are shown—that is, of course, when a single subject is being taken; in the case of groups it is best to avoid getting any of the figures too fully faced.

The powder used should be pure magnesium, as any admixture serves to make it highly dangerous in use. It may be either driven through the flame with a puff of the breath, or by the aid of a pneumatic ball; the latter is most generally employed, but has a tendency to draw back into the pipe any unused powder. It is an important feature that the powder be kept perfectly dry, as any trace of moisture will detract materially from the brilliance of the flash.

Used in the manner I have briefly described, the flash lamp will be found an important adjunct to the studio; in fact, to paraphrase a well-known mode of advertisement, "No establishment is complete without it." If used in fading daylight, poetically termed "the gloaming," the results will be, as a rule, preferable to those obtained at night; if, however, portraits must be taken at night, a few lamps should be lighted on the side of the studio opposite to that from which the flash will come; these will be found to prevent the sitter closing the eyes at the critical moment, though I have found on several occasions that the flash has done its work before the eyes could move, and that, although the sitter seemed to me to close them at the very moment of exposure, yet upon development it has been clear that they could not have done so until after the exposure was completed. Even in the brightest weather it is very rarely bright enought to obtain an absolutely instantaneous picture, and when a group of children is required it is certain we cannot afford a very long exposure. Pull down the white blinds on the light side of the studio, light the flash lamp, forget that it is only mid-day, and the trick can be done, a fully exposed negative obtained, and all the little sitters steady. By this means we may please many a client, add to our business, and, at the same time, increase the little amount put by for a rainy day.

One word ere I close as to development, for flash light pictures must not have the same treatment as daylight; the following is a formula which in my hands acts well, which I therefore recommend to those workers who have not yet hit upon one which gives them satisfaction.

Stock Solutions.

A.—Pyrogallic acid	... ...	1 ounce
Bromide ammonium	... ...	240 grains
Rain or distilled water	... ...	8 ounces
Nitric acid	... ...	3 drops
B.—Liquid ammonia	... ...	1 ounce
Water	... ...	7 ounces

C.—To one ounce of A add 20 of water.
D.—To one ounce of B add 15 of water.

To develop, take equal parts of C and D, applying D to the plate first. This formula applies to plates of ordinary rapidity, as I prefer using a slightly larger charge of magnesium, so as to dispense with the extra rapid brands.

Sunshine and Rainfall at Ben Nevis.—The registrations of the sunshine recorder at Ben Nevis Observatory according to a report read at the British Association at Newcastle, showed 970 hours of sunshine during the year; the smallest number of hours for any month being 8 for November, and the largest 250 in June, being nearly half the possible sunshine. The number of hours for the four years now observed beginning with 1885, were 680, 576, 898, and 970. The contrast of the sunshine of 1886 with that of 1888 is thus very striking. The amount of the rainfall for the year was 132·46 in., the month of least rainfall, 3·76., being June, and the greatest, 20·60 in., being November. The number of days on which precipitation was *nil*, or less than the hundredth of an inch, was 118. The number of rainless days for the three last years have been 159, 128, and 118. From all the observations yet made, it is seen that a fall, equalling at least 1·00 a day, has occurred on an average of one day in nine. Atmospheric pressure was this year again above the annual average, the mean level being 29·889, or 0 055 higher. The lowest mean at the observatory, 25·035 inches, occurred in March, and the highest, 25·595 inches in September; the difference being 0·555 inches. At sea-level at Fort William, the extreme monthly means were 29·636 inches in November, and 30·132 in September; the difference being 0·496 inches.

Notes.

It has always seemed to us that far too little variety exists in regard to coloured photographic Christmas and other festival cards. Some time ago it was declared that the taste for this kind of thing had died out, but if so, it was due to the terribly monotonous character of the productions. This defect was pointed out recently by the *British and Colonial Printer and Stationer*, and the charge is too true. Our contemporary contends that there is a demand for photographs if only novelties be introduced, and it supports its argument by adducing the rush after plain or coloured photographs on porcelain. It remarks that the "hand coloured photographic manufacturer neglects all these things more or less, generally the former, and the end is diminished sales." This is certainly a pity, as photography is inexhaustible in its applications, and it only needs a little ingenuity to make these appliances of practical use.

The *Echo* announces, as a distinct novelty in theatrical advertising, Mr. Beerbohm Tree's contemplated enlargement, for posters, of a series of photographs of the different most striking situations in "A Man's Shadow." This is no novelty at all, as it was done most effectively by Mr. Augustus Harris some four or five years ago in connection with the Drury Lane drama "Pleasure," when a reproduction of an enlarged photograph of Mr. Harry Nicholls and two ladies laughing, stared at the public from every hoarding in London.

M. G. Balagny, in the first of a series of articles on lenses in *Le Moniteur de la Photographie*, endeavours to indicate what may be termed the millennium of instantaneous photography. He lays down certain conditions; he demands an instrument which can be used quickly, one that will not compel you to ask what diaphragm must be used in order to obtain the desired sharpness. He declares that whether the camera be on its own legs, or on the arm of the operator, it must be capable of being used almost automatically, and in such a way that the shutter can exercise its function immediately.

M. Balagny is not satisfied with the sizes of to-day. He asserts that 8 centimetres by 9, and even 9 by 12, are too small, and he is not content with enlargements, as he considers they are insufficient. He wants to be able to easily photograph people, so that we may recognise them—so that we may obtain types of faces, whether dignified, serene, or, as he observes, "unhappily for humanity," ridiculous. He also exacts that with size must come clearness from the foreground to the distance, because, to use his words, "the human eye which sees clearly at ten yards sees just as well at forty yards." Whether M. Balagny's dream—this is his own expression—will ever be realized may be doubted; but we shall look for his subsequent articles on the subject with interest, all the same. In the meantime, there seems to be a weak point in his arguments as to the powers of the human eye. It is true that the human eye can see equally clearly at a small and at a long distance, but not at the same time. To demand that a photographic lens shall do this seems to be rather hard upon the opticians.

Photography has attained a recognised position in medicine. Facsimile reproductions from photographs form a special feature of the *Illustrated Medical News*; there are amateur photographers on the staff of nearly every hospital, and the extensions now being carried on at the Royal College of Surgeons comprehend a "Photograph Room." The department has already been opened, and was alluded to by Mr. J. Hutchinson, the president, at the annual meeting of the College held last week. Before long, the surgeon will think no more about carrying his camera than he does now of carrying his stethoscope.

Photography is to find a place in the Royal Military Exhibition to be held at Chelsea Hospital, and the specimens, like the rest of the exhibits, will be the work of soldiers of all ranks in the Army, Royal Marines, and Auxiliary forces.

The daily illustrated paper promised by the *Graphic* is a bold experiment. There are no insuperable difficulties in the way except one—will it pay? The evening papers which, on special occasions, go in for illustrations, show in what directions the public taste is tending. But a paper which gives pictures occasionally is one thing, and a paper which depends entirely upon its illustrations is another. The *New York Daily Graphic* made two valiant efforts to establish itself, but failed. Still photographic reproductive processes, upon which a daily paper must mainly depend, have greatly advanced in rapidity and efficiency since the days of the New York paper.

Most jokes in our comic papers *apropos* of photography have a suspicion of age about them. The French are a little more alive to the possibilities of humour in fresh developments of the art. In the *Almanach Amusant* just published, there is a picture of an old gentleman making furious love to a young woman, and informing her that her image is engraved upon his heart. She ridicules the idea, whereupon, as a proof of the truth of the declaration, he points to the secret camera, of the flat circular variety, which he has buttoned to his coat somewhere near the cardiac region, and with which he has taken her portrait. Here is literalness and sentiment combined, with a vengeance!

The International Photographic Congress, which concluded its sittings shortly before the closing of the Exhibition, has determined not to allow its labours to finish with the present year. It has appointed a permanent committee to act as a sort of link between the Congress of 1889 and the Brussels Congress of 1890.

PHOTOGRAPHIC OPTICS.

BY W. K. BURTON.

CHAPTER XII.—*(Continued.)*

THE principal conditions to be satisfied in the case of a perfect shutter may be said to be the following :—

It must be capable of giving a short exposure.

It must be capable of giving a variable exposure.

It must give a good coefficient of light.

It must not increase the inequality of distribution of light given by a lens.

It must not shake the camera.

Of course there are other conditions, such as lightness, portability, and simplicity, but these are self-evident.

A few words on the above-mentioned conditions. I have already stated what I consider to be the shortest exposure that it is ever necessary to give in ordinary practice.

As regards variability, it should be so great, if possible, that anything, from the shortest exposure ever needed, to one of $\frac{1}{3}$ second, or even longer, can be given. It is possible to give, with a little practice, exposures of $\frac{1}{4}$ second and upwards by hand; still it is a very great convenience to have a shutter with which exposures of several seconds can be given if it be desired.

As to a good coefficient of light, I know of only one way of securing this in the case of shutters consisting of one or more openings crossing the axis of the lens. It is to have the openings long in the direction in which they move, and to compensate for this length by an increased rapidity of movement. To secure even a *fair* coefficient of light the opening or openings should always be at least two or three times as long as the actual working diameter of the lens, and this particularly in the case of a shutter opening in the centre by two apertures crossing each other. In this form of shutter, if the openings be square and the diagonal of the square equal to the diameter of the lens, the coefficient of light is only $\frac{1}{3}$; that is to say, the lens is only permitted to act with $\frac{1}{3}$ the intensity actually due to its angular aperture, and the plate receives only $\frac{1}{3}$ the amount of light that it would with a hypothetical shutter.

A few words will be said farther on as to the best actual form of aperture which secures the best coefficient of light —considerable *length* of aperture being pre-supposed—in the case of a single moving part.

I have already stated that it is more difficult to secure immunity from shaking of the camera by the lens during the exposure than might be imagined.

In the light of what has just been said, we shall briefly consider several of the most efficient shutters commonly used.

I must first of all, however, say that I have spoken of shutters only as placed before or immediately behind the lens, or between the combinations, because the vast majority of shutters work in one or other of these positions. There is, however, one shutter which works, not near the lens at all, but close to the plate. This is the curtain shutter of Mr. B. J. Edwards, and it has certain advantages over any other form of shutter. It consists of a curtain of a flexible opaque material, which is made to move rapidly across the plate by being rolled off a roller at the top of the camera on to one at the bottom. Those who know the structure of any "roll-holder" or roller slide, or who consider how a panorama is worked, will readily understand what is meant. There is a slit in this curtain transverse to the direction of its motion. This slit of course lets light pass. There is an arrangement whereby its width can be varied so as to admit of varying exposures.

It may be said of this shutter that it satisfies *all* the conditions laid down, whilst it has one property peculiar to itself: it gives a better coefficient of light than any other shutter. In fact, it gives the hypothetical coefficient.

On the other hand, the shutter is of necessity bulky—although it may be arranged so as not to add much to the size or weight of an already bulky camera—and it has a defect peculiar to itself. Although the exposure of any one part of a picture is very short, there is quite an appreciable lapse of time between the exposure of the top and the bottom of the plate, probably quite $\frac{1}{2}$ or $\frac{1}{4}$ second. The result is that one part of the picture is exposed a little later than another. Thus, if an express train, occupying a fifth or a sixth part of the width of the plate, were photographed, the train would have advanced some five or six feet between the times when the lower part of the driving wheels and the top of the funnel were exposed. The result would perhaps be curious. It is true that this objection is rather a hypothetical one than one likely to give rise to trouble in practice.

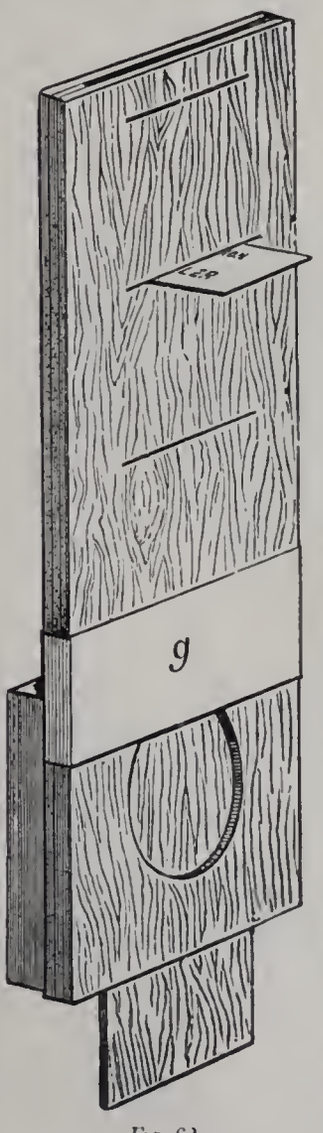


Fig. 62.

The Drop Shutter must have a word or two of notice, because, although it is imperfect in various respects, its extreme simplicity makes it very useful for a great deal of everyday instantaneous work. Its drawbacks are, that it will not give a very short exposure unless the aperture be so formed that it gives a very bad coefficient of light. If it be arranged so as to give a good coefficient of light, it gives an exposure not very short, and is somewhat cumbrous.

It is inadvisable to use it at all for very short exposures. I illustrate here a shutter which has long been used by the writer, and which will probably be found as useful as many others where exposures, say, never shorter than $\frac{1}{20}$ second are admissible.

It will be seen that there are three slits in the framework of the shutter. The dropping piece is removed entirely for focussing. It is afterwards inserted, its weight being supported on a card or needle inserted in one or other of the slits, according to the length of exposure needed. With a shutter made as shown, and proportioned for a lens of $1\frac{1}{2}$ inch aperture, the exposure from the lowest slit will be about $\frac{1}{8}$ second, from the top one about $\frac{1}{16}$, from the intermediate one something *about* half way between these two.

The annexed cut shows the form of opening—due to

Professor Pickering—which gives the best coefficient of light with a drop shutter.

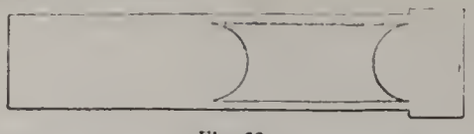


Fig. 63.

The next shutter I would mention is Wollaston's diaphragmatic. It consists of two discs revolving in opposite directions, between the combinations of the lens, on the same centre. The apertures are long in the direction of motion, and the opening is in the centre of the lens. The shutter fulfils all the conditions laid down, and has the advantage over most shutters, working between the combinations of the lens, that the continuity of the lens tube is not broken, so that there is no liability to disturbance of the "centreing" of the lenses, a thing liable to occur, from the warping of the wood, in those forms of shutters where the combinations are screwed on to opposite sides of a wooden casing or framework. Moreover, the shutter provides for the use of diaphragms whilst it is being used as a shutter. The exposure may be varied from $\frac{1}{100}$ second to several minutes. The only drawback that attaches to the diaphragmatic shutter is, that it is somewhat heavy and bulky. This defect has been, in a great measure, remedied in recently constructed instruments.

Another form of shutter is constructed on the principle first laid down by Noton, who, so far as we know, was the first to suggest two parts moving in opposite directions at the same time, and securing an opening on the axis of the lens.

In point of construction and detail the shutter made by Messrs. Sands and Hunter is a great improvement on the Noton. It fulfils all the conditions laid down, except that of giving a good coefficient of light, and this could easily be secured by a slight modification of construction, which, however, would probably make it impossible to get quite such short exposures as can be made with this shutter in its present form. This shutter is a great favourite with many, and excellent work has been done with it.

Mention has already been made of a shutter by Gotz, which is of the "go-and-return" pattern, but in which the impulse otherwise given to the camera at the time of reversal of the motion is compensated. A circular disc is moved up and down by a link actuated by a pin near the circumference of a revolving disc. By weighting the revolving discs at one side, an impulse is given which compensates that given by the reciprocating disc. The writer has used a shutter of this pattern of large size, and has found it very convenient.

I have not had an opportunity of seeing the shutter recently invented by Mr. Dallmeyer, but can speak of its ingenuity from the descriptions of it that have been published. It works between the lenses, and is so constructed that it *is entirely* within the lens tube. I imagine that the coefficient of light is not as high as in some shutters, but, not having seen the instrument, I cannot be sure of this. If I have understood the drawings and descriptions that I have seen, all other conditions are fulfilled.

AT a recent meeting of the Chicago Camera Club, Dr. Garrison read Capt. Abney's paper on the "Scientific Achievements of Photography," as published in a recent number of the *Scientific American*.

THE WASH-OUT PROCESS FOR PHOTO-ENGRAVING.

BY W. T. WILKINSON.

THIS method of producing phototype blocks is very interesting as a process, but is of limited practical use—in fact, nothing can be done by it that cannot be done cheaper, better, and quicker by the etching method; for half-tone blocks it is quite useless, as there is no power of compensating for the degradation of the whites caused by the screen, that there is in stopping out and re-biting, in the etching method.

In the swelled-gelatine process it is necessary to use a gelatine of the very best quality, so that the unexposed portion of the film may absorb the maximum quantity of water, and so enhance the height of the relief; but in the wash-out process we require to use a very poor quality of gelatine, so that the setting power be easily destroyed by prolonged boiling with ammonia and sodium carbonate or hydrochloric acid.

The process is as follows. Three pounds of glue are soaked in cold water until thoroughly soft, the water being changed at frequent intervals so as to remove any soluble impurities. When quite soft, drain free from water, and place in a jar; place this in a pan of cold water, and put on a slow fire, gradually raising the temperature to 200° F. When the glue is melted, add five ounces of ammonia, or one ounce of hydrochloric acid, then keep up the temperature of 200° for three days or a week until the setting power of the glue is quite destroyed. When this stage has been reached, add five ounces of molasses, ten ounces of water, three ounces of bichromate of potassium in fine powder, mix thoroughly, then strain through muslin, when it will be ready to coat the plates previously prepared as below.

Clean glass plates of a suitable size with dilute nitric acid, rubbing and washing well, then coat with

Gelatine	2 ounces
Water	20 ounces
Bichromate of potassium	30 grains

—melted and flooded over the wet plate; when coated, stand up to dry on a rack, and when dry expose for an hour or two to strong light, so as to make the thin film of gelatine thoroughly insoluble.

Now place these plates on the levelling screws of a drying box, which can be heated to 80° or 90° F., then coat with the sensitive glue mixture, putting on as much as is possible without overflowing, and when all in the box are coated, close the lid, and the films will be dry in from three to six hours. Be very careful of dust and air-bells, as they would quite spoil the surface.

When the plates are dry, expose under the negative, which must be quite opaque in the black portions, representing the whites of the original, and clear in the lines; the progress of the exposure can be seen from the back, but with practice a time exposure can be judged, from five to thirty minutes in sunlight being required, the time being longer the deeper the relief.

When the exposure is complete, lay the plate in a dish of cold water for ten minutes, then put into a upright bath containing water at 100° F., when the development will be complete in from two to six hours; then remove, wash under the tap, and immerse for fifteen minutes in a strong solution of alum, wash, remove the surplus water by dabbing with a damp, soft rag, and at once pour over it plaster-of-Paris, using the very best, and not at all thick;

allow the plaster a couple of hours to set, then lift away the plate carrying the gelatine image; after the plaster is poured, the back should be smoothed as much as possible.

From this plaster-cast a wax mould is taken which, after having the whites made higher by running wax upon them from a hot conical tool, is polished with plumbago, when it is ready for the electrotyper.

The electrotype may be made from the gelatine direct if the subject is a close one and there be no whites to build up, in which case, after washing from the alum bath, it is soaked in spirits of wine for half an hour, and put away to dry. When dry it is sprinkled with fine black-lead, and polished with a soft brush, when it is ready for the electrotyper.

In cases in which extra depth is required, the washing out may be effected with saturated solutions of bichromate of potash or soda, or resinate of magnesia, sulphate or chloride of magnesia, and of hypochlorite of lime.

The sensitive plates will keep in a chloride of calcium box for about a month, but after that I find they are difficult to develop. If the first coating put on does not give sufficient relief, a second coating may be given.

I may say that I find the gelatine substratum, given above, very useful for the plates or the film for the swelled gelatine, there being no danger of frilling off when soaking after exposure, as there sometimes is when plain glass is used.—*Wilson's Photographic Magazine.*

The Magnesium Light.—In taking "flash-light" pictures, do not use any deflagrating powders, other than ordinary magnesium; most of them are dangerous, and those that are not are, as a rule, great smoke producers. These pictures give strong contrasts and hard negatives, unless carefully developed. Reduce the quality of pyro a little, and dilute the developer with water. Give a longer time to develop; softer negatives will result.—*Scraps.*

Sunset Glows.—It is a curious fact that a revival of sunset glows, similar to those described by Sereno E. Bishop in a letter published in *Nature* for August 29 (p. 415), was observed in Western New York at almost precisely the same time that he saw them at Honolulu. I inclose a clipping from the *Rochester* (N.Y.) *Democrat and Chroniele*, which was published on July 21:—"The skies at evening show signs of the gradual return of the red light. It will be of interest to ascertain if the phenomenon reappears as the solar disturbances continue to increase in energy to the maximum. It is quite apparent now that the minimum has been passed, and the tendency is towards an increase in the number and in the violence of solar disturbances. There are certainly three, and probably four, well-defined disturbances at present."—M. A. Veeder, Lyons, New York, September 13.—*Nature.*

Reproducing Old Prints.—At a meeting of the Paris Societe d'Etudes Photographiques, Mr. Ginestet described a process for the reproduction of old prints which, although not new, is but little known to amateurs. To reproduce an engraving by this process, commence by placing it in a bath composed as follows:—Water 100 grams, sulphuric acid from 3 to 5 grams, alcohol from 3 to 5 grams. It is allowed to remain from five to fifteen minutes in this bath, then, after having been well washed and sponged between two blotters, the paint, still wet, is placed on a marble slab, a glass plate, or a lithographic stone. When very exactly fixed to this support, on the side to be reproduced, give a fine sponge a thin coating of gum water; then ink with transfer ink mixed with a little essence of turpentine, until the complete inking of the image. To remove the impurities that might present themselves, make use of a dry roller. The image thus obtained is finally applied either on a zinc plate or a lithographic stone, which serves to make as many prints as may be required.—*Moniteur.*

APPARATUS AT THE PHOTOGRAPHIC EXHIBITION.

No. V.—Conclusion.

The Photographic Exhibition closed last Wednesday, but we have a few more items to describe. Fig. 1 represents a connecting piece for gas bottles and taps used in

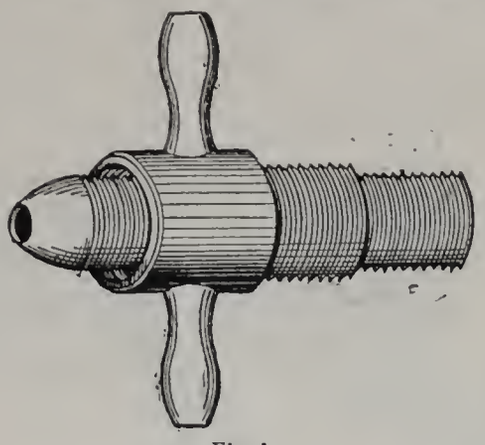


Fig. 1.

the production of the oxyhydrogen light; it was exhibited by Messrs R. R. Beard and Co. The connecting piece has a variety of screw threads, and the diagram explains itself.

Figs. 2, 3, and 4 represent Fichtner's changing-box and camera, in which there are several clever automatic

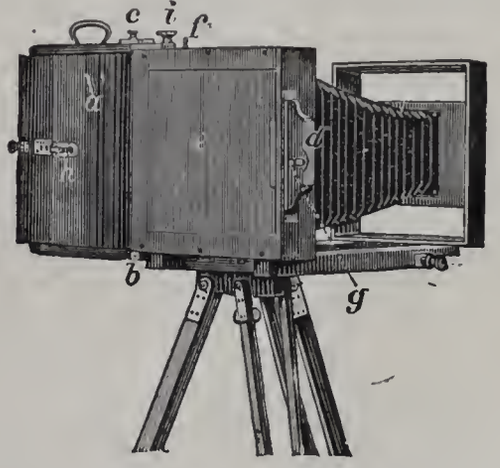


Fig. 2.

arrangements, so that a single motion achieves one, two, or more results. The apparatus takes twelve plates or films, and was exhibited by Mr. Otto Schölzig. The following description of its mode of action is published by Herr R. Huttig, of Dresden:—(1) *Filling the Carriers.*—The film-side is laid against the four little plates provided on each carrier. The retaining springs with which the carriers are filled allow glasses of uneven thickness to be readily used. For film-photography—paper or Carbutt's celluloid—carriers of cardboard are made, and the films stretched by frictional devices. (2) *Filling the Changing Box.*—The carriers are inserted in the grooves in the box, care being taken to have



Fig. 3.

the notch on the same turned towards the bottom and the back—lid—of the box. The box lid is then closed by the button, and accidental opening of the same is thereby entirely prevented. (3) *Attaching the changing box to the camera.* — The camera having been fixed upon its stand, the hook *b* at the bottom of the box *a* is inserted into the aperture of the lower rack; the box is then pushed towards the camera, and firmly connected with the upper rack by the turn-button *c*. (4) *Focussing.*—The slide *e* being opened, the focussing screen is pushed forward; in order to do this, the slide *d*

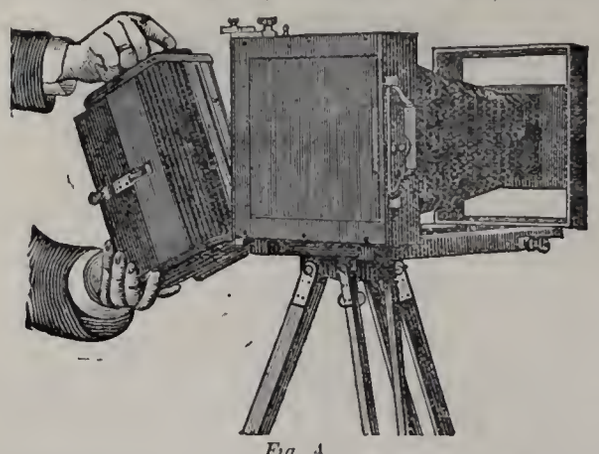


Fig. 4.

must be drawn out before slide *e* is opened. When the picture is focussed, slide *e* is first closed, and then slide *d*. (5) *Transfer of the plate or film from the changing box to the camera.*—By pushing lever *f* on the top of the camera forward, the light-guard of the box is opened; next the bolt *g* on the handle of slide *d* is pressed towards the point of the arrow; this causes the hook to pass into the box, and to seize that carrier which happens to be in front of the light-guard aperture. This carrier (or any other brought into position by pressing upon the button *h*, and turning button *i*) is now drawn into the camera by means of the slide *d*. After exposure the slide *d* is pushed back, and another plate or film (the next in sequence or any other) is brought into position. (6) *Removal of Changing-Box from the Camera.*—Before removing the changing-box, it is essential to push the bolt *g* on slide *d* towards the camera; this lifts the hook out of the box, and the light-guard is now closed by turning back the lever *f* on the camera. It is important carefully to close the light-guard by the lever *f* each time the slide *e* is to be opened or the box removed from the camera.

Messrs. B. J. Edwards and Co. exhibited transparencies and negatives relating to the copying of difficult paintings, and other coloured subjects by means of their isochromatic plates. That more truthful rendering of paintings and microscopic objects is obtainable by orthochromatic, than by ordinary methods is now denied by nobody, and the specimens on view were good illustrations of the fact.

IMITATION STEEL ENGRAVINGS.—An apparatus has lately been perfected by which glass plates are lined for photographers' use. By this process the finest steel engraving can be imitated, and a finish given to the work heretofore unattainable, except in Europe. Plates of a similar character have been produced in Berlin, and some of our leading photo-artists have had to pay enormous prices for them. Hereafter they can be had at less than half the European prices; and lines as fine as 125 to the square inch can be furnished. This will prove a valuable aid to photo-engravers, as well as a remunerative discovery to the inventor.—*American Picture and Art Trade.*

Notices of Books.

PHOTOGRAPHIE MIT BROM-SILBER-GELATINE UND CHLOR-SILBER-GELATINE. By Prof. Dr. J. M. Eder. Fourth edition, revised and enlarged. (*Knapp: Halle.* 10 marks.)

WE have here a fourth edition of Eder's "Theorie und Praxis der Photographie mit Brom-Silver-Gelatine," which originally appeared as a separate treatise in 1880, but which now forms the third volume of the author's "Ausführliches Handbuch der Photographie." This great work is not yet completed, but the importance of gelatine emulsion processes with silver bromide and silver chloride has led to a regular demand for successive editions of that part of the work in which they are described. Dr. Eder has utilised these opportunities of keeping his book up to date in a truly remarkable manner, and it would be difficult to find any published fact of actual or potential value in connection with the subject which has not been recorded in these pages. The first edition appeared in an English dress from the hands of the late Mr. H. Baden Pritchard, in 1881, under the title of "Modern Dry Plates, or Emulsion Photography," and if we compare that little book with the present volume of nearly five hundred well-packed large octavo pages, we realise what a great amount of work—not always, it is to be regretted, of a particularly trustworthy character—has been done in the last nine years. The list of authors and inventors now quoted contains no fewer than 271 names!

The book is divided into four sections—namely, (1) thirteen chapters on the scientific principles of photography in gelatine emulsions; (2) twenty-one chapters on the practice of photography with gelatine emulsions; (3) three chapters on photography with silver gelatino-chloride; and (4) a chapter on failures, and a supplementary chapter. The various subjects in each section are treated in minute detail. In Section I. we find a description of the compounds of silver; the properties and selection of gelatine; methods of emulsification; ripening of emulsions; causes of fog; effect of foreign substances; effect of the addition of silver chloride and iodide to the silver bromide; effect of light on silver compounds and their emulsions; principles of development; testing of plates for sensitiveness and gradation; principles of orthochromatic photography. In Section II. the arrangements of the dark room, the methods of cleaning and cutting glass; preparation, washing, and keeping of emulsion; the melting of the emulsion and the coating of plates by hand and by machine; drying, cutting, and storing plates; development, fixing, intensification, reduction, varnishing, and retouching, are discussed with careful attention to all the minutiæ essential to uniform success; film and paper supports are not forgotten; and a chapter is devoted to the production of positive images on bromide paper. In Section III. the uses of gelatino-chloride and gelatino-citro-chloride for the production of positive images by development or by printing-out are fully described. Section III., with its chapter on failures, is by no means the least valuable part of the book. No fewer than forty distinct kinds of defects are pointed out, extending from faulty emulsion to the deterioration of the varnished negative, and the causes of these defects and the methods of avoiding them are explained so far as the present state of our knowledge permits.

Comparing the present edition with the third edition of 1886, we find an increase of one hundred and thirty-one

pages. The sections and chapters correspond in the two editions, and the increase is mainly in the account of practical details. We find, for the first time in any photographic treatise, a full and detailed description of the machines used for coating plates with emulsion on a large scale. The chapter on developers has also been considerably extended, and contains summaries of the author's own experiments. Pyrocatechin (catechol) is stated to rank with pyro, quinol, or ferrous oxalate as a developer, and to act more rapidly than quinol. Its high price will, for the present, prevent its general adoption. Paraphenylene diamine, first proposed as a developer by Dr. Andresen, is said to rank with pyro, quinol, &c., in developing power. Two parts of paraphenylene diamine hydrochloride are dissolved in 100 parts of water, and this solution is mixed with one to two volumes of a 10 per cent. solution of potassium carbonate. Eikonogen, the use of which is also due to Dr. Andresen, is favourably spoken of for instantaneous exposures. Ten parts of sodium sulphite and five parts of potassium carbonate are dissolved in 150 c.c. of water, and 5 grs. of eikonogen are added. For ordinary purposes two solutions are employed: (*a*) 1 part of eikonogen and 4 parts of sodium sulphite in 75 parts of water; and (*b*) a 15 per cent. solution of crystallised sodium carbonate; three volumes of the former being mixed with one volume of the latter.

Orthochromatic photography, as was to be expected, receives very full treatment. Numerous authorities are quoted in support of the statement that the bath method of preparation gives much higher sensitiveness than adding the dye to the emulsion. Erythrosin is still the most powerful known sensitizer for the less refrangible rays. The author, like Wellington, Pringle, and Vogel, has been unable to obtain good results with Abney's method of sensitizing by means of a solution of the dye in collodion or varnish.

Another subdivision of the subject which receives full treatment is the manipulation of stripping-films, films, and flexible supports generally. The various methods of cutting plates and the methods of washing negatives are also described in detail. The book is profusely illustrated, and is emphatically *the* book on photography with gelatine emulsions. It should find a place in every photographic library, however small; and, until we are in possession of an English translation, a German-reading photographer has a great advantage over those of his competitors to whom its pages are practically sealed. Anyone engaged in photographic research will find this volume an indispensable companion, and certainly no one is justified in occupying space in photographic journals with an account of experiments which he may believe to be new, until he has at least ascertained whether similar experiments have been made before, and their results recorded by Dr. Eder in a volume which at present has no competitor.

Lehrbuch der Photographischen Chemie und Photochemie. By A. Lainer. (*Knapp: Halle.*)

This useful addition to photographic literature contains the subject matter of the instruction in photographic chemistry and photo-chemistry given at the Imperial School of Photography in Vienna. It is stated to be "Part 1, Inorganic Chemistry," and hence we may expect to have before long the second part, dealing, we presume, with organic chemistry; but the necessity for such a division is not self-evident, nor, in fact, does the author attempt to adhere to it. In the purely chemical portion of the book the arrangement adopted is identical with that of Richter's well-known "Anorganische Chemie," to which the author seems to have been considerably indebted. Compounds which are of importance in photographic processes are described at considerable length, and the chemistry of the processes is explained in connection with the particular compounds. Following the description of silver nitrate and its preparation, we have a full account of the chemistry of the silver bath, and of other processes in which silver compounds are the essentials, together with methods of analysis, and methods for the recovery of silver from residues; in connection with gold the chemistry of the various toning processes is fully discussed, and a summary of the results of the author's examination of commercial compounds of gold is given; after an account of potassium dichromate comes a full and valuable summary of Eder's researches on the properties of chromated gelatine, and a concise description of autotype, Woodburytype, and photo-mechanical processes which involve the use of dichromated gelatine. The treatment of these subjects seems, as a rule, to be quite trustworthy, though the author should have pointed out that certain statements must not be taken as definitely established. Many English photographers will be surprised to hear, for example, that potassium metasulphite has an injurious influence on the colour of the image, and can only be used in conjunction with sodium sulphite; and the statement that silver iodide in the emulsion acts merely as a weak restrainer will also be disputed by some authorities. On the whole, the book is well up to date, though we notice a few statements not quite in accordance with the present state of our knowledge; and the table of atomic weights is much behind the times, and contains some important errors. An account of methods for the purification of water would have been useful, and sodium metasulphite and sodium dichromate should at least have been mentioned. Several formulæ, too, are incorrect—notably those relating to the amount of water of crystallisation in certain common salts. Faults like these are, however, of minor importance, and do not seriously impair the usefulness of the book to every photographer who reads German.

Photographischer Almanach und Kalender fur das Jahr 1890. (*Dusseldorf: Ed. Liesegang's Verlag.*)

This annual, edited by Dr. Liesegang, maintains that excellence of former issues to which testimony has been borne in these columns. Not so bulky a volume as is published in this country as a shilling annual, it nevertheless includes a large amount of useful information condensed into small space. It contains as pictorial supplements a portrait, with notice, of Wilhelm Dreesen, court photographer in Flensburg, and a picture by him of the Harbour of Flensburg.

Photographie mit Bromsilber-Gelatine. By Ludwig David and Charles Scolik. (*Halle: Wilhelm Knapp.*)

We have received the above, of which a notice will appear in due course.

Photographers' Benevolent Association.—On the 8th inst. the Exhibition at Pall Mall was, by kind permission of the Photographic Society, opened during the evening for the annual benefit of the Photographers' Benevolent Association. A lantern display from slides lent by Messrs. Cembrano, England, Freshwater, Hastings, Pilkington, Smith, and Wright, concluded a very satisfactory evening's entertainment.

A NEW PLATINUM TONING PROCESS.*

BY LYONEL CLARK.

PLATINOUS chloride itself is an insoluble salt, but it forms with the halogens double chlorides which are freely soluble in water, the salt that has proved the most suitable being the double chloride of potassium and platinum, known as the chloro-platinite of potassium, $2KClPtCl_2$, or K_2PtCl_4.

In the most recent of the platinotype processes, known commonly as the cold-bath process, or Willistype, this salt is practically used, the provisional image being formed of ferrous oxalate, in which, however, the organic matter in the sizing of the paper certainly has some action; this provisional image is converted into platinum by the addition of the chloroplatinite of potassium, oxalate of potassium, and monopotassic orthophosphate, the quantities being as follows:—

D.—Oxalate of potash	...	5 ounces
Monopotassic orthophosphate	...	3 ,,
Water	...	50 ,,
P.—Platinum chloroplatinite...	...	60 grains
Water	...	2 ounces

Normal developer, D 3 parts+P 1 part+water 2 parts.

This developer is brushed over the print, or the print is floated on the developer; the faint lilac image very rapidly changes to a deep rich black, the print being completed in from one-half to one minute. The unaltered iron salt has then simply to be dissolved by suitable acids, and the proof is complete.

When we come to the other sort of platinum-toning, where *silver* is used as the basis, we see that very much the same chemical changes obtain. The colouring matter of which the image is formed is more complex in its nature, being probably a mixture of metallic silver, purple subchloride, and a deoxydised organate of silver, which Messrs. Davanne and Girard very appropriately term a *lake*.

It is, therefore, difficult to say precisely whether any particular one, or all of these compounds, have an action. I am inclined to believe that the violet subchloride practically plays no part in the transformation; for if the print be treated with common salt, all the violet subchloride is destroyed, and the reddish organate of silver alone remains, but yet the toning goes on as well—perhaps a little more slowly—as usual. But, at the same time, if a print be fixed in hypo before toning, as far as my present experience goes, I find that the print refuses to tone; with plain paper prints, however, there is a slight tendency to tone.

There is a certain contradiction in this which I cannot as yet solve or explain.

But whatever may be the precise composition of the salt that forms the provisional image, the action is precisely the same as in the case of iron. Assuming it to be metallic silver, we should get the following equation, parodying that of Berkeley:—

$$4\,Ag+PtCl_4=2\,Ag_2Cl_2+Pt$$

This is, of course, far from being correct; for we know that the silver is not wholly in the metallic state. However, the equation shows clearly enough that four molecules of the silver are converted into chloride before one of platinum is reduced, and these four molecules of silver had to be produced by the action of light.

With plain paper prints—that is, paper simply salted and excited—it is an easy matter to obtain some sort of toning with any platinum salt, but not so with albumenised prints; this fact was noticed from the very first by Haackmann (PHOTOGRAPHIC NEWS, vol. i., p. 251). It would appear, therefore, that the reduced albuminate of silver that is formed by light has a mechanical action that tends to prevent a ready interchange between the two metals, and that we should therefore endeavour to soften the albumen by some agent, such as tartaric, acetic, or tribasiphosphoric acid added to the toning-bath. I have, however, such a dislike to the surface gloss of all albumenized prints, that I do not take enough interest in them to experiment in this direction.

I have, however, for some time past been trying to bring about a thorough toning of matt-surface silver prints by means of platinum. The goal I have aimed at is to have a print that can be examined in the printing-frame as it progresses; the advantage of this for combination or cloud-printing is obvious. Secondly, the greater part, preferably the whole of the silver, should be replaced by platinum black—that is, that the print should not change colour when treated with mercuric, cupric, or other chlorides or oxydising agents. Minor points are that the print should not lose in intensity in the toning, that the colour should be variable, that some power of altering the gradation or scale of tones should be possible, by slightly varying the toning ingredients; in short, that the process should be as perfect and as well under control as the cold-bath platinotype process, with the advantage that the paper requires no special precaution in keeping, and the image is plainly visible. So much for Utopia; now for practice.

My first experiments were naturally made with the ordinary commercial platinic chloride, and I found that it certainly was capable of toning, although slowly, and as the formula shows there should be, I got a great reduction of half tone, and general loss of intensity over the whole print. Following the lines of Willis, I tried the addition of oxalate of potassium; this certainly improved the toning of the platinum, and it was possible to completely convert the image into an agreeable tone, but the loss of intensity was very great, and the prints, to have any vigour at all, had to be printed very deeply. The effect of this was to cause granulation in the darkest shadows, that is, where the print was solarised and had the well-known metallic lustre due to this cause. In this the silver prints show a striking analogy to the iron ones. It is a well-known fact, both in the hot and cold bath platinotype processes, that, after a certain exposure, the image solarises, and becomes lighter in colour than the surrounding parts. I have repeatedly noticed that these solarised parts on development also gave granularity. I cannot chemically account for this; I can only presume that in these solarised parts the metal has been completely reduced from the *organate*, and that it has a tendency to form into nuclei, around which the deposit of platinum is more violent. (*To be continued.*)

* Continued from page 744.

PHOTOGRAPHIC CLUB.—Subject for discussion on Wednesday, "Dark-room Appliances," preceded by the adjourned annual meeting.

METABISULPHITE OF SODA is now made by causing a current of sulphurous acid to pass through a solution of carbonate of soda, of bicarbonate, or of hydrate of soda, the liquid being heated from 113° to 212° F., and preferably kept slowly boiling. When the density of the solution reaches 1·450, and the sulphurous acid is not absorbed, the solution is allowed to cool and crystallize.

PATENT OFFICE LIBRARY.

Proceedings of Societies.

Photographic Society of Great Britain.

At the ordinary meeting of this Society, held on Tuesday, the chair was occupied by the President, Mr. James Glaisher, F.R.S.

Capt. Abney read a paper on "The Density of a Negative after Intensification," illustrated by a diagram showing curves of density, representing the gradations of intensity before and after the process. In the course of the paper he remarked that although much had been written on the subject of intensification, it had been treated, up to the present, in what he termed the qualitative manner. He had undertaken a qualitative examination to ascertain not merely the total amount of added density, but whether the proportion of density remained the same after intensification as before, and he found that it did not. The process he had used was that with mercury and bromide, followed by nitrate of silver and cyanide of potassium, and he found, as shown by the diagram, that there was not the proportionate difference at the ends of the scale that there was in the middle of it, and that, in fact, the range of gradation was reduced by about one third.

Mr. W. E. Debenham would like to know whether with other modes of intensification the same results would be arrived at. When in the collodion days, it was customary to intensify with pyro and silver, he thought that he noticed a difference between the action of that intensifier and one composed of a mercuric salt. In the latter case the action seemed to him to be more complete at the thin end of the scale—that is to say, upon the fainter half-tones—rendering it a more suitable method to use for negatives that were at all under-exposed, whilst the pyro, or building up process, seemed to act particularly on the more vigorous portions of the image, rendering it more advantageous for negatives that were over-exposed. He would also be glad if Capt. Abney would repeat his experiment with a negative, intensifying it with a solution of bichloride of mercury and iodide, followed by Schlippe salt, and inform a future meeting whether the range of gradation was impaired in the same way as it had been by the process that he had used.

Capt. Abney's view of the characteristics of the mercury method as compared with that with pyro and silver was in agreement with that expressed by Mr. Debenham. He would make the experiment suggested, and bring the result to a future meeting.

Mr. Chapman Jones enquired whether the method of intensifying described as having been used by Capt. Abney did not first carry intensity to a maximum, and then begin a contrary or reducing action. In that case the loss of gradation at one part of the scale could be accounted for.

Capt. Abney said that he had stopped the application of the second solution before reduction had commenced.

Mr. Chapman Jones doubted whether it was possible to go up to complete density in one part of the scale before some reduction had commenced in another part.

Mr. W. Bedford asked whether Capt. Abney had experimented with the converse process of reducing intensity, and if so, whether there was a similar change in the relation of intensity.

Capt. Abney replied that he had not made the experiment suggested by Mr. Bedford.

Mr. Friese Greene would like to know what the difference would be if hard or soft gelatine had been used in the preparation of the emulsion with which the intensified plate had been coated. He believed that there would be a decided difference.

Capt. Abney replied that he had used some plates of his own preparation, the gelatine in which was of the soft kind, and some commercial plates. He had not noted any difference.

The President having distributed the medals, and congratulated the recipients, expressed his satisfaction with the exhibition generally. It had been visited by 12,600 persons, and the receipts had been larger than at previous exhibitions. The only thing with which he had not been pleased was the amount of white upon the walls. The great white margins to so many of the pictures he thought detracted from the effect.

At the meeting to be held on Dec. 10, Mr. W. E. Debenham is to read a paper on "Estimating the Efficiency of Plate Backings;" and Mr. Whipple, of Kew Observatory, will read one on "The Application of Photography to Meteorological Purposes."

The Camera Club.

At a meeting of the Camera Club held on Thursday, last week, at Bedford Street, Strand, London, Mr. Francis Cobb presided.

Mr. Andrew Pringle, in relation to some recent experiments of his upon orthochromatic photography, said that the Camera Club is now getting more or less inured to one man exhibitions, but the one man exhibition of that evening was slightly different to that which then adorned the walls. Their previous one man exhibitors had shown the best, or nearly the best, specimens of their work. He, however, was going to show his entire results, good and bad, from 130 negatives, six only excepted; those six he had been unable to develop because of faults in a borrowed shutter. He wished to see how far he could corroborate the views of Bothamley, Edwards, and others, with regard to the value of orthochromatic plates in landscape work. A few years ago he had occasionally tried colour-correct plates on landscapes, and came to the conclusion—perhaps too hastily—that they gave no perceptible advantage when used either with or without a yellow screen. Since then, Mr. Bothamley had shown him results in which marked effects had been obtained with orthochromatic plates and screens, so he (the speaker) wished to see how far he could corroborate or correct those results. Mr. Bothamley, though an exceedingly able man, is but a young photographer, and perhaps may not be able to meet all the difficulties incidental to ordinary plates; he would also probably allow him (Mr. Pringle) to remark that he had worked at landscape photography under many circumstances for a considerable number of years. In the experiments he had to describe that evening, he carried with him ordinary plates of two kinds, namely, slow landscape plates, and very rapid ones, both commercial; he also took with him some of Edwards's isochromatic plates of medium rapidity, made for such work as copying paintings, and very sensitive to yellow light. He had also prepared for orthochromatic work some of Wratten's slow plates, green labels; these plates he dyed in two baths; in the one bath there was twice as much erythrosin as in the other. As regards erythrosin, there are several varieties in the market, and the proper one must be obtained, namely, the potassium salt of tetraiodofluoreseine. He prepared his stock liquids as follows:—

A.—Erythrosin	...	...	...	...	1 part
Distilled water	...	...	...	...	1,000 parts

B.—Ten per cent. solution of ammonia

C.—Distilled water.

For use, he mixed one part of A with one part of B, and eight parts of C, so that one part of erythrosin was contained in each 10,000 parts of the bath solution. The first noticeable thing was, that plates dipped in this bath had their sensitiveness increased about three times; they exhibited much yellow sensitiveness when exposed upon suitable subjects, such, for instance, as objects for the microscope. All his plates were developed with pyro and ammonia. He thought that most dry-plate workers erred on the side of under-exposure, so all his plates were over-exposed—so much so, that he had difficulty in developing many of them without producing fog. The slides he exhibited that evening were all the results of different experiments, in which his care had not been to make the best prints, but as accurately as possible to show all that was in the negatives, for he was, as Mr. Bothamley had said of himself, not an advocate, but an investigator. He was inclined to view orthochromatic photography favourably, because in microscopic work he should be absolutely at a standstill without colour-correct plates. [Mr. Pringle here, by means of the optical lantern, exhibited upon the screen a great number of views of scenes on and near the Wye, usually in groups of two or three, the results of comparative experiments; he likewise passed round a number of paper prints.] His own conclusion, he said, after careful study of the results, was, that those results were slightly in favour of orthochromatic plates for landscapes, but the advantages were very small. It was for those present to form

their opinion whether they would use orthochromatic plates for the sake of the gain. In a few cases the ordinary plates had given the best results, but that was to be expected in such a large number of exposures.

The CHAIRMAN wished that Mr. Pringle had given sample pictures taken by means of ordinary plates with a yellow screen, for his own experience was that they were as good as if taken upon orthochromatic plates. He thought that Capt. Abney, some years ago, had published that, to a great extent, he was of that opinion.

Mr. ASHBOURNE wished to know whether films could be made orthochromatic.

Mr. PRINGLE did not see why they should not be.

Dr. PATERSON wished to know whether colour-correct prints produced with or without the screen were best.

Mr. BIRT ACRES wished to know if Mr. Pringle had compared ordinary plates with and without a yellow screen. He was also understood to say that he had recently been experimenting in North Wales, and found that with an orthochromatic plate and yellow screen he could get remarkably good results; but when a yellow screen was used with an ordinary plate he could see no improvement at all due to the use of the said screen.

Mr. GEORGE DAVISON remarked that in very few of Mr. Pringle's photographs before the meeting did halation appear to be cured, but in the little he (the speaker) had done with Mr. Edwards's plates, halation seemed to have been partially averted. The staining should prevent halation.

The CHAIRMAN remarked that Mr. Pringle stated that none of his plates had been backed.

Mr. S. B. WEBBER stated that he had had experience in copying paintings, and other coloured objects, in which, apart from landscape work, there was an immense field for othochomatic plates. He was surprised that halation was so strong in Mr. Pringle's work, even although the plates had not been backed. The meeting had only been shown one example of the results obtained in photographing flowers, and that was not enough; the same subject should be photographed over, and over, and over again, before it could be known which was the best class of plate for particular purposes. He had been trying to copy oil paintings in the Dulwich Gallery, and found that the orthochromatic plates he had bought, varied extraordinarily. The first lot worked beautifully; he then ordered a lot more, and had not found a good plate since; there was an iridescence all over them with a blue stain, but they printed beautifully. He had to take great pains sometimes, and to travel long distances to places where he had to have paintings specially taken down for him, so he did not want to have all his efforts frustrated by variable plates. He preferred to buy a slow plate, and to dye it himself.

Mr. B. J. EDWARDS said that the isochromatism of a plate had nothing whatever to do with its keeping qualities when the plate had been correctly prepared, but if they dyed a plate they at once set up a decomposition which could not be stopped. The plates should be prepared in the first instance with an isochromatic emulsion; of the latter plates, his firm had some in stock which had kept good for three years. If those present would keep isochromatic plates side by side with ordinary plates, so as to keep them constantly under the same conditions, no difference in their keeping qualities would be found. Mr. Webber appeared to have obtained plates at different times and of different rapidities without knowing it; besides, it must be remembered that light and development varied very much. Mr. Webber had just shown him the deep orange glass screen he used in his work; the results obtained with it were not to be wondered at; it should only be used in copying very old oil paintings. There was no advantage in using a yellow screen in landscape work, except in foggy weather, and then the screen must not be of too deep a yellow, or they would lose that "atmosphere" which gave so great a charm to British scenery. The plates were sensitive to the yellow without the use of a screen at all. The advantages conferred by the plates were most marked in indoor work; with landscapes they gave better gradation than did other plates, and photographers could work with them later in the year, as the light grew yellower.

Mr. WEBBER said that the first batch of plates he bought were in his possession a month, and worked excellently. The two batches he bought afterwards had scarcely half the rapidity; he gave them more than double his earlier exposures, and that was not enough. The said plates were labelled "instantaneous."

Dr. CHARTERS WHITE remarked that the isochromatic plates he bought direct from Mr. Edwards worked well, but those bought from agents had the iridescent appearance mentioned by Mr. Webber.

Mr. ROBERTS had bought some of Edwards's isochromatic plates two years ago, and found them useless in a month, whereas some which he had stained for himself lasted three or four months.

The CHAIRMAN remarked that Mr. Pringle had spoken only of landscape work; nobody doubted that the plates were good for copying paintings and for use with the microscope.

Mr. PRINGLE responded that years ago he had made experiments with a yellow screen and ordinary plates, and came to the conclusion that a vast amount more exposure was necessary to get any colour-correction at all; the same holds good with coating plates with coloured collodion or varnish. The plates dyed in a bath come out more or less red, and may be expected to lower the halation; but Edwards's plates are little, if at all, yellow, so the curing of halation thereby is not to be expected. Mr. Webber had spoken about the number of experiments necessary with flowers before coming to a conclusion. He (Mr. Pringle) agreed with him, and thought, moreover, that 300 exposures would not be too many. A few months ago he would have joined issue with Mr. Edwards about the keeping qualities of his plates; once they would not keep, but of late they have been keeping very well indeed, as he knew from using them a great deal; he thought, also, that they had improved in quality. A very light yellow screen is useful in foggy weather. He had prepared a few dipped plates and kept them alongside Edwards's plates; the latter kept all right, but the former, after a time, fogged all over. There was nothing in the theory of the subject to suggest that orthochromatic plates would not keep.

Votes of thanks to Mr. Pringle and Mr. Edwards were passed. The latter, in replying, said that he should always be willing to do what he could to promote the interests of the Camera Club.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on the 7th inst.; Mr. J. J. BRIGINSHAW occupied the chair.

A series of transparencies was exhibited by Mr. A. COWAN, developed with and without sulphite of soda for comparison.

1. Developed with 2 grains pyro, 2 grains bromide, and 4 minims ammonia.
2. As above, with the addition of sulphite 4 parts to 1 of pyro.
3. The same, but using a different sample of sulphite.
4. Sulphite reduced to 3 parts to 1 of pyro.
5. Metabisulphite used in place of sulphite, in equal proportion to pyro.
6. As No. 2, with the addition of 1 grain citric acid to the ounce.

It was generally agreed from the plates shown that the sulphite developer gave better results than the normal developer. In one instance metabisulphite was added to the fixing bath, producing an exceedingly brilliant transparency. The exposure and length of development in each case were the same, and the plates used were all of the same batch.

Mr. COWAN also passed round a plate developed with eikonogen alone, no alkali of any kind being used; also two plates developed with eikonogen and sulphite with excellent results.

Mr. F. P. CEMBRANO asked if metabisulphite had been found a better preservative for pyro than sulphite.

Mr. PASK had kept pyro in solution for upwards of a year by the addition of metabisulphite.

Mr. A. COWAN had not found sulphite to be a restrainer; this, however, did not apply to metabisulphite.

Mr. A. HADDON asked if it were the experience of any member that sulphite gave green fog.

Mr. A. Cowan said he had used a sample of sulphite which produced decided green fog; he threw the sulphite away. He passed round some crystals of eikonogen; it kept well, although it was less soluble in this form.

A question from the box was read:—

"In focussing the back combination of a rapid rectilinear lens, is the sharpest image obtainable the best for photographic purposes; if not, can the correction be easily effected?"

The Chairman said the extent of divergence of the visual and actinic foci of a lens could only be ascertained by experiment; the necessary racking in or out of the camera would have to be carefully noted and allowed for before exposing a plate.

Mr. W. E. Debenham suggested exposing a plate placed at an angle to the objective; the object being in one plane, by noting the sharpest part of the negative, the difference of foci could be estimated.

Mr. A. Clarke remarked upon the deposit on the sides of bottles containing ammonia to which water had been added.

Mr. A. Haddon said this was due to the lime in the water.

In reply to a question asking for a formula for a transparency varnish that could be used cold, the Hon. Sec. recommended gum dammar dissolved in benzole.

Mr. W. E. Debenham said an excellent varnish could be made by dissolving gum mastic either in benzole or turpentine —1 ounce of gum to a pint of the solvent.

The subject for discussion on the 21st will be "Eikonogen."

West London Photographic Society.

An ordinary meeting of the above Society was held at the Addison Hall on the 8th inst., the President, Mr. Charles Bilton, B.A., in the chair.

Mr. Lyonel Clark described his new method of toning with salts of platinum, and gave a practical demonstration of the process.

Mr. Blackmore thought everybody must admit that Mr. Clark had brought before them a very beautiful process; the only doubtful point appeared to be the question of permanency. He hoped Mr. Clark would continue his experiments until he arrived at a result which would compete with any known process in that respect. He would ask, would the result of over-printing and over-toning be to effect a more complete interchange of molecules—a point in favour of increased permanency.

Mr. Foxlee enquired whether Mr. Clark could give an idea of the composition of the platinum-toned image—*i.e.*, the proportion of platinum to silver?

Mr. Clark replied that no doubt the over-printing and toning referred to by Mr. Blackmore would conduce to the permanency pf the result, but the effect would also be to reduce the intensity of the print, as was the case with gold toning. To arrive at the relative proportions of platinum and silver in the image would necessitate having recourse to an abstruse analysis; there was, however, some silver present, for a print, on being treated with an oxydizing agent, would lose intensity. No greater degree of over-printing was required than when toning with gold, except when using matt surface paper. One point must be observed: the bath must be always slightly acid; if at all alkaline, the toning would be extremely slow. A bath smelling faintly of ammonia would have very little toning action.

In answer to the question; "Has a landscape lens any advantage over the back combination of a rectiliuear leus?" Mr. Foxlee thought that the old form of landscape lens would give a better result, inasmuch as it could be used with a larger aperture, but the back lens of the rectilinear would cover a larger field.

Mr. Whiting thought Dallmeyer's new landscape lens was a distinct improvement.

Mr. Foxlee did not quite agree. The chief advantage of the single lens lay in the fact of its having but two reflecting surfaces, but the new lens had four; it had, however, rectilinear properties, which was a gain.

Mr. Clark did not favour the employment of the back combination, inasmuch as the angle given was generally too small for pictorial effect; further, the position of the stop was not correct, and if an adapter had to be used it would save time to employ a proper lens.

The next meeting, which takes place on November 22nd, will be a lantern night. Members are requested to bring slides.

Coventry and Midlands Photographic Society.

The annual meeting was held on November 6th, Mr. Councillor Andrews in the chair. The consideration of the annual report was postponed until next meeting. The following officers were elected for ensuing year:—

President—Mr. Councillor Andrews. *Vice-Presidents*—Messrs. H. Sturmey, G. Winstanley, F. W. Hardy, and H. W. Jones, F.C.S. *Council*—Messrs. A. B. Clarke, C. H. Waters, J. Mountfort, and W. R. Goate. *Treasurer*—Mr. W. L. J. Orton. *Secretaries*—Mr. F. W. Dew, The City Studio, Coventry; Mr. F. J. Harker, 40, Smithford Street, Coventry.

Several schemes for increasing the utility and membership of the Society were mooted, and referred to the Council for it to consider and report thereon at the next meeting.

Lewes Photographic Society.

A meeting was held on November 7th, with Mr. G. J. Wightman in the chair.

The evening was devoted to a discussion on "Developers," whic hwas opened by Mr. P. Morris. He described in detail the methods of development by ferrous oxalate, alkaline pyro, and quinol, and concluded by saying he thought pyro-developed negatives gave the best prints, but that quinol was preferable for lantern slides and transparencies.

The general opinion seemed to be that the merits of quinol had been rather over-rated, and that photographers were gradually coming back to pyro.

The Hon. Sec. spoke in favour of quinol for negatives, and thought its capabilities of giving gradation had been very much lessened by trying to hurry its action by the use of the caustic alkalies in combination with it. He preferred the fixed alkalies, and used carbonate of potash.

Mr. G. J. Wightman passed round negatives of the same subject developed by pyro, without a preservative, and quinol, also platinum prints from same; and the print from the quinol-developed negative was thought to be the best.

Mr. A. R. Dresser will read a paper on "Detective Cameras" at the next meeting to be held on December 3.

Dundee and East of Scotland Photographic Association.

November 7th.—Mr. W. D. Valentine in the chair.

Seven new members were elected. The following were declared the prize winners in the bromide print competition:—Equal firsts—Mr. D. Ireland and "Ignotus;" second, Mr. W. Saimond; and third, M. V. C. Baird. The method adopted in this competition was as follows:—Packets containing six marked pieces of Mawson and Swan's bromide paper were issued to competitors at the previous meeting; the paper could be cut down to suit the competitor's negatives, but the distinguishing mark might not be obliterated, and only three prints had to be sent in.

In a discussion on eikonogen several members gave their experiences, on the whole not very favourable to negative work, but that it promised well for transparencies used with soda carbonate as the alkali.

Specimens of Vérel's printing-out opals, Friese Greene's opal cards, and Marion's lantern-slide cameras were exhibited.

Two silver prints on albumenised paper were found in the question box; the first had the following written on the back:—"What is the cause of blistering on this print? Blisters commenced in toning bath—bicarbonate of soda—and increased in fixing bath and washing."—The only solution propounded was that too much bicarbonate had been used.

The second print:—"What is the cause of the white cloud-

ing over all this print? The negative shows no such clouds, and the print was all correct when it was washed after fixing."—The print must have come in contact with copper or brass while washing. The solution is probably correct, as the print was washed in a basin fitted with a brass plug and chain.

The meeting to be held on December 5th has been postponed till December 12th.

NOTTS AMATEUR PHOTOGRAPHIC ASSOCIATION.

ON Monday evening last, in Castle Gate Lecture Hall, under the auspices of the Notts. Amateur Photographic Association, a conversazione was held. The hall in which the large gathering took place was rendered attractive by tastefully displayed decorative material. In addition to the entertainment connected with the purely social part of the assembly, there was an excellent display of photographs, which were the exclusive work of members of the association. Mr. H. Tolley sent eighteen platinotype prints (15 by 12), and several were prize pictures. Mr. S. Bourne showed twelve frames of cabinet size photographs, which he exhibited last year at the Pall Mall Exhibition, and also a collection of mounted but unframed photographs taken twenty years ago in India by means of the wet collodion process. There were views of Cawnpore, Kashmir, Lucknow, Agra, Ootacamund, Gwalior, and Allahabad. Mr. Armitage displayed a large collection of direct photographs, reductions, and enlargements, the process for making the latter being illustrated by diagrams. A frame of lantern transparencies was also shown by this exhibitor, who further exhibited an extensive stock of silver prints—of Haddon Hall, Sherwood Forest, and Thoresby Park. Three pictures (15 by 12) were sent by Mr. G. A. Bull, and they showed that careful attention had been paid to all the necessary technical points. Mr. J. H. Hardy, of Kimberley, contributed several photographs of local scenery. A long winding country lane was the subject of one of his views, and the cliffs at Watnall made another effective picture. Mr. J. Taylor, of Bridlesmith Gate, sent a collection of cameras, shutters, lenses, and other novelties in connection with photographic art; Mr. G. E. Smith forwarded detective or hand cameras, and also an electric dark-room lamp; Mr. J. H. Holroyd sent for inspection a camera of his own make, full plate size, and showing some important improvements; Mr. G. A. Bull kindly added a 15-in. by 12-in. camera; a Kodak camera was received from Mr. G. Furley Lewis, along with some stripping films; and Messrs. Hardy, Carnell, and others displayed objects of interest to photographers. In a small room a number of the members, who are naturalists as well as photographers, exhibited the proceeds of some of their rambles. The collection was interesting; and the addition to it of microscopic objects, for the delineation of which glasses were provided, was a further inducement for visitors to prolong their inspection in this section of the exhibition. Among those exhibiting in this department (which also contained photographs), were Messrs. B. S. Dodds, F. Rushmer, H. R. Cooke, J. H. Luptou, and Dr. Marriott. In another room a binocular stereoscope holding 100 views, and which was lent by the president of the association (Mr. G. A. Bull), was placed for the use of those attending the conversazione. Amongst the pictures in the large hall which attracted attention was a full-sized bromide enlargement from a photograph of Mr. W. G. Taylor, of the South Notts. Yeomanry Cavalry Band.

After the receptions, Sir JOHN TURNEY said that probably during recent years no science had made greater progress than photography, and some pictures he had seen that evening were so excellently done that he wondered whether some artist with his brush or pencil had not drawn them, instead of their having been taken by an artist with a camera.

During the course of the evening about 500 persons inspected the exhibition and stayed out the programme provided. A number of new members were enrolled, and at the close of the gathering in the Lecture Hall some of the members proceeded to Well's restaurant in Wheeler Gate, where they hospitably entertained visitors from a kindred association in Derby.

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper & Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

W. L, Java.—1. Having seen a goodly number of specimens printed on the cards you mention, and heard favourable accounts from many quarters, we should unhesitatingly recommend you to give them a trial. 2. Why go to the expense of purchasing a solution when there are so many published formulæ for making it up from the solid substance, and the cost of carriage would be so much less? The preparation referred to is, however, in every way satisfactory, and considerable latitude may be permitted in its use, but it can never be said that plates give equally good results regardless of the duration of exposure. For developer, give eikonogen a trial, and you will be pleased with it; but in your hot climate be careful to avoid making up too large a quantity of the stock solution.

J. P. S.—Your letter is quite a testimonial, and we are glad to hear of your good success. The fact of having worked formerly with the wet process often unfits one for rightly estimating the exposure in the case of dry plates, their sensitiveness being so very greatly superior. The Table I. on page 71 is quite right, for the numbers in the vertical columns refer to *diameters*, which, being squared, work out quite correctly; for 2·25 × 2·25 gives a number practically double that of 1·59 × 1·59, or four times 1·12 × 1·12, and so on throughout. Circles are to each other as the squares of their respective diameters.

R. N. D.—There is no question about the superiority of the higher priced article. The construction and workmanship are so much better that the difference is well worth paying for, and although costing more originally, it would in the end prove to be the cheaper, for it would bear quite twice the amount of wear and tear.

H. M.—We believe Bennett's Rapid Dry Plates were first introduced into the market in the spring of 1880. Write to Messrs. Watson and Sons, 313, High Holborn, who would doubtless be able to give you the exact date.

N. E.—Of detective cameras, there are so many patterns that we should be puzzled to make a choice. All depends upon the size you intend to work, and degree of secrecy demanded, also whether for films or glass.

C. L.—Iodide of potassium has no action upon starch, but if some agent be present capable of liberating the iodine, or of doing so by atmospheric oxidation, then the coloration proceeds, and the blue compound is formed.

G. P.—For the representation of bright silver objects, there might be a peculiar appropriateness in employing the old glass positive process with collodion, using a dark or medium background and a little free nitric acid in the ferrous sulphate developer. With nitrate of soda added to this last-named solution, the brightest effects are produced, veritable counterparts or shining silver miniatures being thus easily obtained.

L. S.—The drying of gelatine plates in an atmosphere of diminished pressure has been long ago suggested, and an exhaust pump or fan blast is often employed to create a current of air which shall more rapidly draw off the moisture from the drying houses. The use of quicklime for such purposes would be impracticable on a large scale, and the fine dust arising from it when hydrated would be sure to spot the plates.

PHOTO.—If the operator's qualifications seem to be satisfactory and well attested, by all means offer to pay his travelling expenses in coming to you, or at least advance him something on account. In the event of his not suiting you after a fortnight or month's trial, you will use your discretion as to paying his railway fare back again; but even in this case it is well to err on the side of liberality.

T. B.—The Pall Mall Exhibition, which closed on Wednesday night, was the most successful ever held in the history of the Photographic Society. There were altogether thirteen thousand visitors, and the sum collected at the turnstiles was the largest on record, about £350. The medals were distributed at the general meeting on the previous evening, and twenty-one new members proposed for election.

PHOTARGUS, A. T. G., and LYNTON received.

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THE PHOTOGRAPHIC NEWS.

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ATOMS AND MOLECULES.

PHOTOGRAPHY has not inaptly been termed the handmaid of the sciences, and the effect of the position is, that it is common ground upon which not alone all the votaries of science are liable to meet, but those of artistic proclivities also; the consequence is, that sometimes scientific specialists hector in authoritative tones the practical photographer, or speak of the funny things they read in photographic journals. The unfortunate professional is told by the man who does not publicly exhibit his own pictures, that he does not understand the fundamental points of photography if he does not know all about atoms and molecules, and the professional worker may be inclined, in reply, to make the same remark about the ultimate atom that Mr. Mantalini did about the odd halfpenny.

The tendency of undeveloped man in this age of semi-barbarism is to unconsciously fix as the limits of the universe the boundaries of his own knowledge, and some physicists are as much annoyed at anyone who speaks disrespectfully of atoms, as a savage is at a man who does not revere his fetish. What, then, does the scientific world know about ultimate atoms and molecules? Nobody has ever seen one, and those who draw upon the blackboard diagrams fearfully and wonderfully made to explain chemical reactions, sometimes sink themselves to the assumed capacity of their listeners to explain that the pictures are not views of the molecules themselves. The ancient Jews, in limiting the universe to their own knowledge, considered the earth to be a flat plain of limited extent, and the chief thing in creation, with a sun and stars placed above as varieties of incandescent lamps made for the sole purpose of giving it light. When Franklin first discovered lightning conductors, his paper on the subject was rejected by our Royal Society, and the first witnesses of the actions of flying fish were victims attacked by the ridicule of orthodox science. Galileo, in his day, was roughly treated by the authorities of that age, who knew all about the laws of nature, and who forced the philosopher to deny upon his bended knees the rotation of the earth round the sun. In passing, may we ask why Galileo Galilei is always mentioned by his Christian name? Mr. Glaisher might as well be everywhere spoken of as "James."

What, then, does the scientific world know about atoms? Some first-class scientific men consider them to be a kind of small-shot, possessing hypothetically measurable length and breadth, and that by a process of development, the poems of Shakespeare were, in the course of ages, evolved from these scientific marbles when rattling in a special manner in the box of a human skull. Other first-class scientific men consider atoms to consist of an infinitely elastic fluid in a state of vortex motion. Others, again, consider them to possess neither length nor breadth, but to consist of forces emanating from points, thus reducing them to a kind of metaphysical abstraction. Others, again, like Berkeley, more modestly question the infinity of accurate perception of the observing instrument, and argue that the appearance of the exterior world may be due to mental impressions governed by fixed laws, so that the phenomena, although purely mental, are none the less real. This study of the instrument used is not unimportant, as many an electrical engineer knows when he thinks that he has discovered the locality of a fault three hundred miles away in a submarine cable, and afterwards finds out the indications by which he was guided to be due to peculiarities in the particular galvanometer which all along was directly under his nose.

Hence, when a specialist, in talking to photographers, assumes the too prevalent a tone which of late years has not conduced to the popularity of scientific men in society, let the listeners first ask the speaker to specify exactly what an atom is, and then ask him whether all the other authorities of the scientific world unanimously accept his definition. They may also ask him whether, from his high standpoint, he can produce better photographs than certain practical men present, and, if not, how it is that he fails.

MR. G. M. WHIPPLE, the Superintendent of Kew Observatory, will read a paper at the meeting of the Photographic Society next month. Some questions might then be put to him about the project for testing photographic lenses at Kew.

EIKONOGEN.

BY LYONEL CLARK.

I HAVE lately been making a series of experiments on the reducing powers of this new developer, and, as these experiments have been strictly comparative—that is to say, negatives produced under identical conditions were developed both with pyro, and with eikonogen—the results are reliable, and may be of interest to photographers generally.

In order to obtain results easily comparable, I employed a sensitometer constructed according to Spurge's method, in which the exposure was doubled for every other hole, the last hole giving an exposure 768 times as powerful as the first one.

Two parallel sets of experiments were made, the one on Carbutt films, and the other on "Ilford" ordinary plates; but no appreciable difference in the results is visible.

The eikonogen was obtained from Messrs. Marion, and was of a brownish sand-like appearance. As I have since seen a later sample of the salt in the form of pure white crystals, it is highly probable that the original samples had suffered from an incipient oxidation. Two working formulæ are given by the vendors, one in which the eikonogen with sulphite of soda is in one solution, the alkali—carbonate of soda—being made up separately; and the other a concentrated solution, in which eikonogen, sulphite, and the alkali—caustic potash—are all made up together in one solution.

I found the new salt to be by no means freely soluble. When made up with cold water, I failed to get even six grains to the ounce to dissolve. I believe, however, by boiling, that as much as twelve grains can be taken up. The addition of the caustic alkali, however, considerably increased its solubility, for in this formula there are sixteen grains to the ounce given, the whole of which was taken up. The quantity of sulphite of soda used in both cases was four times the weight of eikonogen present. Both these solutions assumed a clear apple-green colour; without sulphite of soda, however, I found the solution at once assumed a deep claret colour, becoming rapidly muddy.

Taking the results obtained with the mixed solution sulphite soda $\frac{3}{4}$ ounce, potash caustic $\frac{1}{4}$ ounce, water 10 fluid ounces, to which add $\frac{1}{4}$ ounces of eikonogen, first, and comparing them with those obtained by a developer containing pyro two grains, bromide of potassium half-grain, and strong ammonia two minims (more or less), I found that no more detail is obtainable by the new developer than is with the pyro one, the last visible square of the sensitometer being the same in both cases. The general appearance of the scale showed some difference, the maximum density being gained lower down with eikonogen than with pyro; in other words, less exposure was required to produce a thick deposit on a feebly exposed portion with eikonogen as a developer, than when pyrogallol was used.

A preliminary bath that is recommended had no further effect beyond causing slight fog; if anything, it destroyed detail.

Turning now to the experiments made with carbonate of soda, very different results were obtained. The position of the least exposed squares remained the same—that is to say, the amount of detail brought out was the same in both cases—but instead of the pyro giving the least density, it was now the elkonogen which fell considerably short.

Resuming these experiments, therefore, I find that in no case can eikonogen produce more detail than pyro; it has, therefore, no advantage over the other developer in bringing out the under-exposed portions of plates, but it has an advantage in giving greater density to those parts that have been but feebly acted on by light. But this is only when used in the concentrated solution; in the ordinary solution, on the contrary, it gives a thin negative, even in the high lights of a well lighted scene, where a normal pyro developer would give adequate printing density.

It is interesting to see to what this is due. One experiment I made throws considerable light on the subject; that is, eikonogen can develop a plate without the addition of any alkali almost equally as well as when an alkali is present, and the only effect that the carbonate of silver has appears to be a slight softening of the film. I further proved this fact by increasing as much as possible the strength of the carbonate, and found that no difference was appreciable in the results. It therefore follows that the developing power of the eikonogen is wholly in the chemical itself, and does not depend, like pyrogallol, on the addition of an alkali. This is a comparative statement; we know that in reality pyro can develop *per se*, but such a thing is not practical, at least not for dry plates. I further tested this fact by reducing the quantity of the eikonogen, and found that its power of giving intensity varied precisely with the amount of the salt present, although the amount of detail brought out remained constant.

This shows us why the concentrated developer gave so much superior density over the ordinary one; the former contains 16 grains to the ounce, whilst the latter contains only six. For ordinary work I consider the concentrated developer too powerful, as it works very close to the fogging point; but, on the other hand, the ordinary developer is too weak. A good working developer should contain something between the above amounts—say 10 to 12 grains to the ounce—combined with three or four times its weight of sulphite of soda, and if time is an object a little carbonate of soda might be added, as this has undoubtedly some accelerating action. But take the developer as one will, it is very evident that, weight for weight, eikonogen is a much feebler developer than pyro, and as the price of the two salts is about the same, this is equivalent to saying it is a much more expensive developer. However, it has the advantage over pyro of being capable of being used over and over again, as it does not oxidize rapidly, and has absolutely no staining effect on gelatine; it may therefore be found useful for developing hand camera work, where many negatives have to be treated in the same manner. In cases of real under-exposure, where no part of the plate—not even the high-lights—have had a sufficient exposure, the concentrated solution would be distinctly superior to pyro; but in cases of ordinary so-called under-exposure, where only the shadows are under-done, it would, of course, give too great hardness.

One of the most serious disadvantages of eikonogen appears to me to be its great insolubility. A sufficient amount of the salt can only be dissolved by boiling water unless the caustic alkalies be employed, and their use is very objectionable on account of their action on the skin. This fault is more serious because solutions of the salt, even in the presence of sulphite of soda, will not keep if exposed to the air, and it is only by keeping the bottles full that the mixture is preserved.

On these two points alone pyro has an immense advan-

tage, at least for the spasmodic amateur, who, perhaps, only develops one plate now and again. Pyro, we know, when in conjunction with sulphite, will keep in a half empty bottle certainly over a year—my personal experience—or, if preferred, can be dissolved at the moment of using. Eikonogen will go wrong in a week in a half-filled bottle, and, when mixed with caustic potash indeed, it hardly keeps hours, and it is at the same time too insoluble to permit of it being made up as required.

This is at least my experience with the older samples; what the newer ones will do I cannot, of course, say. Photographic dealers have a very playful way of admitting that their last samples were all wrong, but just you buy some more, and see what you will get; and, doubtless, the long-suffering race of photographers will do this with becoming meekness and humility.

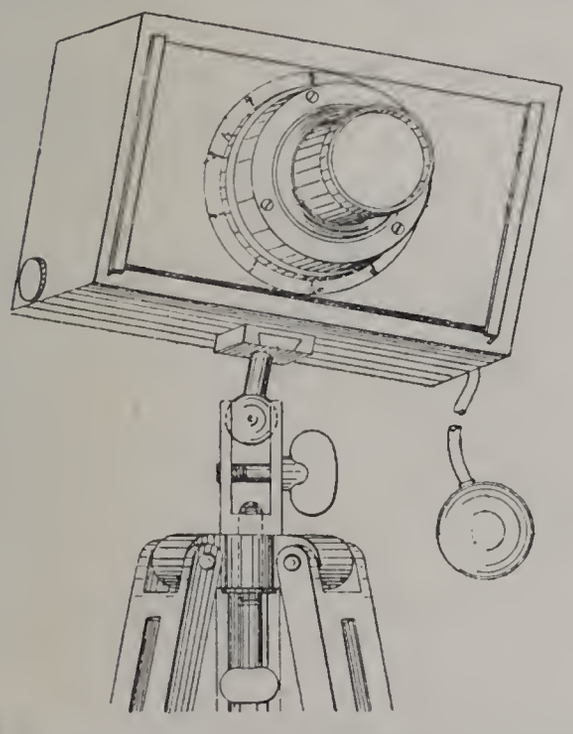
If I may be allowed to point out the chief point requiring improvement, it is, in my opinion, some means of increasing the solubility of eikonogen; the advantage that a concentrated solution possesses in giving greater density than pyro in cases of under-exposure is not to be despised, and, if obtainable by any easy method, would ensure eikonogen a place in most dark rooms.

THE CAMERA OF ANSCHUTZ, OF LISSA.

The following is a copy of the provisional specification relating to the above subject, and to which we have added three of the drawings from the complete specification:—

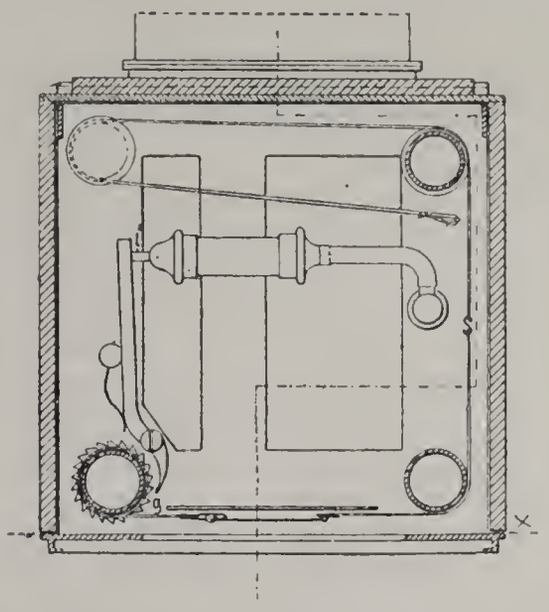
"I, Ottomar Anschutz, of Lissa, Province of Posen, kingdom of Prussia, photographer, do hereby declare the nature of this invention to be as follows:—

"My invention relates to photographic cameras principally designed for taking instantaneous photographs, and its object is to provide means, firstly, for producing photographs of the said kind which are clearer than those here-



tofore made; secondly, for altering the time of exposure; and thirdly, for facilitating the adjustment of the lens to the focus corresponding to the distance of the object to be photographed.

"For the first purpose I provide the camera with a shutter having a slit, and so located within the camera as to move with the slitted portion along the rear wall of the camera, *i.e.*, the wall containing the exposure opening. The shutter may be carried out in different manners. It may, for instance, consist in two pieces of untransparent cloth, so connected together as to leave the required slit between them, the outer edge of one piece being fastened to a winding-barrel having combined with it a catching and disengaging mechanism, while the outer edge of the other piece is attached to india-rubber cords. Or the shutter is constituted by a light box open at two opposite sides, and



arranged in the camera so as to be directed with the said sides respectively towards the lens and towards the exposure opening. This box is connected to the camera by guiding devices adapted to conduct the same with its slit across the exposure opening, and it is provided with a catching and disengaging contrivance and springs or india-rubber cords, as in the first arrangement.

"By means of a shutter which moves with its slitted part close to the sensitive surface, as described, the said surface is exposed in successive strips to the full action of the concentrated rays of light forming the picture, while dispersed rays are excluded.



"For altering the time of exposure, the shutter is provided with an adjusting device whereby the width of the slit can be varied. In the shutter of the first arrangement, the edges of the pieces of cloth forming the slit are fitted with narrow metal mountings, one of which constitutes a guide for a resilient sliding pall arranged to engage with ratchet teeth formed on the said guide. From the top of this mounting a cord is passed through eyes at the ends of the other mounting, then through an eye at the bottom of the first mounting, and finally to the pall, to which it is fastened. The cord thus forms an adjustable connection between the two parts of the shutter, the distance between

the said parts being reduced when the cord is drawn upon by means of the pall, whereas, when the cord is slackened by disengaging the pall and shifting it backward, the aforesaid springs or india-rubber cords cause the said distance to be increased. The same contrivance may be applied to the shutter of the second arrangement, provided only the walls forming the slit, or the ends of the said walls, be made movable in respect to each other.

"For the purpose of facilitating the adjustment of the lens, the casing thereof is provided at one end with a screw-thread, with which it is screwed into a ring fixed to the camera, so that the lens may be focussed by screwing the casing more or less in or out. Besides this, the casing is fitted with a pointer, and on the ring marks are made, which show the position the pointer must have when the picture surface is in the focus corresponding to the distance indicated by any of the marks."

Herr Anschutz claims :—

"1. The combination, with a photographic camera, of a movable shutter having a slit, and so located in the camera as to move with its said slit along the wall of the camera containing the exposure opening, substantially as described.

"2. In a photographic camera the combination, with a shutter composed of two parts, forming between them a slit *l*, and movable in respect to each other, of a contrivance for regulating the width of the said slit, consisting in the cord f, eyes f^2 f^6, rack f^4, and pall f^3, substantially as described.

"3. The combination, with a photographic camera, of a ring m^1 having screw-threads, and provided with division marks, and a lens casing having a screw-threaded portion that works in the said ring, and a pointer *m*, substantially as specified."

The italic letters in the above claims refer to those in the drawings which accompany the complete specification.

PHOTOGRAPHIC CLUB.—The monthly lantern meeting will take place on Wednesday, November 27th.

BATH PHOTOGRAPHIC SOCIETY.—In the Assembly Rooms, Bath, on Monday, December 2nd, Mr. Eadweard Muybridge will give a lecture on "Animal Locomotion," illustrated by the zoopraxiscope and a large series of instantaneous photographs. The proceeds will be devoted to the building fund of the Royal Literary and Scientific Institution.

A TENACIOUS SOLDER.—An account is given in the *Berliner* of a soft alloy which adheres so firmly to metallic, glass, and porcelain surfaces that it can be used as a solder, and which, in fact, is valuable when the articles to be soldered are of such nature that they cannot bear a very high degree of temperature, the composition consisting of finely pulverised copper dust, which is obtained by shaking a solution of sulphate of copper with granulated zinc. The temperature of the solution rises considerably, and the metallic copper is precipitated in the form of a brownish powder—20, 30, or 36 parts of this copper dust, according to the hardness desired, being placed in a cast-iron or porcelain-lined mortar, and well mixed with some sulphuric acid having a specific gravity of 1·85. To the paste thus formed are added 70 parts by weight of mercury, with constant stirring, and when thus thoroughly mixed, the amalgam is well rinsed in warm water to remove the acid, and then set aside to cool ; in ten or twelve hours it is hard enough to scratch tin. On being used, it is heated to a temperature of 375° C., and when kneaded in an iron mortar becomes as soft as wax. In this ductile state it can be spread upon any surface, to which, as it cools and hardens, it adheres with great tenacity.—We fancy this "discovery" is not new, but the recipe may be useful to many who have not back volumes.—*English Mechanic.*

SOME MEMORIALS OF DAGUERRE.*

BY WM. LANG, JUN., F.C.S.

IN bringing before you this evening a few photographic illustrations connected with the later years of Daguerre's life, I have first of all to acknowledge the extreme courtesy and kindness of Monsieur Davanne, President of the French Photographic Society, in presenting me with these interesting reminiscences of the illustrious Frenchman.

Daguerre, as all the world knows, was by profession a scenic artist. For one theatre, especially, L'Ambigu Comique, he painted several important scenes, but his fame was more permanently established by the painting of those pictures which have received the name of dioramic, wherein, by different arrangements of light and shade, and by viewing the picture first by reflected and afterwards by transmitted light, various effects are rendered. To enumerate all the pictures Daguerre produced in this way would be to exceed the limits of the present communication ; but it may be sufficient for our purpose to refer to the delineation of the Goldau Valley in Switzerland, where, early in the present century, a severe landslip took place. the appearance of the valley, both before and after the catastrophe, being shown to the spectator. Another famous effect was that of Holyrood Chapel ; this picture earned for Daguerre the Cross of the Legion d'Honneur in 1824. His last work was the Temple of Solomon, and this was produced in 1839. In connection with these dioramic effects Dagnerre had associated himself with another artist of the name of Bouton. The diorama was first opened to the public on the 11th of July, 1822, and continued to be one of the sights of Paris down to the year 1839, when, on the 3rd of March of that year, the whole of the series of paintings were destroyed by fire. Daguerre did not attempt to reproduce any more of these dioramic representations, having been engaged in the securing of his light-drawn pictures, with what success we are all acquainted.

The photographic print which I now pass round shows, perhaps, the only remains of Daguerre's handiwork now to be found in France. If you were asked what does that picture represent ? the answer would be, The interior of some large cathedral ; but it is nothing more nor less than a painting. The circumstances under which it was painted are something like the following. Daguerre, after he had received the annual pension of 6,000 francs decreed to him by the French Government for his discovery of Daguerreotype, removed from Paris and settled down in the retired village of Bry-sur-Marne. Here he built a villa, where he spent the remainder of his days with his wife and niece. He married an English lady, Louisa Arrowsmith. The house itself was pulled down in 1870, having been acquired by a religious body. The only thing remaining, as in existence in Dagnerre's time, is the handsome gateway erected by himself. This you will see a picture of by-and-bye. Returning to the church picture, it seems the Parish Church at Bry terminated very abruptly, almost immediately behind the high altar. By the expedient of painting on canvas an interior such as you see depicted, Daguerre increased the apparent size of the building ; indeed, it may be said he more than doubled it. In making the connection between the real building and the artificial one, Daguerre first drew, in very high relief, on either side of the wall behind the altar, a stone column.

* Read before the Glasgow Photographic Association.

On one was painted a gilt picture frame with no picture in it, on the other a frame was shown with a representation of the Virgin. On each pillar a bouquet of roses was delineated, and from the arch above a crucifix was made to appear as it had been only suspended. All this formed, as it were, a starting point, a sort of framework for the illusory nave, which filled up the centre of the canvas. Monsieur Balagny, who photographed the picture, describes the illusion as most complete, and if the altar were not there to bar further progress, visitors would wish to penetrate to the nave beyond. It is to be noted that the effect described is to be seen from any part of the Church. Daguerre, in painting, was careful enough to see that it should be so. His invariable habit, after almost every stroke of his brush, was to retire to the various parts of the Church to see the effect produced.

The next picture which I wish to bring under your notice is, as you will see, a representation of a kind of grotto. This was an arrangement erected on the grounds of Daguerre's friend Baron Louis de Bigny. In 1848, during one of those revolutionary periods to which France seems to be periodically subject, the inhabitants of Bry-sur-Marne were in somewhat sore straits; many of the villagers were employed in the Park of Bigny, under Daguerre's superintendence, in making a sort of miniature Switzerland; the photograph gives a very good idea of what the nature of that work would be. It is somewhat theatrical in effect, this grotto, but I have no doubt it will form a cool retreat on a hot summer's day.

We have already referred to the fact that Daguerre's house is no longer in existence, but, as also noted, the gateway to the house remains. In the print now sent round you have this gateway shown, while on the right of the picture is seen the small parish church of Bry-sur-Marne.

The remaining photograph connected with Daguerre and Bry-sur-Marne represents Daguerre's tombstone. It is a plain square stone, presumably of granite, having a medallion of Daguerre carved on the side represented in the picture. This was the work of M. Husson, and is said to be a faithful likeness. The inscription underneath the head reads as follows:—

A.
Daguerre,
Artiste, peintre, chimiste,
L'inventeur de la photographie.
La société libre des Beaux Arts.
1852.

From which it will be seen that this commemoration stone has been erected by the Society of the Fine Arts of which Daguerre was a member. The other sides of the stone have also inscriptions: one, Sciences Beaux Arts; another, Diorama-Daguerréotype; and the remaining, Le Consul Municipal de Bry à Louis-Jacques-Mandé Daguerre, né à Cormeilles en Parisis, le 18 Nov., 1787. Decédé à Bry, le 10 Juillet, 1851.

We now leave Bry-sur-Marne to turn to Cormeilles, a town which has the honour of being the birthplace of Daguerre. A very handsome monument was erected to the memory of Daguerre in the year 1883, on a small square opposite the house wherein he was born. The funds were provided by those interested in photography in the various countries of the civilised world. It is a pedestal some six or seven feet in height, and is surmounted by a bust in bronze, the work of the sculptor Capellaro. The print I now pass round shows this handsome memorial. The inscription is much the same as on the tombstone at Bry-sur-Marne, giving the dates of Daguerre's birth and death; while at the foot of the pedestal we find the inscription, Souscription Internationale, 1883. It only remains to be added that the inauguration took place on Sunday, 26th August, 1883, and the two prints shown are from negatives taken on that day, an interesting record of an interesting ceremony. They manage these things better in France, is a saying we often have quoted, and I think in the matter of erecting memorials to their illustrious men we could borrow a leaf from the book of our Gallic friends. When are we to see monuments erected in this country to men such as Talbot, Ponton, and others, who have done as much towards the solution of the problems involved in photography as either a Daguerre or a Niepce?

Speaking of the latter brings me now to the end of my communication, and in connection therewith I have only to place before you two other very interesting prints, viz., the scene that took place at the inauguration of Niepce's statute at Châlons-sur-Saone. This event was celebrated on the 21st of June, 1885. The artist who designed the statue was Monsieur Guillaume, and the casting in bronze was from the famous workshops of Barbadienne, in Paris. For these interesting memorials I also am indebted to Monsieur Davanne, and I think I cannot do better, by way of conclusion, than ask you to record a vote of hearty thanks to that gentleman for the favours conferred.

I have reproduced all the various prints as lantern slides, so we will have the lights turned down, and we shall all be able to see at one and the same time, each particular subject.

Two correspondents in *Wilson's Magazine* contradict the statement that hydrokinone is a poison, either when taken internally, or when absorbed into the system. One of these correspondents is the head of the largest firm of manufacturers of hydrokinone in the United States; and the other quotes American doctors who prescribe large internal doses of hydrokinone for rheumatism.

The Oldest Observatory.—The observatory at Pekin is the oldest in the world, having been founded in 1279 by Kubla Khan, the first Emperor of the Mogul dynasty. There are still in it three of the first instruments of observation. These were used for the observation of Halley's comet in 1738, and may also be used when, 22 years hence, this comet again appears. The oldest observatory in Europe is that founded by King Frederick III. of Denmark, on the island of Hveen, in the Sound, and where the famous astronomer Tycho Brahe carried out his celebrated observations—among others, that of the "bright" star in Cassiopeia. The Paris observatory was established in 1671, and that of Greenwich three years later.—*English Mechanic.*

The Royal Institution.—General monthly meeting, November 4th, Sir James Crichton-Browne, M.D., L.L.D., F.R.S., in the chair. The following were elected members of the Royal Institution:—Thomas Browning, C.B.; Latimer Clark, F.R.S., M. Inst.C.E.; Charles Pitfield Mitchell, M.R.C.S.; Maurice Powell, M.A.; and Delisle Powles. Edward Pollock was elected a manager of the Royal Institution in the room of Sir James Crichton-Browne, resigned; and James Edmunds, M.D., F.C.S., was elected a visitor in the room of Edward Pollock, resigned. The special thanks of the members were returned to Professor Dewar, F.R.S., for his valuable present of a portrait of the late Mr. Henry Pollock. The special thanks of the members were returned to the Rev. John Macnaught, M.R.I., for his second donation of £50 for improvements in the building. The presents received since the last meeting were laid on the table, and the thanks of the members returned for the same.

EXPERIMENTS WITH EIKONOGEN.

If eikonogen is, as it is said to be, says *The Beacon*, of Chicago, a definite chemical compound, there is no doubt that, from slight variations in the method of its production, or other causes, various samples vary considerably in their solubility and reducing power, as well as their physical appearance. Our first sample was, we understand, imported by the treasurer of the Camera Club direct from Germany, and was of a pinkish brown, interspersed with sparkling laminæ like crushed mica, and soluble only to the extent of eighteen grains to the ounce. Our recent experiments were made with what we suppose to be the now regularly imported article, in square tins holding about three and one-half ounces, with a rather ingenious folding spout, by which, when open, the powder may easily be poured out, and which, when closed, the air is excluded. It is considerably lighter in colour, there are fewer of the sparkling luminæ, and the solubility is greater, being to the extent of thirty grains to the ounce. The colour of the solution is very similar to that of a strong solution of logwood, deep enough to be opaque to sunlight in a thickness of less than an inch. The first sample, when dissolved in a solution of sodium sulphite, made a rather deep grass green solution; that from the tin at present in use is of a different shade, which may be described as an *amberish* green. But the most important difference between the two samples is in their power as reducing agents, and, although it is somewhat difficult to measure that exactly, we think we have fairly good evidence that it is nearly as three to five; that is, to carry on development with a solution of our more recent samples at the same rate, and to the same extent in the same time as with the first sample, the strength of the former must be in reference to the latter as five to three.

On that datum we propose to amend the formula given in our last issue as follows:—

A.—Eikongen	... ...	1 ounce av.
Sodium sulphite	... ...	2 ,, ,,
Water	... ...	20 ,, fluid
B.—Sodium carbonate	... ...	1½ ounce av.
Water	... ...	20 ,, fluid

To make the developer, take one ounce each *a* and *b*, and two ounces of water. This solution, taking the difference of reducing power into account, is a little stronger than that recommended in our last, and may, in cases of very full exposures, be advantageously reduced a little.

Further experiments strengthen the opinion already expressed, that the recommendation to add a mixture of sodium hyposulphite and sodium bromide is a mistake, as being an unnecessary complication. In cases, however, of unavoidable under-exposure, a preliminary bath of hypo, with a trace of bichloride of mercury, may be of some value. The following is the formula recommended:—

Sodium hyposulphite	1 grain
Water	5 ounces
Mercuric chloride (1 per cent. solution) ...	1 drop

Immerse the under-exposed plate in this for one minute, and then, without washing, place it in the developing solution.

A question seems to have arisen in some quarters as to whether or not eikonogen has been patented in this country. Indeed, we have an idea that we recently saw a statement in a contemporary to the effect it was not. That, however, seems to have been a mistake, as the following indication of the method of its production, extracted from the *Patent Gazette*, we think, of some week in April, has been handed to us by a friend closely connected with patents, and who promises to furnish us with a copy of the complete specification, which we hope to publish in our next:—

"The new alpha-napthol-disulphonic acid obtained by first forming naphthalene-disulphonic acid by treating naphthalene with sulphuric acid and monochlorhydrin, or with fuming sulphuric acid, then treating the naphthalene-disulphonic acid so formed with nitric acid, reducing the resulting alpha-nitronaphthalene-disulphonic acid to alpha-amidonaphthalene-disulphonic acid, separating and converting into the corresponding alpha-napthol-disulphonic acid substantially as described."

ARTISTIC LIGHTING.

BY BRUNO SAEMANN.

We know that the first aim of lighting is to render the model in its pictorial presentation clear and distinct in all its parts. Further, we strive, by management of the light, to give the model roundness and relief, *i.e.*, plastic quality. In later days the search for the most effective tones has come in, from which it has resulted that very often, at the expense of clearness, one seeks to give distinctness to various portions of the model by the use of unduly large masses of light, desiring brilliant contrast, but destroying completely all artistic effect.

I lately saw the photograph of a *prima donna*, in which the arm, more to the front, seemed like a gigantic protuberance on the other. The large figure, with a tiny fan in its hand, stood behind a little stool, and showed on the light side such a storm of light on hair, neck, shoulder, arm, and body, cutting the contour sharply out, that the figure seemed like a silhouette, with all the rest merely indicated. Nowhere on this contour, nor on the rest of the figure, was there to be seen any of those tender half-lights such as the best paintings show, and which, with clear, transparent shadows, give them their reputation. Another example will make plainer what every photographer seeks to obtain by his lighting.

The picture, "The Fairy Tale," by Prof. Grafe, of Berlin, is familiar to most people. If we consider the light on the figure of the girl in the picture, we find the so-called direct light on the contour of the light side—the light comes a little from the side and rear—is isolated, and that the light which shows the prominent parts falls especially on the upper side of one thigh; whereas, the under side is more weakly lighted, and hence, the bending of the leg is very precisely and naturally rendered. Everything else in the picture is in a soft twilight, the shadows being cleared by reflected light, and hence, all subordinated to the high lights on the contour. Here, then, are secured relief and plastic quality without the finest gradation of shadow being impaired. The hair, the face, the entire body show endless delicacy, and yet distinctness, in every part of the form, even in the deepest darks, so that the whole picture has the quality called by the artist "warmth," whether in monocrome or in colour.

But the photograph described above was particularly hard and cold; nowhere could there be recognised any distinct direction in which the illumination was coming. The half-lights and shadows must in every picture which lays claim to artistic worth—whether photograph or painting—be distinct. The photograph failed entirely, the different sources of light producing a perfect chaos. Most photo-

graphers of the present time do not yet realise that they should think of their studio not only as a photographic but an artistic atelier. They cannot get enough light, and the more glass they have in the place, the better they consider it to be. The present employment of tremendous quantities of light is exactly the cause of the model appearing to be drowned in light, causing the photograph to take on that well-known white shimmer that is now passed as the highest achievement in photography, because it lends the picture a certain lustre. But, I ask, do we make portraits only to adorn them with burnish and polish: or shall we not rather hereafter try to subordinate tone to artistic quality, when we know that that is pure and quiet? The most artistically beautiful photographs, if they are natural, show a particular neutral tone, and so represent the model, not the raw material of a picture, for this is only a means to an end.

A second example, to prove that too much light is generally used, is given by the picture of a lady who wears much jewellery and many polished ornaments; these stand out as formless spots without detail. Why is this? Can it be avoided? Yes, in this manner: the side curtains are drawn together at least up to the height of the head of the sitter; the top curtains also slightly more, so as to weaken the light from above. The curtains directly above —of course too much precision is absurd, as their arrangement differs in every studio—are closed just so far that the forehead on the shadow side shows a touch of light, corresponding to that on the light side, but only on the edge: in the same way on the cheek and the rest of the body. If the arrangement is such that on the shadow side of the cheek there is a clear shadow thrown by the nose, and falling a little over the upper lip, without entirely covering the cheek, so that this carries a distinct but well-subordinated light, we have the "classic lighting" of Klary. But if the contrast is a little hard, the shadows not transparent, Klary's screen is not to be recommended as an assistance to soften this; while, as a reflector, it is even worse in unskilful hands, producing most wonderful distortions.

To borrow a model of simple lighting for a portrait from the domain of painting, I should take for an example the well-known portrait of Michael Angelo, which so unites massive relief of the features with skilful handling and pure delicacy that one can hardly look too much at it. How wonderful are hair and beard, how beautifully the illumination is graded over the whole picture! As an example of the lighting of a portrait in full-face, I take the portrait of Albert Dürer, by himself. One sees the difference between light and shadow side, and how beautiful is the gradation of light in them; how finely modulated the light on the hair; how clearly the hands are defined. For a head in profile I choose the portrait of Titian in the fur coat. How clear and quiet is the light, without hardness. As another example, I would take the portrait of Rembrandt, by himself; this opposite to his Raphael. What a difference between the two heads, each beautiful in its own way. I cannot comprehend why men do not follow such examples, instead of striving to produce photographs that, while they have a finished and painstaking appearance, are without an atom of artistic merit. Schreiber shows this in telling of a skilful sculptor who, shown a modern photograph from a very well-known atelier, did not seem greatly impressed; but on seeing another study from an atelier much less famous, but where the operator had followed the principles of great painters in his work, said: "Yes, there is a real picture; that is what photographs should be like; from that I could draw, model, do everything you wish; but there is nothing to be done with the other."

Wherein, then, lies the secret, the character of beautiful, artistic lighting? The answer is: "In the unity of the illumination." Is there but a single source of light to be made use of, it must be sufficiently evident in the picture whence it comes; in other cases where there are two, or even, rarely, more than two, so must the effect of each and its direction indicate its position. For, if in the picture it appears as if the model had been drowned in a sea of light, or as if light was being poured all over it, then all repose is lost, and repose is the first characteristic of artistic illumination.

It is generally through the employment of too much light that the photographer falls short of the painter in his work. Lately another error in illumination has been noticed which this time is in the domain of art itself, and might have been avoided by considering the subject. It is this: the antique sculptures in marble are notable for a certain spiritual expression, which is produced by a deepening of the eye-sockets. As the Greek masters chiseled their marble figures they must have noticed that if the eye-sockets were cut according to nature at a moderate distance in the head, the effect of the eyes was flat, unbeautiful, and unnatural, on account of the translucency of the marble. It was necessary, therefore, to cut the statue somewhat differently from nature, in order to give a natural appearance. Later artists, following the Greeks, did this also, but transferred the custom of deepening the eye-socket to other materials, such as bronze and plaster. It is thus evident that the casts from antique marbles must show a false expression about the eyes, since plaster lacks the translucency of marble. Many artists, and in a still more exaggerated way many photographers, believing they would produce something superior, produced portraits of their patrons which, by strong lighting from above, gave a false and melancholic expression; I have seen a great many portraits of this sort from well-known establishments, in some of which the eyes had been made almost indistinguishable.

Whoever would really learn to imitate the beautiful spiritual expression of the antique should consider particularly the heads of the Juno Ludovici and the Venus de Milo, which have each long been famous as the most perfect representations of feminine beauty. But I must here give earnest warning, in respect to taking sculpture as models for picture-making, that the inexperienced are by this very apt to fall into a certain monotony in their lighting. I would not, however, be understood as counselling against the use of casts for the study of lighting in the atelier; on the contrary, as against a properly prepared background, light and shade come out on them as on nothing else; but a background of some harmonizing light colour should be used, and not the coal-black one so generally employed. By such studies the eye is trained; they are remarkably rich in suggestion; one seeks to produce the same effects as appear in the works of the masters cited above, and from this one may observe the effect that colours have in plastic work. In any case, the photographer is to repudiate copying others, no matter how celebrated; especially pictures of popular types, costume studies, etc., cannot serve as models for a portrait. If, for example, such a model sat in a studio with a head-covering, it is doubtful if quite the same light

would serve to take a picture with this removed; so the more or less prominent or retreating features of each subject have so much influence on the effect of the light, that it may be said that each head demands a separate lighting of its own. The skilful operator thus has it in his power to make unusually heavy features appear normal, or to fill out the haggard. Especially for these last is it serviceable to cut out as much as possible the light from behind, because by this exactly the opposite effect will be produced. In spare hours the operator should draw all his curtains together, pose a model, and then open the different ones and observe the effect of each; even photograph it and study what he finds on the plate. From such studies he learns what photographs with good effect, as well as what *looks* right. He will learn that the lights in the eye seem a little weak for an artistic effect; if it looks strong in the light it will be hard in the photograph. The optical and chemical difference is not the same in all ateliers, and must be learned. The operator needs a quick and artistic eye; in addition, he should study the laws of the action of light, and investigate the position and construction of ateliers, on which the individual differences in their working depend. The polished floors, bleached curtains, reflecting objects in the vicinity, particularly when on a strongly lit part of the atelier, may seriously injure the purity and quiet of the illumination. The fatal influence of strong light falling on the objective is known to all—as the clearness of the picture depends on this, especially in case the old style of portrait lens with a separate back combination is employed.

The illumination may be ever so perfect, but will not work unless the background agrees with it. Let us consider the painters, who are here the best teachers; one notices how they surround the contour of the figure, how the respective degrees of light are governed by the light on that portion of the figure which comes against them, head, clothing, &c., so that the background shows gradations also. A too dark ground works hard; a too light one cold and weak, especially if uniform, whereas one with fine gradations gives the picture body and warmth. Every one who has ever drawn from the model knows the influence of the degree of obscurity or light of the background on the former.—*Wilson's Photographic Magazine.*

THE exhibition of Mr. H. P. Robinson's photographs at the Camera Club continues to prove very attractive to visitors.

PHOTOGRAPHY AND ART.—A *Pall Mall Gazette* correspondent who visited Mr. Linley Sambourne says, in the course of an article thereupon:—"Taking up a photo from life, one of his own doing of a young girl draped, lying back upon a rock, Mr. Sambourne said: 'That's a study for a mermaid. I am illustrating Hans Andersen's fairy tales, and here is the sketch itself.' I took up the gracefully-sketched mermaid, and, lo! it was but for the scaly tail a replica of the photo at which I had just been looking."

A FERROUS CITRATE DEVELOPER.—An amateur has tried, and gives praise to the following formula for a citric acid developer:—

A.—Citric acid	... ...	25 grms. (6½ drachms.)
Water	... ...	700 c.c. (23 fl. ozs., 5 drs.)
Ammonia (density 0·81)	... ...	1 part
B.—Ferrous sulphate	... ...	1 ,,
Water	... ...	3 parts
C.—Chloride of sodium	... ...	1 part
Water	... ...	30 parts

Mix 15 parts of A with 5 of B and 1 of C. It is probably the cheapest developer for gelatino-bromide plates, and gives excellent results.—*Revue Photographique.*

ORTHOCHROMATIC PHOTOGRAPHY.*

WE are so seldom asked to reproduce paintings or coloured drawings, that the new orthochromatic methods of doing this class of work do not come much within the working scope of the office, and consequently they have not received much further attention during the year. When required, the method described in last year's report of staining gelatine dry plates (by preference Wratten and Wainwright's "ordinary") in a bath of erythrosin-silver and ammonia is followed, and when it is inconvenient to use the yellow beam reflected from a mirror covered with a transparent yellow screen, very good results can be obtained by placing in front of the lens a yellow screen made with a piece of *parallel plane* glass coated on one side with a clear varnish composed of a mixture of—

Turmeric varnish	... ...	2 parts
Annatto do.	... ...	1 part
Kamala do.	... ...	1 ,,

This varnish has the advantage of giving a more structureless film than collodion or gelatine. The different varnishes are made by adding the dyes (powdered turmeric, annatto seeds, and kamala powder) to ordinary benzole crystal varnish, and may be used in varying proportions according to the tint required, the annatto giving a red tone, the turmeric a greenish yellow, and the kamala a neutral yellow between the two.

Good results have also been obtained by placing a glass plate coated with the above yellow varnish or with coloured collodion or gelatine, in front of the picture to be copied.

I commenced a series of experiments on various eosin dyes obtained from the Basle Society of Chemical Industry and other sources, to ascertain the most suitable for use with collodion and with gelatine, but had to give them up on account of other work. The most promising results with collodion were obtained with cyanosin (the potassium salt of tetrabromtetrachlorfluoresceine ethylether); phloxin (the potassium salt of tetrabrom dichlorfluoresceine); erythrosin B (Basle) the sodium salt of tetrabromtetrachlor fluoresceine), and yellow-shade eosins (J. L. of Basle—the sodium salt of tetrabromfluoresceine—and Brooke, Simpson, and Spiller's).

For gelatine the blue-shade eosins (B. A. of Basle—the potassium salt of tetraiodfluoresceine, which is similar to ordinary erythrosin) were found to give more yellow-sensitiveness than the yellow shade. The addition of ammonia, in the proportion of about 1 per cent. of the staining bath, increases the yellow sensitiveness, acetic acid destroys it; washing off the excess of the dye after staining was also tried, but its efficacy in increasing sensitiveness seems doubtful. Annatto added to erythrosin was not found an improvement, but the addition of uranin greatly increased the sensitiveness to spectrum green.

Using the stained gelatine plates while wet with the dyes was also tried, but was not found an advantage, the sensitiveness being less, and the swollen state of the gelatine film spoiling the sharpness of the image.

I hope to be able soon to resume these experiments.

In connection with this subject it may be mentioned that in copying some monochrome shaded drawings done in rather a blue shade of neutral tint or Payne's grey, it was found a great advantage to place a glass plate coated with collodion coloured with eosin over the drawing, so as to lower the blue tone, and enable the different shades to be reproduced in proper gradation and strength.

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* A part of the Government Report forwarded to us by Colonel Waterhouse, Director of the Photographic Office of India.

THE FADING OF SILVER PRINTS.

BY W. E. DEBENHAM.

In an article in the Photographic News of the 1st inst., Mr. C. Brangwin Barnes announces that he has discovered the cause of the fading of silver prints to be albumen. The proposition that albumen is a cause of fading has often been made before, but with the announcement that a discovery has been made, some proofs of a nature that will bear scientific investigation are naturally expected. No such proofs, however, have been produced, and as it is sometimes as useful to assist in exploding old fallacies as in promulgating new discoveries, it may be worth while to discuss the question with the help of what argument can be drawn from past experience and observation. The wide-spread impression that albumen is somehow the cause of fading of silver prints appears principally to rest upon the foundation that silver prints generally fade, and that silver prints are generally printed upon albumenized paper. Mr. Barnes does not carry the evidence much farther; his opinion, which I submit does not amount to a discovery, being apparently formed from his own observations of the fading of certain photographs, and some of these observations point in the opposite direction, as showing the preservation of albumen prints that have been in existence for more than thirty years.

The argument by which the permanence of these thirty year old prints is made to support the contention that albumen is the cause of fading of silver prints will not, I submit, hold good. It is stated that the albumen paper of thirty years ago was not as that of to-day, and that the albumen was then only employed to avoid the grain of the paper, and was used very sparingly. These propositions cannot, I think, be accepted as proved. My own remembrance is to the effect that paper was then very nearly as highly albumenised as it is at the present. In Hardwich's "Photographic Chemistry," published in that year, the only two formulæ given for albumenising paper contain, one: three parts of albumen to one of water, and the other, pure albumen with the chloride beaten up in it, and no added water at all. Supposing, however, the three-fourths albumen solution to have been used, that is still a proportion which cannot be called a very sparing one, and in any case, if the essential cause of fading is albumen, this cause might be expected to operate wherever albumen is present in sufficient quantity to give its name and character to the paper.

Mr. Barnes's statement that he has never yet seen a faded print upon salted paper is rather surprising. Salted paper has been so little used of late years, that one may very well not have seen any at all for some time past; but I should think that all those photographers whose experience goes back to the times when salted paper was in common use can recollect many instances of fading in these productions, perhaps nearly as many in proportion to the total number of salted prints made as they can of faded albumen prints of that time. I say of that time because, before cartes-de-visite became general, the production of paper prints was so limited that they probably received more thorough washing, in the shape of several turnings over by hand, than was afterwards the case. If, however, the proportion of faded to durable prints should prove to be somewhat lower with salted than with albumenized paper, such a circumstance would not justify the sweeping conclusion that albumen is the cause of the fading of silver prints. Toning proceeds much more readily on salted than on albumen paper, and the plain prints are, therefore, more likely to receive what protection is derived from a considerable substitution of gold for silver. Again, some photographers—notably Hannah and Kent, of Brighton—were in the habit of finishing the washing of salted paper prints with boiling water, a proceeding which not only ensured a more perfect removal of the hypo-sulphite of soda, but of the drying material of the paper. Albumen prints, it was found, would not endure this treatment without too much loss of tone. As to the suggestion that a print of ten or twelve years old, on highly glazed albumen paper, is not to be met with, it may be said in reply that prints of that character, and of considerably greater age, have often been produced at meetings of societies—prints which were in a perfectly good condition, showing no sign of that deterioration of the albumen itself to which Mr. Barnes refers.

The unfaded albumen prints just mentioned have mostly not been mounted ones, and this brings us to another consideration, namely, that mounting might, with at least as much justice as albumen, be set down as the cause of fading of silver prints. The instances in which unmounted prints have been found to remain unchanged, whilst mounted ones have faded badly, are so numerous as to leave no doubt that some mounting is, at all events, a cause of fading. Further striking instances of this have been found in photographs which have been mounted at the edges only, and in which these edges have faded badly, whilst the rest of the picture remained but little altered.

As an alternative proposition to the one that albumen is the cause of fading, it was once suggested that the fading was due, not to the albumen itself, but to gelatine which had been added to the albumen bath as a sort of adulterant. A circumstance which seems to give some colour to the charge as against gelatine or other sizing materials, used probably in the paper and not with the albumen, is that prints kept long in the washing water are apt to show weakness, as if some kind of fading had already commenced. In many houses it has been noticed that the prints taken out of the water on Monday mornings are often rather inferior to those that have only had one night's washing. Gelatine, we know, is apt to decompose when left in water for a couple of days, but with coagulated albumen there is, I believe, no proof of such a condition being set up.

As a further argument against picking out albumen as the cause of fading, it may be noticed that in the Photographic News recently Dr. H. W. Vogel says that it is well known that aristo prints—which contain no albumen—are not more permanent than other silver prints.

It appears, therefore, that not only is there no proof that albumen is the cause of the fading of silver prints, but that the facts point to some other condition or conditions than that of its presence as the real cause. What these conditions are may some day be laid down, but a useful preliminary to their discovery is the abandonment of any indefensible opinions that may have been entertained.

Exhibition at Royton, Lancashire.—An exhibition of photographs, photographic apparatus, and lantern slide transparencies, will be held in the Town Hall, Royton, February 5th to 20th, 1890, in aid of the Church Restoration Fund. "Evenings with the lantern" will be given as often as can be arranged. Gold, silver, and bronze medals and other awards will be offered for competition. The judges will be Messrs. Charles W. Hastings, Paul Lange, and Watmough Webster. Communications requiring a reply must contain a stamped and addressed envelope, and be sent to the Rev. J. George Gibson, S. Paul's, Royton, near Oldham.

PATENT OFFICE LIBRARY

Notes.

The special artist who wants to make use of photography ought to know a little of the art if he wishes to save himself trouble. The experience lately of a well-known artist in South America is not encouraging. Thinking he could rely upon the local photographers to develop his plates, he did not trouble to provide himself with taking materials for developing, and, to his disgust, found, on taking his dark slides to the local man, that the latter had not the proper chemicals, and had to do the best he could with make-shifts, certainly not to the benefit of the negatives. When we say that the photographic campaign closed with the loss of the camera itself, which was left behind by some careless mule packer, it is easy to believe that the artist in question was not wholly satisfied with photography as an assistant.

The purchase of photographs of men of note indicates a sort of hero worship, but if the motive of each purchaser could be ascertained, it is doubtful whether it would quite accord with the admiration of the particular talent which has made the hero in question famous. For instance, it is said that more photographs of Walter Besant are sold than those of any other novelist of the day. Next to Mr. Besant comes Dr. George Macdonald. Whatever may be Mr. Besant's position as a novelist—a very high one, no doubt—certainly Dr George Macdonald cannot lay claim to being what is called a "popular" novelist. His rather dreary and altogether too religious novels have their readers, but the majority of those readers would not like to be called "novel-readers." But Dr. Macdonald has a personality as a lecturer and preacher, and for this reason it is his photographs are bought. Mr. Besant also has lifted the veil that shrouds the novelist as a rule, and his name is associated with the People's Palace at Mile End. His photograph, therefore, is popular, not because of his writings, but because of the personal interest in him. The sale of photographs of literary men must, we are afraid, be very small. How many people possess photographs of Dickens, of Thackeray, of Ruskin, of Tennyson, and of a dozen lesser lights we could name? The number, we fancy, is not large.

A capital lecture on the fashions of the last thirty years could be given by the aid of photography. The materials furnished by half a dozen family albums taken at random would suffice. From the crinoline and bell sleeve, the "kiss curl," the peg top trousers, and dog collars of the "Sixties," down through a long series of changes to the V-cut bodices and fur collared great coats of to-day—what a kaleidoscope of style would be presented! A good collection of such photographs made into lantern slides, and illustrated by some bright, slightly caustic remarks, would make a lecture sure to take. Music of the period might accompany the pictures. We commend the notion to Mr. Oscar Wylde.

A New York insurance office has been sending broadcast a quarto volume with reproductions of photographs of its head office, and its pages contain the following sentence:—"The accompanying engraving will convey some idea of the structure, but the building has never been successfully photographed, for the reason that the camera has not yet been constructed that will take within its focus the entire edifice, and within the space in which it is possible for a photographer to operate." We take this to mean that the street is so narrow that the camera cannot be got sufficiently far away to take in the whole edifice. But this might happen where the edifice was a small one, and is really no evidence of the extent of the building. Of course, the public do not know this, and so a very ingenious use has been made of inability of the laws of optics to comply with advertising requirements.

If the insurance office really wants a front view of its building, the difficulty could be easily got over by taking two or even three negatives at different elevations, and joining the three by careful printing. This method has constantly to be adopted in the City of London in respect to the preservation of what is known as "ancient lights." When a house is about to be pulled down, the owners of the houses opposite are immediately on the alert to preserve a record of the old structure, so as either to prevent the blotting out of the "ancient lights," or in order to sell the "lights" for a consideration.

In a sarcastic notice of the insurance volume already mentioned, a city financial journal spots a weak point in photographs of interiors intended to be advertisements, which we have before noted in these pages—namely, their usually bare and empty aspect. The journal in question remarks, "There does not appear to be much law required in the Mutual office, for all the chairs in the main section of the law department are unoccupied. Perhaps, though, there was a trotting match to be looked after on the day the photographer visited the lawyer's office. The president's room is likewise vacant. Not much business is doing in the 'supply department, looking east,' and, from the absence of life in the boiler rooms, hydraulic-pump rooms, and dynamo room, we are constrained to believe that the wicked photographer must have visited them on a Sunday." There is a good deal of truth in this. If employés cannot be depended upon to sit still for the required time, how would it do for photographers who have many commissions of this kind to have a staff of professional sitters whom they could take about with them and place in the required attitudes, with pens in their hands and ledgers before them, where the interior of a bank is to be photographed, or as diners and waiters, when it is the interior of a restaurant that is wanted?

The photographer who photographed the fortunate winner of the first prize in the soap beauty competition has not, so far as we know, received recognition. The winner, on the other hand, has been overwhelmed by public and private notice. She has received some two hundred letters, two of them containing direct offers of marriage, several of them asking her whether she had plighted her troth, and a large number from photographers appealing to the young lady to give them a sitting. The original photographer, as we noted at the time, has been strangely overlooked. Why does he not step boldly forward and disclose himself? Surely such a splendid opportunity for advancing one's business has never happened to a photographer before.

There is no reason why postage stamps should not in their way preserve an authentic record of the features of monarchs and rulers. The stamps themselves may perish, but the dies are practically indestructible, and in after years would be invaluable if only the portraits are faithful. For instance, how great a curiosity will be the postage stamp now about to be circulated in Spain. The stamp bears a *fac simile* of a photograph of the infantile monarch, and will in all probability be but a short time in circulation, as His Majesty will soon grow out of babyhood, and, of course, will require to be represented as he is, and not as he was. A glance through a stamp album shows how far in advance of England are the Continent and America. The head of the Queen is purely an imaginary one. If we want to see a real portrait of her on a stamp, we must go to Canada, where a reproduction of the well-known photograph, with the widow's weeds and hand to the face, appears on the bill stamps. America gives excellent portraits of the various Presidents, and so do Austria, Italy, Belgium, Portugal, and even Siam and Samoa.

Photographic Society of Great Britain.—A technical meeting will be held on Tuesday, November 26th, at 5A, Pall Mall East, at 8 p.m.

Japanese Lacquer.—A paper on Japanese lacquer, read lately by Mr. R. Hitchcock, before the Chemical Society of Washington, has been printed in the "Proceedings" of the United States National Museum. Japanese lacquer is the product of a tree, the Rhus vernicifera, which grows throughout the main island of Japan. It attains a large size, the trunks sometimes measuring a metre in diameter. It is said the tree will live for forty years, but only comparatively young trees are valued for the production of lacquer. Having yielded for several years, they are cut down, the lacquer extracted from the branches, and young trees take their places. "It gives a surface to wood," Mr. Hitchcock says, "much harder than our best copal varnish, without brittleness. It takes a polish not to be excelled, which lasts for centuries, as we may see in the old treasures of Japan. It is proof against boiling water, alcohol, and, indeed, it seems to be insoluble in every agent known. It is the best possible application for laboratory tables. I have a set of photographers' developing trays that have been in use for more than a year, and I find them excellent and cheap. In Japan it is used for many household articles." Unfortunately, lacquer poisoning from the fresh material is a serious danger. According to Rein, the poison is a volatile acid, and Mr. Hitchcock suggests that it might be removed by a heat that would leave the lacquer uninjured.

NEW METHOD OF PREPARING CARBON TISSUE FOR TRANSPARENCIES.

BY DR. E. GUNTHER.

Transparencies on glass produced by means of a suitable pigment-tissue are, without doubt, exceedingly charming, rendering all the detail and beautiful gradation of tone of good negatives in a most perfect manner. It is, however, very difficult, as many will have experienced, to find in the trade a pigment-tissue sufficiently saturated with colouring matter to answer the purpose perfectly. Richness and depth of tone, as well as the permanency of the pigment employed, leave much to be desired, generally, in the papers of the trade.

Many operators will, therefore, be glad to see that a reliable and approved process for preparing a suitable carbon tissue for this purpose has been recently published, by such an authority as Dr. Szekely, of Vienna. We have ourselves repeatedly tried the process with satisfactory results, and can therefore highly recommend it to all photographic operators. It is true, the preparation of carbon tissue in small quantities is rather troublesome—at least, more so than to prepare albumenized paper—as it requires the use of warm solutions; but the results are so beautiful, and the after process, if the tissue is once made, is so simple and certain, that none will regret having undertaken the work.

The tissue should be prepared only with such colouring matters as are permanent. How quickly many of the finest water-colour paintings fade away in the light is well known. The most permanent colouring matter, and the one which best resists all chemical reagents in the temperature of our atmosphere, is finely-divided carbon, which forms the basis of the colour-mixture in the form of lampblack, Indian-ink, and so on. To impart to this colouring matter a warmer and more pleasing tone, it is mixed with peroxide of iron (English red) in the following manner:—

Gelatine	250	grammes
Isinglass	25	,,
Water	3,500	c.c.
Lampblack	30	,,
English red (peroxide of iron) ...	50	,,
Glycerine	80	,,

The above quantity is sufficient for eight sheets of Saxe paper of the usual size.

The gelatine should neither be too hard nor too soft, and the quantity of the glycerine should be about equal to the volume of the colouring matters. The black colour is rubbed down on a stone slab; then the glycerine is added and the rubbing continued. Sufficient of water is added to obtain the required consistency, and the desired degree of fineness having been attained, the colour is, by means of a horn spatula, collected at a corner of the slab. The rubbing down of the red colour is done with water alone. When sufficiently fine, the two colours are well mixed on the slab. During this time the isinglass, cut into small pieces, may be allowed to soak in about 200 c.c. of water; it is then boiled, stirring all the time, until but fine skins are floating in the somewhat muddy solution, when the whole is strained through linen. This solution is poured into the gelatine, which has been dissolved in lukewarm water, and it is then ready for being mixed with the colouring matter. The colour is put into a large porcelain dish, and the warm gelatine solution gradually added in small portions, stirring all the time with the pestle, until

an even, homogeneous mixture has been produced. The whole is at once strained through moistened flannel, when the mixture is ready for coating.

The paper to be prepared is immersed in a dish filled with cold water, then it is at once removed and squeegeed down on a previously levelled plate glass by means of an india-rubber squeegee to flatten it and to remove all the excessive water. The edges of the paper are bent round to the width of about half an inch, and joined at the corners by turning back the edge to a sort of dish. This done, the measured quantity of the lukewarm gelatine mixture required for one sheet of paper is at once poured in, and, if necessary, evenly spread by means of a piece of writing paper; then the surface of the pigment paper is at once stripped off by means of strips of tissue paper, to remove all the air bubbles which may have been produced during coating. After the gelatine film has set, the edges of the paper may be stretched and the tissue placed on a small frame covered with book-muslin, and fastened by means of drawing-pins to the edges of the frame. The whole is then suspended in a well-ventilated, not too warm a room, protected from dust.

The sensitising of the pigment-tissue is done, as is known to all operators, by soaking the paper in a solution of bichromate of potassium. As the paper is but little sensitive to light in the wet state, it may be prepared in subdued daylight; but before the paper begins to dry, the room must be quite darkened, as the dry pigment-tissue is much more sensitive to white light than the sensitised albumen paper. The sensitising bath should consist of a solution of pure bichromate of potassium of 2½ to 3 per cent., and, more especially in warm weather, it should be used for one day only. It is well to add to the bichromate solution some liquid ammonia, until it smells slightly of the ammonia; the solution can then be used over again, provided it be always filtered before use. The sensitised tissue should be dried in not too warm a room, well ventilated. High temperature produces reticulation—a network structure—in the pigment-tissue, which possibly destroys the fineness of the transparency.

The negative on the film side is provided with a correct paper mask. As the pigment picture cannot be examined during the printing, it is necessary, in regulating the exposure, to use a photometer. Vogel's photometer answers well for the purpose. It is printed until the photometer shows 18 to 22 degrees, but that depends entirely on the density of the negative. The exposed tissue is placed with a well polished glass plate, or with a glass plate coated with thin plain collodion, in cold water; both are taken out, pressed together by means of the squeegee, and, after a few minutes, placed in warm water, developed, alumnised, washed, and allowed to dry. If the prints are not vigorous enough they can be intensified, before drying, with pyrogallic acid and silver, like an ordinary collodion negative. Mawson's intensifier has always given us good results; it consists of the following two solutions:—

Solution No. 1.	
Pyrogallic acid	10 grains
Citric acid	25 ,,
Distilled water	2 ounces
Solution No. 2.	
Silver nitrate	20 grains
Distilled water	2 ounces

Small portions of the solutions Nos. 1 and 2 are mixed together in equal quantities just before use.

The retouching, where necessary, is done in the more delicate parts with a soft lead pencil; in the parts, however, requiring strengthening, or where shadows are to be deepened, colours should be applied, coming as near as possible to those which have been used in the preparation of the pigment paper. The finished image having been placed on the ground glass plate which has been designed for the purpose, and which may eventually be provided with a simple ornament, the projecting border of the glass is cut off by means of the diamond, and, after narrow, thin strips of cardboard have been inserted, it is bordered with thin gummed paper, and, surface down, placed in the small metal frame prepared for the purpose, and which is provided with four hooks; finally the projecting border is bent down by means of a fleshing knife, when the transparency is ready for hanging up.

PYROCATECHIN DEVELOPER.

Dr. Carl Srna gives the following formula for a pyrocatechin developer:—

Solution A.	
Sulphite of soda ...	100 grms. (3 ozs. 2 drs.)
Distilled water, warm ...	400 c.c. (13 fl. ozs. 4 drs.)
Solution B.	
Carbonate of soda ...	100 grms. (3 ozs. 2 drs.)
Water	400 c.c. (13 fl. ozs. 4 drs.)

Take 30 c.c. (1 fl. oz.) of A, 60 c.c, (2 fl. ozs.) of B, and add 1 gramme (15 grains) of pyrocatechin. This seems to act much more energetically than a similar developer made with hydroquinone.—*Wilson's Photographic Magazine.*

Photographers' Benevolent Association.—On the 15th inst. the committee were again engaged in considering alteration of the rules of the Association, and made fair progress. Mr. J. D. O'Connor was elected a member of the committee.

A Photographic Competition is to be held in which all negatives must be the work of the competitor on Messrs. R. W. Thomas's plates or films, excepting in three classes, where it is only compulsory that the Pall Mall Lantern transparency or opal plates be used. Intending competitors are required to sign a form of declaration, and are requested to specify the kind of plate used. Notice of intention to compete must be sent to the Company's office, on or before March 1st, 1890, accompanied by the form of declaration. The prizes will comprise a gold medal, or its equivalent, value £15 in cash; silver and bronze medals; and certificates of merit. Forms of entry and declaration may be obtained at 10, Pall Mall, London, S.W.

Edinburgh International Exibition.—In 1886 the third of a series of international exhibitions was held at Edinburgh, and an exhibition on a still more extensive scale than any of its predecessors will take place in 1890. The Exhibition, as formerly, is under the patronage of the Queen, and the Marquis of Lothian, Secretary of State for Scotland, is again the president. The vice-presidents include the Lord Provost of Edinburgh, the Lord Provost of Glasgow, the Lord Mayor-Elect of London, Mr. Edison, and Sir John Fowler, the engineer of the Forth Bridge. The chairman of the executive council is Sir Thomas Clark, Bart., ex-Lord Provost of Edinburgh, and of the London committee Sir George Hayter Chubb. The executive has secured a site of about ninety acres in extent, within easy walking distance of the centre of the city. It is anticipated that the opening of the Forth Bridge—the greatest engineering work in the world—early in 1890, will attract numerous visitors, in addition to the great stream of tourists which annually visits Edinburgh. A great number of the most interesting exhibits now at Paris will be shown at Edinburgh, including samples of the extensive and unique collection of Mr. Edison. At this Exhibition, photographic apparatus, appliances, and materials, will be exhibited in the Education and Liberal Art Section, Class 89.

Patent Intelligence.

Applications for Letters Patent.

17,998. Thomas Colley, 18, Lansdowne Circus, Leamington, "Dark Slide, Swing Frame, and Indicator."—November 12th.

18,139. Henry Duncan, 45, Southampton Buildings, London, "Apparatus for the Microscopical Examination of Photographic Pictures."—November 13th.

18,166. W. J. Lancaster, 6, Livery Street, Birmingham, "Cameras."—November 14th.

18,167. W. J. Lancaster, 6, Livery Street, Birmingham, "Photographic Camera Shutters."—November 14th.

18,224. H. G. M. Conybeare, 24, Southampton Buildings, London, "Photographic Shutters."—November 14th.

18,314. J. J. Walker, 127, Long Acre, London, "Rendering the Exposed Edges of Mirrors or Glasses more or less invisible."—November 16th.

18,330. W. R. Baker, 9, Belmont Villas, Wallington, Surrey, "Camera Stands."—November 16th.

Specifications Published.

8,274.—*May 18th*, 1889. "Focussing Photographic Cameras." Christopher Obee Ellison, 62, Dale Street, Liverpool, Architect.

The use or attachment of a mirror or reflector to the outside of any kind or make of cameras having a focussing plate or screen at the back, so as to show the intended view as clearly as seen thereon, but the right way up as in nature instead of upside down as on the focussing screen itself, enabling the operator to artistically arrange and focus the subject in any easy graceful position, instead of the fatiguing and cramped attitude now so well known, and that without any change in or enlargement of the cameras, or the use of screws, levers, or other appliances liable to get out of order, and doing away entirely with the covering of the head, shoulders, and camera with the black sheet so annoying to lady and gentlemen amateurs.

The mirror or reflector to be held or attached with rubber bands or other means to the back of the camera, so as to allow of the correct angle being obtained, and give play during focussing, and also allow of the mirror or reflector being swung out of the way when not in use, or laid flat against the camera for travelling, the light being kept therefrom by silk or other light material, or even a pocket handkerchief, so arranged as to be used with or without eye-piece or focussing glass, single or double, as preferred.

The mirror or reflector may also be hinged or otherwise attached to the frame of the focussing screen, so that both will swing out of the way together after focussing and remain ready for instant re-use, or lay against the camera as above, leaving no loose or unattached parts.

What I claim is:—

1. The focussing of any camera by means of a mirror or reflector on the outside thereof, showing the subject to be photographed exactly as upon the focussing plate, only the right side up, as in nature, and seen from the top instead of the back of the instrument, without any alteration or enlargement of the camera, the necessity for the use of any special camera, the use of screws, levers, or other appliances likely to get out of order, and without covering the head and shoulders with the black sheet so annoying to lady and gentlemen amateurs.

2. The attachment of a mirror or reflector to the frame of the focussing plate so that, after focussing as above, both reflector and focussing plate can be easily swung out of the way together ready for instant re-use—leaving no loose parts to get mislaid—or laid flat against the camera for travelling.

3. The reduction of the weight of apparatus to be carried, and greater freedom from vibration of camera, by the use of shorter legs, owing to focussing from the top instead of the back of the instrument.

12,343.—*3rd August*, 1889, "Mounting Photographic Lenses." David William Noakes, 9, Billingsgate Street, Greenwich, Kent, Manufacturing Optician.

My invention relates more especially to double or combination lenses where the stops, or diaphragms, or exposure shutters are introduced between the lenses. Hitherto most lenses fitted with a series of stops or diaphragms have been so mounted that the stops have been introduced between the lenses by means of a slot cut in the lens mount, with the consequent tendency of the light to leak in to the interior of the lens. Again, when exposure shutters are used, especially those working between the lenses, and without means of adjustment so as to reduce or enlarge the extent of their opening, there has been difficulty in limiting the aperture of the lens to the intensity ratio required. To obviate these and other defects I

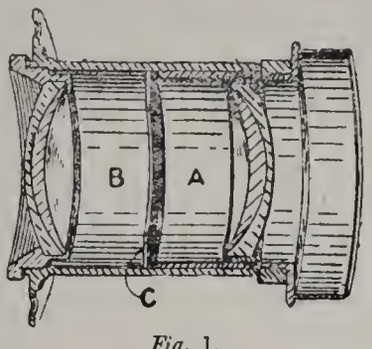


Fig. 1.

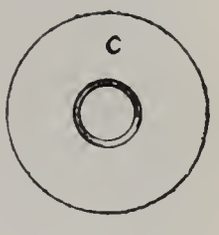


Fig. 2.

mount one or more of the lenses of the combination—preferably the front lens or lenses—in a distinct and separate tube marked A in the drawing fig. 1; this is made to fit the outer or jacket tube B in such a manner as to withdraw easily; a stop of the largest aperture intended to be used is fixed at C. Others stops of varying intensity ratios are easily introduced by withdrawing the tube A, and inserting a stop of the character and shape of C, fig. 2, and then replacing tube A in its working position.

The same procedure is also adopted to introduce the stops

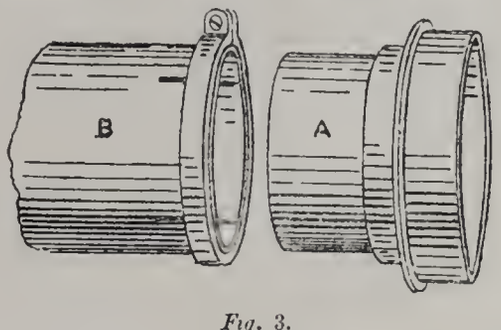


Fig. 3.

when an exposure shutter is fixed to the body of the mount or to the front lens, thus enabling any of a series of stops to be instantly introduced without displacing the shutter.

When the lenses are of a large or heavy character, in order to make the inner tube A fit the outer tube B in such a manner that the inner tube cannot slip out by means of its own weight or being inaccurately fitted, I mount on the outer

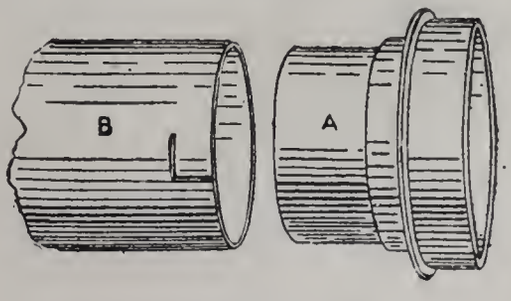


Fig. 4.

tube B, fig. 3, a divided brass band having two ears or lugs which are drawn together by means of a screw, the outer tube B being slotted in several places to admit of sufficient contraction. Or in some cases I fit on the inner tube A a small stud which engages in a bayonet joint cut in the outer tube B, as shown at fig. 4.

I claim—

1st. The method of mounting one or more lenses of a

double or combination lens in an inner tube that can be withdrawn and replaced readily.

2nd. The mode of tightening the outer tube by means of a slit band and set screw.

3rd. The mode of locking the inner to the outer tube by means of a pin engaging in a bayonet slot.

12,727.—13*th Aug.*, 1889. "Improvements in Astigmatic Eye Pieces." JOHN THOMSON KING, 4, Clayton Square, Liverpool, Patent Agent. Communicated from abroad by JOSEPH KORNBLUM, Optician, JOHN ALFRED BRASHEAR, Manufacturer of Instruments of Precision, and PARK PAINTER, Iron Manufacturer, all of the City of Alleghany, State of Pennsylvania, United States of America.

My invention is designed to correct, in the use of optical instruments, the defect known as astigmatism, caused by difference in refraction of the horizontal and vertical meridians of the observer's eye, and which more or less completely prevents the efficient use of such instruments as ordinarily constructed, by persons whose eyes—one or both—have an abnormal difference of curvature of the two meridians of the cornea of the same eye. My improvement may be applied to telescopes, microscopes, lorgnettes, opera-glasses, field glasses, levels, and similar instruments, but for convenience I describe it in the specification as applied to an opera-glass.

My improvement consists in the application to the eye-piece, or upper lens of an opera glass or similar instrument, of a secondary lens placed inside the tube of the instrument, the character of the secondary lens being such as to correct the effect of astigmatism of either or both of the human eyes in the use of such instruments.

My improvement further consists in the construction and arrangement of the parts, so that the astigmatic correcting lens may be readily adjusted by the user to suit the peculiar character of his eye or eyes, and so that in a binocular instrument, such as an opera glass or a lorguette, the astigmatic correcting attachment may be thrown out of use on either or both sides of the instrument, so that it may be equally adapted to use by a person whose eyes are normal, or by a person one only of whose eyes is affected with astigmatism.

The secondary lens which I use, instead of being of the ordinary shapes, such as double convex or double concave, or plano-convex or plano-concave, has parallel faces in a section in one direction, and plano-convex shape in a section at right angles to the first plane of section, or, in other words, it is a segment of a cyliuder. This lens is made of circular shape, and of any desired diameter to suit the instrument, being usually of about the same diameter as that of the primary lens or eye-glass of the instrument.

In cases where the astigmatism of one or both eyes is merely an abnormal difference of curvature of the cornea in the two meridians of the eye—the meridians being at right angles to each other—the problem of constructing an instrument to cure the defect would be comparatively simple; but as astigmatism of the human eyes is very frequently not of the regular type, the greatest difference of the curvature of the cornea occurring in the planes which are not at right angles to each other, it becomes necessary to a really practical and useful instrument, that the line of the parallel faces of the secondary lens should be adjustable to any desired angle to the vertical line of the primary lens, and this is very important in a binocular instrument to accommodate cases of different angles of astigmatism in the two eyes of the observer.

In order to permit of such adjustment by the user, I have devised a construuction of the eye piece of the instrument, such that the astigmatic or secondary lens, either in an instrument to be used with one eye or with two eyes, may be readily adjusted to any degree af astigmatism.

After describing his drawings, the inventor claims:—

1. The combination with the eye-piece or ordinary primary lens of optical instruments, such as hereinbefore set forth, of a semi-cylindrical secondary lens, capable of rotation on its axis within the secondary lens holder.

2. The combination with the eye-piece or ordinary primary lens of a telescope, opera-glass, or similar optical instrument, of a secondary lens or eye-glass of a semi-cylindrical shape, set in a frame or secondary lens holder, so as to be rotateable on its axis therein, such secondary lens holder being pivoted to the instrument to permit the secondary lens being turned in or out of the line of vision.

3. In a binocular telescope, lorgnette, or opera glass, the combination with the ordinary object-glass and eye-glass at each end of the instrument, of a semi-cylindrical lens set near to and substantially parallel with the eye-glass, and set in a circular frame capable of rotation on its axis in an annular frame or auxiliary lens holder, which is pivoted to the frame of the instrument so as to be readily turned into or out of the line of vision of the instrument.

4. In combination with eye and object glasses of a telescope or similar optical instrument and the frame carrying the same, an annular lens holder for carrying a secondary astigmatic lens, within which frame the said lens is capable of being turned on its axis, and a graduated scale for indicating the angle of astigmatism when the primary and secondary lenses are adjusted in use.

15,068.—*October 19th*, 1888. "Improvements in Photographic Cameras." THOMAS PERCY GRAHAM, St. Mary's, Bedford, Photographer.

The invention consists in the improvement in the appearance of photographic cameras, so as to render the same an object of amusement and interest, especially to children when having their photographs taken, and dispenses with the necessity of fixing their attention upon outside objects in order to get the natural expression in photographs. For this purpose he places the camera behind or in any other suitable position, an ornamental structure of attractive and interesting design in which is a door for receiving the lens tube, and above this said door or in any other suitable position he arranges an interesting device, such, for instance, as a cuckoo clock or any other pleasing toy, to which motion or articulation may be given by electrical, mechanical, or pneumatical means.

The object of the invention will be seen from the following directions. The sitter to be photographed is placed before the camera in the usual way, and told to look full at the camera face, the design of which being sufficient to create an interest and retain the natural expression of countenance. The cuckoo or other device is then set in action or motion on the camera, which of course attracts and retains the attention of the sitter, during which the lens is uncovered and the photograph taken. The drawing accompanying the specification shows an ornamental stand behind which the camera is placed, and shows a trap door, from which appears a cuckoo, such as is exhibited in the cuckoo clock. He does not bind himself to this device. He may use any mechanical animal or toy which would be of interest to children.

He claims:—

The arrangement and combination of the camera used in photography, with an ornamental structure on which any animal figure or device is made to perform, by either electrical, mechanical, or pneumatical arrangement connected therewith.

16,016.—*November 6th*, 1888. "Adjustable Frames for Holding Magic Lantern Slides." FRANCIS BEAUCHAMP, Lawrence Cottage, Rose Lane, Romford, Engineer.

To provide means for the adjustment of magic lantern frames or the like to slides of different sizes.

For this purpose I provide a rectangular skeleton frame made of tubing square or otherwise in section, the long ends of the frames have their faces cut away, forming slots to hold one, two, or more glasses or slides, and are connected by tubes working in each other telescopically and provided with a spring or elastic band or any other suitable device for clutching the glass or glasses firmly in the frame.

The said frame is provided with side springs for holding it firmly in front of the condenser when exhibiting.

I sometimes use a jointed frame made of wood or any other suitable material which is held together by a spring or springs or ordinary catch for the purpose of holding various sized glasses or slides, and with sliding end or ends for the purpose of adjustment as before described.

WHITE CRYSTALLINE EIKONOGEN.

Messrs. Marion and Co. have forwarded us a newly arrived sample of white crystalline eikonogen, which is a great improvement, so far as appearance goes, upon the earlier specimens of this new developing agent, the merits and demerits of which are now the subject of so much contention.

The following are the latest formulæ issued by the German makers for eikonogen developing solutions:—

For portraits and lanscapes:—

1.—Four parts sulphite of sodium are dissolved in 60 parts water. To this solution add 1 part of eikonogen, which has been previously finely powdered by means of a mortar, and dissolve by shaking. Should a mortar be wanting, the solution can also be prepared in the following manner:—To 4 parts sulphite of sodium and 1 part eikonogen, which are placed either in an earthen or enamelled vessel, 10 parts water are added, and the dissolution brought about by boiling and stirring. The hot solution is then poured into a flask containiug 50 parts cold water.

2.—Three parts crystallized carbonate of soda are dissolved in 20 parts cold water. Immediately before developing, mix 3 parts of solution No. 1 with 1 part of solution No. 2.

For instantaneous photographs with detective cameras (about $\frac{1}{50}$ second exposnre). For this purpose formula No. 1 is to be used, with the exceptiou that the crystallized carbonate of soda is substituted for the same quantity of carbonate of potassium.

For very short instantaneous exposures ($\frac{1}{100}$ of a second) and for increasing the power of the developers Nos. 1 and 2 in cases where the plate has not been sufficiently exposed.

Five parts sulphite of sodium, 2 parts carbonate of potassium, and 1 part eikonogen are placed in an earthen or enamelled vessel, and to these are added 30 parts water, the dissolution being brought about by boiling and stirring.

After having been allowed to cool, the developer, which is now ready for use, is preserved in a tightly closed bottle.

The developer, if it has been prepared exactly according to the above method, is stated to keep in good condition for a long time.

Plates which have been developed by means of eikonogen should be well washed, and will greatly benefit, it is said, by being fixed in a bath composed of:—

Hyposulphite of soda	4 parts
Bisulphite of soda	1 part
Water	20 parts

The advantages of nsing this fixing bath, which was first devised by Mr. Berkeley, are said to be:—

1. The negatives have a perfect tone, which enables very fast printing. 2. The new fixing bath remains, even after frequent usage, clear and water-white. 3. The plate need not be bathed in a solution of alum before fixing, and it is therefore not possible that the plate should be covered with a white layer, in consequence of insufficient rinsing.

Should the nature of the plate require that the coating be hardened, then there is no objection to an alum bath being used either before or after fixing, yet the quantity of alum added must not exceed 1 part to each 20 parts of water, as a stronger solution might cause the gelatine to blister.

The bisulphite of soda can be replaced by ordinary neutral sulphite of soda, the same as is used when developing with eikonogen, provided that the bath be acidulated by means of a little sulphuric acid.

In this case it should be made up in the following manner:—

Dissolve 20 parts hyposulphite of soda and 5 parts neutral sulphite of soda in 100 parts water, to which add slowly 1 part concentrated sulphuric acid.

This bath, if properly prepared, answers the same purpose as the other, also remaining clear and water-white.

The paper, having been exposed to the light, is soaked in 40 parts water. The paper is then taken out, and 10 parts of a solution prepared according to formula 3 are added to the bath. Should the picture be slow in appearing and the details not be perceptible, then add gradually an additional quantity of solution 3. If the paper have been exposed too long, only a small quantity of solution 3 must be used from the commencement. The addition of bromide of potassium is often the cause of the details not being forthcoming; it should therefore not be employed. After developing, the picture should be well washed, and then placed for several minutes in an alum bath; whereupon it is again washed and fixed. The manufacturers say that the crystallized soda employed in the formula need not be pure, but the same quality that is used in every household.

MR. W. K. BURTON IN JAPAN.

Mr. George Davison has received some letters from Mr. W. K. Burton, and the following two quotations therefrom have been published in the *Camera Club Journal*:—

"I have had very hard work through all the heat of summer, and am now established for a few days to recuperate on a little island, or rather isthmus, that bears the name Enoshima. I am established in the minutest house I think I ever saw, like a doll's house stuck in a niche at the top of 100 steps in the face of a cliff, and looking down on the loveliest bit of sea and landscape that ever human eyes could gaze upon. I spend the time in getting down the steps to have a swim in the sea, in lying on the mats smoking and reading, and in hammering away at my type-writer, which is absolutely the only piece of furniture that there is in the house, except the said mats. I am lightly and airily arrayed in a 'fundoshi,' which is, in truth, only a piece of somewhat broad tape wound around the waist."

Replying to some remarks in a previous letter from Mr. Davison to him, he says:—

"Various of my friends and myself have tried silver sensitising by different methods of many kinds of Japanese paper, but with less success than we expected. In spite of its great beauty, there was always something wanting, due, I believe, to want of regularity in the texture. Far the best results that I have seen have been got by an American on some very thin, almost transparent, silky paper, of which I should send you a sample were I at home.

"I quite agree with you about reform in printing matters. My own latest fad is rough drawing paper, printed with a wide margin. I think the results are very fine for any work 12 by 10 or larger. From 12 by 10 I print with an opening as nearly 12 inches long as the plate will allow, and about 8½ inches wide—that is to say, for most subjects. Many, of course, need variation, both in shape and size of opening. I leave a margin to make the size up to about 16 by 11. The margin may be either tinted or white, as suits the subject. There is nothing new in this, of course, but I intend to write a bit about it, in the hope that some will be persuaded to try it."

The *Journal of the Camera Club* says: "It is with very great regret that we have to inform fellow members that we are about to lose the valuable help of Mr. E. G. Spiers, who has, since the beginning of 1887, acted as honorary secretary to the Camera Club Company, and has entirely managed the books and other important affairs connected with that office. Members ought to know of the labour, generally thankless, that this kind of work involves."

A NEW PLATINUM TONING PROCESS.*

BY LYONEL CLARK.

Finding, then, that the ordinary platinic chloride was unsuitable for toning, it was only natural at this stage to further follow Willis's example and use the platinous salt. This I did, and my first experiments were made with the ordinary developer as recommended by Willis in his cold-bath platinotype process. My very first trial gave me a very remarkable success, so much so that this developer is a very good toning formula in itself without any alteration. In my first experiments I proceeded exactly according to Willis's instructions; I of course washed the plain paper print to free it from the free nitrate, and then simply floated it over a little of the developing solution spread out over a piece of glass; the toning took place with the greatest of rapidity—in fact, quite as quickly as the ferric oxalate paper, the red-brick colour of the silver organate rapidly giving way to the black of the platinum. When this colour, viewed by transmitted light, had entirely disappeared, the print was fixed and washed in the ordinary way, and an image was left, resembling very closely an ordinary platinotype hot-bath print in colour. I described this process, and showed some specimens, at the meeting of the Camera Club, November 29th, 1888, when Mr. Willis gave his demonstration of his then new cold-bath process.

During the winter I allowed my experiments to lapse, but in the spring, incited thereto by the appearance of Mr. Valentine Blanchard's toning process, which possessed considerable analogies, I continued my experiments.

With the ordinary platinotype paper the chloro-platinite of potassium is not reduced when applied to the paper in an aqueous solution, but requires the addition of a soluble phosphate or oxalate; but with the silver provisional image such is not the case, the platinum being rapidly reduced from the chloropotassic salt without any further addition. It is difficult to say precisely whether any advantage accrues from the addition of the oxalate; when present in large quantities it is injurious, giving a brown or yellowish colour to the delicate half-tones, and when present in small quantities it appears to have no very appreciable effect, so that in my subsequent experiments I have entirely discarded all other chemicals but the chloro-platinite of potassium. At the same time, I am inclined to think that the oxalate may cause a more complete reduction of metallic platinum, and so tend to permanency. Further experiments are wanted in this direction.

The next series of experiments were made to determine the solubility of, or the best amount of water to use with, the chloro-platinite of potassium. It must be confessed that but very little difference is to be found in the resulting prints from any variation in the strength of the developing solution. By difference is meant, of course, a variation in the scale of gradations or intensity curve of the print. The sole difference between using a concentrated solution 1 in 15 (platinotype formula) and 2 grains to the ounce (1 in 218), is that the former completes its work much much rapidly—in fact, the change is almost instantaneous, and the print may be held in the hand and watched during the operation. In such a case it is, of course, preferable to either brush the solution over the print, or else float the print on it. When more dilute solutions are used the toning proceeds more slowly, and the print should be immersed in a bath as in ordinary gold toning. The results, however, will be sensibly the same, with the advantage in favour of the stronger solution, which has a tendency to give slightly more brilliant results. The strength that I practically use now is about 1 in 218—that is, a drachm of the platinotype solution is made up to 2 ounces—with which the toning proceeds quite rapidly enough to enable the developer to be brushed on. I will refer later on to the practical details of the process.

The alkalinity or acidity of the bath demanded also a series of experiments. I do not find any appreciable difference with results when the solution is acidified. The prints have perhaps a slightly blacker appearance, but that is all; but when rendered alkaline, the solution refuses to tone at all, even when a concentrated solution (1 in 15) is employed. This fact was very noticeable; so powerful was the toning solution, that when the wet print was immersed in an acid solution to neutralise the alkali, there was enough platinum left in the pores of the paper to instantly tone the print. Even when only a little alkali is present, I find the toning action is much slowed. In this respect my results differ from those of Gwenthian (Photographic News, vol. ii., p. 263), who says alkaline solution gives brown, and acid ones blue tones.

With regard to the formation of the provisional image, all my early experiments were made on ordinary commercial matt-surface sensitised paper. I have used several brands, some obtained from the Civil Service Stores, some from Marion's, Watson's, and Valentine Blanchard. The last two papers gave decidedly superior results, owing, probably, to their being more richly silvered. It is necessary in this process, if an ordinary negative is to be used, that the paper be somewhat rich in silver, as a good deal of this metal must be reduced in order to obtain a very dense deposit of platinum; in fact, with the same negative, it is not possible to obtain as deep a black on any brand of ready-prepared paper as can be obtained with the ferric oxalate paper of the Platinotype Company. A sufficient intensity for all ordinary purposes can be obtained, however, from any fairly plucky negative.

But I think it is one of the great advantages of this process that it is an extremely easy matter to sensitise one's own paper. It will at once be evident the artistic power this gives one; not alone are we confined to rough or hot-pressed parchment or plate-paper, but we can produce our pictures on silk or cotton, leather or satin, jean, or whatever material the texture of which we think may enhance the effect we have in view. The few examples I hand round, hurriedly and imperfectly executed, will, I hope, give you an idea of the power it puts in your hands.

Although foreign to my paper, I will here give you the salting and sensitising mixtures that I have found most suitable for the formation of the provisional image:—

Salting Solution.

Gelatine	90 grains
Chloride of ammonium	60 ,,
Carbonate of soda (re-crystallized)...	120 ,,
Citric acid (in crystals)	30 ,,
Water (rain or distilled)	10 fluid ounces

Any gelatine will do. The ordinary gelatine of the housekeeper, sold by Nelson in 1 ounce packets, answers very well. The above quantity will be sufficient to make the above solution set into a weak jelly when cold. More or less can be added, according to the taste of the

* Continued from page 761.

operator, or the amount of size the paper already contains. In the place of gelatine, starch or arrowroot may be used (for English animal-sized papers I prefer arrowroot) the resulting tone of the print varying slightly thereby. The quantity of the sizing must, of course, vary with the quality of the paper used. The object of the sizing is to keep the image on the surface; therefore, with a porous paper much, whilst with a glazed paper little, should be used. The above amount will be found sufficient for most papers without causing any objectionable gloss after finishing.

I prefer the ammonium to the other chlorides myself, but sodium or barium can equally well be used, the proportions then being, for the above formula, sodium chloride 72, or barium chloride 138 grains. The paper should be floated on this mixture, or it should be brushed over it, care being taken not to wet the back. It should then be hung up and allowed to dry. In this state it may be freely exposed to light.

(To be continued.)

Correspondence.

EXHIBITION OF REJLANDER'S PHOTOGRAPHS.

Sir,—Would you kindly allow me to state that the committee of the Camera Club proposes that the next exhibition in the Club rooms, after Mr. H. P. Robinson's is closed, should consist of a collection of pictures by Mr. O. G. Rejlander. To ensure a full and representative number of his pictures being brought together, I should be much obliged if any of your readers who possess prints by Rejlander, and would be willing to lend them for exhibition, would kindly communicate with me at the Club. George Davison, Hon. Sec.

Camera Club, 21, Bedford Street, W.C., November 18th.

ORTHOCHROMATIC PHOTOGRAPHY.

Sir,—In your report of the discussion on Mr. Andrew Pringle's paper on Orthochromatic Photography, read at the Camera Club, you have left out part of a word which makes my remarks bear the opposite meaning to the words I actually used. I said "that I had recently used isochromatic plates with*out* a screen against two well known makes of ordinary plates, exposing two plates from the same point of view, under exactly the same conditions of light, &c.; in fact, I had a colour-sensitive and an ordinary plate in each double back, and exposed them one after the other as quickly as I could reverse the back, with the result that the isochromatic plate *without* the yellow screen rendered the various shades of yellows, browns, and greens correctly, whilst in the case of the ordinary plate the different colours were rendered of one uniform shade. You left out the latter half of the word "without," thus making it appear that I used a yellow screen, but as I am strongly opposed to the use of a yellow screen—except for copying paintings, or when photographing landscapes in misty weather, when distances would be lost by the ordinary method—I must ask the favour of your inserting this correction.

Mr. Pringle, in answer to my query as to whether he had found the yellow screen of any advantage when used with ordinary plates, said that there was no advantage whatever gained in colour sensitiveness, whilst the exposure was enormously increased.

I send you per book post a couple of prints of the Fairy Glen, Bettws-y-Coed, one taken on an ordinary and the other on an isochromatic plate—without screen—in which you will see the difference in the rendering of the foliage to which I referred. Birt Acres.

131, *Richmond Road, Hackney, N.E., November 18th.*

[We published that Mr. Birt Acres was "understood to say." His point was missed by several of the listeners.—Ed.]

Proceedings of Societies.

The Camera Club.

November 14th.—Bedford Street, Strand, London. Mr. Machell-Smith in the chair.

Major J. F. Nott, in the course of a paper on "Film Photography," said that a specimen of one kind which he held in his hand was of American manufacture, coated in London by Messrs. Fry and Co., who made their emulsion for such films in two speeds. He then exhibited two negatives taken upon such films in the Paris Exhibition, and which had been exposed upon a scene which presented strong contrasts. He considered the greatest necessity of the photographer to be a roller slide film, and the stripping film was his pet; he had worked it with sufficient success for his requirements, and considered that it should continue to be an article of commerce, even should celluloid roller slide films come into the market. The tendency of high-art photographers, he said, is to employ photo-mechanical processes, and for these reversed negatives are required; such negatives are obtained easily and at once by means of stripping films. Although the stripping film has been long in the market, there are differences of opinion about it; some thought the negatives were not permanent, but he had some finished by the old oiling method, and now as good as on the day they were taken; they would produce lantern slides free from grain. The Eastman Company send them out accompanied by very minute instructions, and he thought that they erred on the side of insisting upon the use of too many chemicals and manipulations. He was informed, however, that those instructions were necessary, in order that the good quality of the films, when properly treated, might be guaranteed. He disliked all the trouble involved in following those instructions, so in his own working he had made everything as simple as he possibly could, and succeeded so well that on the previous night he had been able without mishap to strip a film which was two and a half years old. When developing these films, the opacity due to the thickness of the paper is liable to deceive the operator, and if density were obtained on them before detail, the negative was sure to be hard. He obtained detail first, and afterwards obtained density by means of increased pyrogallol. By holding the film up to the light, and moving the finger behind the film, it becomes possible to tell when the development is sufficient; if he saw his finger very clearly, he knew that there was not enough density; when the finger is scarcely visible, the negative is finished. His experience was that no other alkali than soda could be used with advantage in developing stripping films. He found quinol to be one of the best developers for the emulsion, but after using it he could not strip the picture; the application of hot water then simply melted the gelatine, and caused the negative to sink to the bottom of the dish as a little mud, whilst clean paper is left in the hand. In departure from the Eastman Company's instructions, he took no particular care in cleaning his plates; the plate before them had just been cleaned by the steward of the Club, he did not know how, nor did it much matter; an old negative had been cleaned off the plate. He would not coat it with anything, but would lay the film negative upon it, after soaking the latter in water until it became soft. The film was in a very tender condition, and had to be squeegeed with care; the strokes must be from the centre outwards; if they pressed down the outer edges first, some orifices would be closed, and air near the centre could not escape, and that would be the cause of many failures. The next step was to leave the film and glass near an open window, or in any other suitable place to dry, and the drying must be watched. If the stripping is begun before the film is quite dry, probably the negative will come away from the glass; but if the paper be very nearly dry, but has not quite attained its pristine whiteness, it is in condition for stripping, and hot water has to be poured over it. Should there then be any frilling—and such ought not to be the case—without care at this juncture markings will be found on the finished negative; the remedy is to pour a little methylated spirit over the picture; this will toughen the film immediately, and

it can be spread out properly again on the glass with the finger. Then put the backing into cold water, and after it has remained long enough to get perfectly soft, but not before, place it on the film and gently squeegee. In this stage it is best not to tamper with it in the attempt to intensify. When, in these operations, a film sometimes floats off into the water, by gentle manipulation it should be got into methylated spirit, and can thus be saved. He did not bring the india-rubber backing down upon the film under water, but if the glass held down the film more strongly than the film adhered to the backing, he placed the whole in the water to soak, and then stripped the film from the plate thereunder. It has then to be left on a glass plate to dry, but the plate must be left in a horizontal position; if it be allowed to stand on end during the night the film will fall off when partly dry, and will wrinkle. He had spoken of possible faults, which ought not to occur, but stripping the films never gave him any trouble. The celluloid films might do for lazy photographers, but the stripping film had, and always would have, its advantages.

Mr. GEORGE DAVISON said that he was able to show them some negatives upon the new celluloid roller film. This film is so thin that it will possibly do for reversed negatives for photo-mechanical work. First of all he would like to refer to points raised by Major Nott. Major Nott had said that photo-mechanical processes gave the best pictures from a high art point of view, but he (Mr. Davison) was not sure that platinotype did not give as good or better results; that was a question for discussion. As to films, Mr. Tolley, who was an excellent worker, preferred, he believed, the old Eastman film and the oiling. Major Nott had said nothing about the use of acid, which would sometimes seem to be necessary; he (the speaker) always used it in dealing with stripping films, and it always answered, perhaps being more needed, because he always developed with pyro and ammonia. Major Nott had said that if density were obtained first, it was not easy to obtain detail afterwards. With ordinary plates, when too great density is obtained when developing begins, the remedy is to wash thoroughly immediately, then to treat the plate with alkali alone; enough pyro will have been left in the film to carry on the action. Vergara's Froedman films, of which he exhibited some specimens to the meeting, were, he said, very good films; the negatives upon them, taken two or two and a half years ago, were turning a greenish yellow colour. He believed that the Vergara films were no longer in the market. Mr. England had given him a sheet of thin, translucent celluloid, which he would exhibit to the meeting; it was used for diffusion purposes, that is to say, to put under hard negatives that they might give softer prints. He would also exhibit to them some celluloid films given to him by Mr. Bullock, and made by Messrs. Allen and Rowell; they were about the first which came to England. It seemed to him to be best to use very little spirit in soaking celluloid films: a good plan is to treat them with a dilute solution of glycerine in water; they could be laid down upon blotting paper to dry, and he had not found it necessary to pin them up for the purpose.

Mr. J. D. ENGLAND wanted to know what that line was down one of the celluloid roller-film negatives; also some streaks in the sky in another of the negatives.

Mr. DAVISON thought them to be apparently due to a little inequality in the development.

Mr. E. R. SHIPTON also supposed them to be possibly due to unequal action of the developer.

Mr. A. MASKELL had tried the quinol developer with transferotype paper, and found the stripping exceedingly difficult afterwards; he could only save about four pictures out of a dozen. Could not the celluloid and stripping film methods be combined?

Major NOTT replied that it was impossible, because water will not go through celluloid, and the fact that it goes through paper renders stripping possible.

Mr. ENGLAND had found no increase of sensitiveness of celluloid films with keeping. Glycerine would keep such films flat, but it also had a tendency to keep them damp, which was a disadvantage in silver printing, as the negatives were then liable to become stained. He had some stereoscopic transparencies taken on matt surfaced celluloid.

Mr. HAYMAN thought that the celluloid film had sounded the death knell of the stripping film. He should like to know how long the celluloid film could remain on the roller of the slide, for he thought that its elasticity was not permanent; he should also like to know something about the amount of granularity it gave. He then exhibited carriers for holding celluoid films flat in the camera, also a celluloid transpareney measuring 24 by 18 inches. He said that the quality of the celluloid turned out by the manufacturers is gradually improving; it is made in sheets measuring 50 by 20 inches.

Mr. ENGLAND said that lantern slides printed on celluloid cockled up in three minutes in the lantern when it was attempted to use them.

Mr. H. M. ELDER had developed about two hundred stripping film negatives this year, and always used equal parts of potash and soda; the former he thought to rather soften than harden the gelatine film, and to conduce to delicacy. Sometimes he was troubled with little blisters, but had a mode of dodging them so that they would not show in the result; they were due to osmosis; he could understand the liquid being in them, but could not understand the little bubble of air they also contained. Some of the blisters were occasionally nearly as large as a threepenny piece. The question of the permaneney of the elasticity of celluloid he considered to be important.

Mr. H. STURMEY'S experience with Carbutt's celluloid films was not entirely satisfactory; they had no tendency to frilling, and there was a total absence of halation, but he had fouud in several of them marklngs and spots, and sometimes a series of lines right across.

Mr. F. DE P. CEMBRANO wished to know if the celluloid films would keep any length of time without showing spots, for he thought that they worked all right at first. Collodionising the plate was a very great drawback to stripping film work, but if Major Nott's method made it unnecessary, he should have little to say against stripping films.

Mr. DAVISON did not think that a little glycerine in the films would render them more liable than gelatine plates to stain, when albumeuised silver paper was used for printing. He presumed that the celluloid film he had seen on the roller slide had been there at least three weeks, as it had come from America.

Mr. HAYMAN thought that six months would be a fair time to settle the point.

Mr. DAVISON said that there was no doubt that films did not abolish halation, but they reduced it to a minimum; the newest celluloid film acted well in this way, in one experiuent which he had tried.

Mr. SHIPTON did not know that Major Nott's abolition of the collodionising of the plate was altogether an advantage, because the collodion acted afterwards as a varnish to the film. In his experience, no film was equal to a good glass plate; he had exposed nearly two gross of Carbutt's films, and they had exhibited defects which would ruin a glass plate. One fault is the occasional appearance of something like a thumb-mark; the cause seems to be inside the celluloid itself. Frequently, also, there are transparent spots, and a celluloid film takes about three times as long as an average plate to fix. No doubt the film of the future will be one which will go on a roller slide. Celluloid films are said not to be inflammable, but he had put one which was somewhat curled up to a flame in lus developing room, and he had to clear out pretty quickly.

Mr. SIMPSON, of the United States, said that the early celluloid films were full of spots, and it had been difficult to get them free therefrom. The Carbutt films were also tried; they were not clean, but foggy, The best he had seen so far were those of the Eastman Company. The great difficulty of the makers had been to get the emulsion to adhere to the film firmly enough not to come off in the development, and he had been told that they overcame the difficulty by putting camphor in the emulsion, and as there was also camphor in the film, it seemed to give the power of holding on.

Mr. ELDER remarked that probably camphor would act as an organic sensitiser, and increase the sensitiveness of the film.

Major Nott, in the course of his reply, said that by the old process the paper films had to be boiled in castor oil, which made the whole house smell like a fish shop, and went all over the best clothes of the operator. Granularity in the stripping film negatives was brought about by under-exposure, and perhaps the squeegee then impressed upon the tender film some of the inequalities in the paper.

The Chairman thought that celluloid would form the film of the future. He had not tried any such films, but some of his friends had done so, and they complained of spots. He believed that at present glass plates gave the best pictures, but that no doubt, in time, good films will become as common as good glass plates.

Thursday evening, November 28th, will be devoted to lantern work.

London and Provincial Photographic Association.

At the meeting on the 14th inst., Mr. A. L. Henderson occupied the chair.

A very fine collection of photographs was exhibited by the Chairman of views in Australia and New Zealand of places recently visited by him. These were examined with great interest by the members, especially a panoramic picture of the harbour at Sydney. Specimens of portraiture by resident photographers were also shown by the Chairman.

Mr. Moran showed a negative much fogged, evidently by the material forming the hinge of the dark slide.

The Chairman passed round a dark slide which not only caused fog if the plate was left in for a long time, but also partial reversal of the image.

A member said it might be due to the oil with which some polishers primed the mahogany.

Mr. A. L. Haddon said that the Chairman some time ago had stated that paraffin paper produced injurious results when used for packing plates; as the slide in question had been treated with this substance, might not that account for the result he had shown?

The Chairman said he would remove the paraffin from the slide, and report at a future meeting.

The lantern was then brought into requisition, and a large number of transparencies were shown by Messrs. J. S. Teape, H. M. Hastings, J. Kellow, W. H. Hindley, H. Summers, J. Pask, T. E. Freshwater, and A. Cowan.

Hackney Photographic Society.

November 14th.—Mr. J. Hubert, vice-president, in the chair. Five new members were elected, bringing the total number of members up to about one hundred.

Dr. Kibbler communicated the results of his investigations in toning with an ordinary gold bath, and not completing the process, but instead, transferring the prints, while still brown, into the fixing bath, to which had been added acetate of lead. This gave a beautiful grey tone, to the avoidance of rusty prints.

This being the evening set apart for a paper and demonstration upon "Isochromatic Photography," the discussion upon Dr. Kibbler's process was postponed.

The Chairman then introduced Mr. Birt Acres, who read his paper on "The Practical Use of Colour-sensitive Plates." After a few introductory remarks on the failure of ordinary plates to render in correct values the colours seen in nature, and the consequent great loss of beauty in photographs, he described a few of the attempts of several men of science to discover some process which would correct this great drawback to artistic photography. He gave a brief outline of a discovery made by Waterhouse, that an ordinary collodion wet plate treated with eosin became strongly sensitive to yellow and orange, and he spoke of a further development of this discovery by Tailfer, of Paris, who applied it to the modern gelatine dry plate process, by which he was able to prepare plates by the now well-known eosinated bromide of silver emulsion process. One of the most important features of the paper was a spirited attack on the use of the yellow screen. It was pointed out that with the exception of copying paintings, and in taking out-door views in misty weather, the yellow screen was seldom or never required; the use of a yellow screen in landscape work under ordinary conditions spoiled the atmospheric effect in the resulting photograph, as it made the distant objects appear too near. He then showed some silver prints and negatives of views in North Wales, taken recently on the ordinary and on isochromatic plates, without a yellow screen, from the same point of view at the same time, and, he said, under exactly the same conditions. The differences between the photographs exhibited were strongly marked, for while the ordinary plates rendered the yellows, browns, and greens of one uniform tint, the colour sensitive plate, he said, rendered each in their proper values, as seen by the human eye. He attributed the false impression, that every colour sensitive plate required the use of a yellow screen, to the writings of Dr. Vogel, whose azaline plates, he stated, were so slightly sensitive to yellow that unless a yellow screen were used no appreciable difference was obtained; whereas with a truly isochromatic plate the screen was a positive drawback. Continuing, he gave a few hints on manipulation, severely condemning the small lamps that are frequently used when developing, for if the quality of the light is safe a great quantity is not likely to do damage. He preferred pyro-ammonia for development, and recommended that in cases of under-exposure the developer should be farther diluted, instead of adopting the usual plan of adding more ammonia.

Lantern pictures from the ordinary and isochomatic plates were then shown on the screen; and whilst those from the ordinary plates were considered to be excellent, those from Mr. Birt Acres' colour sensitive plates were pronounced to be finer, especially in the rendering of foliage.

At the conclusion the Chairman opened a discussion on the paper, which was continued by Dr. Kibbler, the Hon. Secretary, and other members.

Birmingham Photographic Society.

A meeting was held on Thursday, the 14th inst., at the Club Room, Colmore Row. Mr. B. Karleese in the chair. Messrs. E. A. Compton, F. Walter Jones, and A. Roberts were elected members.

Mr. E. C. Middleton read a paper entitled "Hints," which proved instructive alike to beginners and those further advanced in photography.

On the 25th ult., the lantern committee gave a display of American slides per favour of the Camera Club.

The annual meeting of the Society will be held on the 28th inst.

Abney Camera Club.

At the meeting November 15th, Mr. C. H. Rushton occupied the chair.

Mr. T. H. Leeds, Hon. Secretary, read some notes on Dr. Backelandt's water-developing and other dry-plates. Six exposures were made for comparison in Shew's eclipse camera at the slowest speed of the shutter, lens working at *f*/8, on (1st) two plates of a well-known French make, (2nd) two ordinary-developing Waterloo plates, and (3rd) two water-developing plates. The first two developed with pyro-soda were complete in fifteen minutes, showing fair detail. The second pair were developed one with pyro ammonia, complete in thirty minutes; the other with pyro soda, which did not gain sufficient density in forty-five minutes, the developer appearing to have no action after a time. Neither of these showed as much detail at the first pair. The first of the water developing plates remained in the developer for four hours, with occasional addition of washing soda; it then showed the sky line and more conspicuous objects. The second, after half-an-hour's immersion in the developer, showed no sign of image, and was accordingly taken out, washed, and treated with pyro-ammonia, when a fair negative resulted.

The next meeting will be on November 29th, which will be a lantern evening.

North Middlesex Photographic Club.

Nov. 11th.—Mr. Humphries, President, in the chair.

Mr. D. P. Rodgers, of the Camera Club, made a few remarks, and opened a discussion on hand cameras.

The following firms responded by sending representatives with specimens as manufactured by themselves: Messrs. Mawson and Swan, Marion, Watson, Platinotype Co., Robinson, Photographic Stores, Shew, and Fallowfield.

At the next meeting, November 25th, Mr. Hart will demonstrate his flash lamp; visitors invited.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THE opening meeting of the session was held on November 7th, Mr. WILLIAM LANG, Jun., President, in the chair.

The following gentlemen were elected members:—Messrs. Edmund J. Mills, D.Sc., F.R.S., R. C. Platt, Airdrie, Alex. Scott, John Morrison, Jun., James More, and W. Murdoch.

The office-bearers for session 1888-89 were appointed:—

President—Mr. William Lang, jun., F.C.S. *Vice-Presidents*—Messrs. William Brown and William McLennan. *Treasurer*—Mr. George Bell. *Secretary*—Mr. J. Craig Annan. *Council*—Messrs. John Annan, William Gunmill, W. J. McHenrick, A. Mactear, George Mason, and A. Watson.

The PRESIDENT then read a paper entitled, "Some Memorials of Daguerre" (see page 772) which was illustrated by lantern transparencies specially prepared.

Two volumes of cyanotype impressions produced in 1859 by an unknown lady amateur, and which had belonged to the late Mr. Robert Hunt, were afterwards shown to members. Mr. Friese Greene's opal cards next occupied the attention of the Society, and the meeting ended with a lantern exhibition of slides, the work of some of the members.

MR. G. L. ADDENBROOKE has returned to London after a tour round the world, and a somewhat prolonged sojourn in Australia.

PHOTOGRAPHY AND "PUNCH" PICTURES.—In the course of a letter to the *Pall Mall Gazette*, headed, "How I do my *Punch* pictures," Mr. Linley Sambourne says:—"I would also take this opportunity, sir, of saying, that my notes by photography, &c., described in your columns, have been accumulated simply as a sort of 'dictionary of nature' which I can quickly refer to, as I am frequently called on to furnish a design at an hour's notice, when there is no time and often no light to work from models or to refer to life in any other way. All artists, and certainly myself, would elect to study direct from the life if possible, but in work such as I have mainly to do, the time is generally barely sufficient to make the necessary strokes on the block or paper without taking any of it for anything else. Photography, though an impossible master, is to me a very valuable servant for the purpose I have described, and I am always ready to acknowledge it as such."

RECEIVED.—MCGHIE AND CO.'S Illustrated Catalogue, which is presented in stiff covers, gilt-lettered and edged, with cloth back. Like many of the catalogues now issued by dealers, it is something more than a mere price list, and contains many useful formulæ.—Fallowfield's Photographic Remembrancer for the quarter ending December is also an illustrated catalogue containing photographic tit-bits and formulæ.—Mr. C. C. Vevers forwards samples of his new *coloured* lantern slide-strips, which he thinks will be found of service in distinguishing one set of slides from another, especially to those who frequently exhibit in conjunction with other slide makers.—Mawson and Swan's New Transparency Frame is an elegant and useful little novelty, simple in construction, yet thoroughly effective. It consists of a wire frame having four triangular corners which hold the transparency or other picture firmly in place, but can be easily opened if it is desired to change the contents. The frame is alike back and front, and can be hung by the neat chain supplied, or stood upon the table. In the latter form the frame can be used for showing photographers' specimens on their reception room tables.—Mr. T. Thorns has patented what he terms the "Scroll Grip Lifter," designed for lifting plates and prints out of the hypo bath. It is made of flexible material bent over in such a manner as to allow of the longer portion being slipped under the plate, the upper portion gripping it on pressure.

M.—We do not think the public would feel much interest in the subject.

Answers to Correspondents.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper & Carter, 5, Furnival Street, London.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

LYNTON.—Answered by post. We have not been able to hear of any agent for the sale of the once famous Soehnée varnish; the Paris address of the makers, MM. Alexis Gaudin et Frères, was given in the NEWS of 31st May last.

PHOTARGUS.—1. Are you quite sure that you want the yellow screen with your orthochromatic plates? If so, you might take a couple of thin mica plates, and shut in the tinted film between them for better protection, and then insert this little arrangement in place of the diaphragm. Aurautia is, as you say, sometimes used as the colouring matter, and this goes better with gelatine than collodion. If the latter vehicle is employed the clear etherial solution of gamboge is a good colour and permanent; so also is aurine. 2. The lens marked A in your list is well approved, and would probably be the cheapest. 3. We are glad to hear that you have succeeded so well with the magnesium flash-light.

A. T. G.—Lycopodium powder is worth a trial for a retouching medium, and we think it will stand the test of varnishing; but be sure that this is actually the case before committing yourself to much work executed in this manner.

S. S.—Extract from specification of the 1886 patent goes to you by post. Your second letter received.

H. BLANDY.—The account of Mr. A. Stroh's lantern stereoscope is to be found in the Proceedings of the Royal Society, 1st April, 1886. The principle of the arrangement depends on the well-known effects of the persistence of vision; revolving discs are employed for alternately obscuring two pictures, projected on a screen at the same place, and at the same time interfering with the view of the observer in such a manner that only one picture is seen by the observers' right eyes, and the other by the left eyes. The discs are rotated at the speed of about twenty revolutions per second, by means of a driving wheel and band worked by a crank handle at the back of the apparatus, and the discs are cut so as to produce two flashes for each eye during every revolution. The observers in this way see the alternate pictures rapidly presented, and the figure on the screen then appears to stand out in stereoscopic relief. The apparatus described is not capable of affording a general demonstration, but is limited to the two observers placed in proper positions behind the screens and alongside the lanterns.

H. W.—For the hydrokinone dry developer, see specification No. 16,537, dated November 14th, 1888. "Developing Photographic Pictures or Images."

F.R.A.S.—The photograph of the moon, published in the *Bulletin Belge*, as taken in Sir Howard Grubb's refractor, is certainly very fine; the illumination being favourable to the rendering of the mountains around Tycho, and the enlargement is carried up to 4¼ inches diameter. It is reproduced by the phototype process of M. J. Maes. The same number contains a complete list of the photographic awards at the recent Paris Exhibition, where M. Davanne was president of the jury (Class XII); Mr. William England, vice-president; and M. Léon Vidal, reporter.

A. & G. T.—The reddish patches on your little print would appear to be marks of imperfect toning rather than of fixing. When immersed in water these patches rise up to blisters, whereas when dry they appeared as depressions; more suggestive of stains from the mountant being smeared upon the face than defects in the photographic treatment.

CRAGSIDE.—We called on Wednesday; you will receive it this week.

A. H. J.—It will be necessary to obtain the author's permission.

F. J. T.—1. At this season you must dry the films in a hot-air chamber or a water oven. A suitable arrangement was described by Mr. England nine years ago. 2. Not impossible; enquire of the Autotype Company. 3. Ruby glass, with extra orange pane in front if wanted. 4. Yes, certainly.

F. M. L., A. D. H., and S. A. V., received.

PATENT OFFICE LIBRARY

THE PHOTOGRAPHIC NEWS.

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FOCUSSING SCREENS.

COMFORT in photographic operations, like comfort in life, depends largely upon attention to little things, especially when in immediate proximity to those who wish to take existence easily, and to assist others in doing the same. This rule applies also to the discomforts of life, and anyone who denies the fact may test it for himself, by shutting himself up all night in the same room with a mosquito.

A considerable porportion of photographers, and probably a vast majority, have had no experience of the comfort in focussing given by an exceptionally finely-ground focussing screen. Mr. Frederick Varley, as others have done before him, wrote on the subject in these pages a few weeks ago; indeed, the subject is nearly as old as the literature of photography itself, yet not so much has been done to meet the public want by some camera manufacturers as might have been expected.

Two or three years ago, when we did not want the trouble of grinding a special focussing screen, we called upon a photographic dealer who advertised in his catalogue that he kept glass specially finely ground for focussing screens, and purchased some specimens, which were better than the average of those in the market. The same day these specimens were by chance exhibited to a second well-known manufacturer, who said that he had still better specimens in stock, although he did not advertise them, and, on examination, this proved to be true, so some samples were bought. A few days later, these specimens were compared with those which Mr. Varley had ground for himself, and both proved inferior to those he had produced, so, after all, we had to do our own grinding. There is a rare beauty about a camera image upon finely-ground glass, especially when upon a fine day the subject is a garden with richly-coloured flowers, and in the foreground delicate leaves—say, those of the trailing vine—illuminated by transmitted light. When, in addition to a properly ground screen, a focussing glass of good optical construction on the principle of the Ramsden eye-piece is used, and extraneous light is kept from the eye by means of a good eye-cup, focussing is rendered easy and pleasant to a degree to which few are accustomed, and there is much less strain upon the eyesight.

In the days of yore, that good experimentalist, Mr. Carey Lea, devoted some attention to this subject, and published his results. In one experiment, he dissolved gelatine in water in the proportion of thirty grains to the ounce, and added thereto "a little" sulphate of ammonia; next he added "a little" solution of chloride of barium, stirring all the while, thus producing a white emulsion of sulphate of barium, with which he coated plain glass. This, when dry, formed a focussing screen, about which he said that he had never seen any ground glass which would give anything like the same amount of detail in the image in the camera. He also tried thin, well-boiled, and strained starch, and obtained a fine hard screen. The film has to be dried horizontally with care, and the glass plate must, in the first instance, be perfectly clean, or portions of the film will split off in the drying. He speaks of this as better than the sulphate of baryta screen. Another method he strongly recommended in those early times was to take alcoholic negative varnish, and occasionally shake up in it during several days some finely powdered tartaric acid. The varnish will dissolve very little of the tartaric acid, but that little sufficed, with the varnish he used, to make a good focussing screen when spread upon the surface of the glass plate, and dried thereupon. Camera makers have done so very much of late years to meet the requirements of the public, that it is not too much to hope that close attention will before long be given in all cases to such a simple matter as the fineness of focussing screens.

THE SOCIETY OF ARTS.—Among the notices of forthcoming lectures at the Society of Arts, are the following:—December 11.—H. Trueman Wood, M.A., secretary to the Society, "The Paris Exhibition," Sir Philip Cunliffe-Owen, K.C.B., K.C.M.G., C.I.E., in the chair. Professor A. H. Church, "Some Considerations concerning Colour and Colouring;" three lectures, March 17, 24, 31. Two juvenile lectures on "The Story of a Flame," will be given by Professor Vivian B. Lewes, on Wednesday evenings, January 1 and 8, 1890, at seven o'clock.

ON SIZES OF PHOTOGRAPHIC PLATES.

BY COL. J. WATERHOUSE, R.S.C., ASSISTANT SURVEYOR-GENERAL OF INDIA.

In the old wet collodion days the size of plate to be worked was very much a matter of choice or convenience, and as large or small plates could easily be worked in the same camera, the range of sizes in use was a large one.

The advent of ready-prepared dry plates has, however, brought about a steady tendency both on the part of plate makers and apparatus manufacturers to limit the sizes of plates and cameras, at any rate for amateur and tourist purposes, to what may be called standard sizes, *i.e.*, the quarter-plate, $4\frac{1}{2}$ by $3\frac{1}{4}$, the half-plate $6\frac{1}{2}$ by $4\frac{3}{4}$, and the whole plate of $8\frac{1}{2}$ by $6\frac{1}{2}$. How these sizes came to be given the writer does not recollect, but it was most probably from the size of the copper-plates which were at first used for Daguerreotype. As they are at present in the proportion of about 10:13, they are for most pictorial purposes too broad for their length, a defect which in copper plates would be lessened by the margins necessary for clean printing and for lettering. They have also the defect that the sizes are not truly proportional, the half-plate being half-an-inch wider than it should be, so that two half-plates cannot be cut from the whole plate.

This limiting of the number of sizes of plates is no doubt found by experience to be necessary, but with the introduction of celluloid films, which are so light and can so easily be cut, it seems desirable that the whole question of sizes of plates and apparatus should be reconsidered and placed on a definite footing.

In the first place, whatever sizes are adopted should be international, and they should have a definite relation of proportion between themselves, in order to facilitate cutting smaller sizes from larger ones without waste.

It is needless to remark on the convenience of international sizes for travellers in foreign countries. At present, although English or American sizes are sometimes obtainable abroad, or *vice versa*, it is by no means common that they are so, and the traveller must either obtain fresh supplies from home, with all the attendant risks of transit and examination at the Customs Houses, or, if he purchase locally, he must content himself with odd sizes, which have to be cut down to suit his apparatus; and this, in the case of glass plates, involves carrying a diamond, and cutting plates in the dim light of the dark room, which is not always easy, besides the liability with some makes of plates for the films to strip from the glass in breaking them apart after cutting.

With regard to the actual sizes to be adopted, it is more difficult to make any definite suggestion, having in view the different requirements to be met, and conflicting interests to be combated. To the writer it appears that the foreign proportion of 9 to 13 is better for all purposes than the 10 to 13 of our whole-plate, which is too broad for its length for landscape or even for portrait work. Adopting 9 to 13 centimetres, or say $3\frac{1}{2}$ by $5\frac{1}{8}$ inches, as the unit, the double plate would be 7 by $5\frac{1}{8}$ inches, and the quadruple 7 by $10\frac{1}{4}$, or about 18 by 13 centimetres and 18 by 26 centimetres respectively.

On the other hand, taking the English quarter-plate, $4\frac{1}{2}$ by $3\frac{1}{4}$, as the unit, we should have a series $4\frac{1}{4}$ by $3\frac{1}{4}$, $4\frac{1}{4}$ by $6\frac{1}{2}$, and $8\frac{1}{2}$ by $6\frac{1}{2}$ inches, or 10·7 by 8·25, 10·7 by 16·5, and 21·5 by 16·5 centimetres respectively.

As the new films give so many advantages in the way of lightness and portability over glass, travellers' cameras may be made larger without adding much to the weight or bulk of equipment of apparatus to be carried, and the writer would therefore prefer a series founded on the 5 by 4, or, reducing the width a little, 5 by $3\frac{1}{2}$ inches, which approximates closely to the foreign size noted above. The series would then be 5 by $3\frac{1}{2}$, 7 by 5, and 10 by 7, all very convenient landscape sizes, and, as shown above, readily convertible to metric measurements.

This question has, the writer believes, already been discussed by various photographic conferences in England and other countries; if so, he must excuse himself for putting forward these suggestions, which otherwise appear to him not inopportune at a time when a new sensitive film, light and as easily divided as ordinary paper, is being brought into use, and especially in the interests of travellers and dwellers in distant countries, where plates of many special sizes hitherto in common use are becoming more and more difficult to obtain.

Royal Society Medal Awards.—The medals of the Royal Society have this year been awarded as follows:—The Copley Medal to the Rev. Dr. Salmon, F.R.S., for his various papers on subjects of pure mathematics, and for the valuable mathematical treatises of which he is the author; a Royal Medal to Dr. W. H. Gaskell, F.R.S., for his researches in cardiac physiology, and his important discoveries in the anatomy and physiology of the sympathetic nervous system; a Royal Medal to Professor Thorpe, F.R.S., for his researches on fluorine compounds, and his determination of the atomic weights of titanium and gold; and the Davy Medal to Dr. W. H. Perkin, F.R.S., for his researches on magnetic rotation in relation to chemical constitution. Intimation has been received at the offices of the Royal Society that the Queen approves the award of the Royal Medals.

The London Chamber of Commerce.—Fifty new members were elected at the November Council Meeting of the London Chamber of Commerce, of which the following is the list:—*Companies*—Buenos-Ayres Metropolitan Tramways Company, Ltd.; Ceara Harbour Corporation, Ltd.; Glasgow and London Insurance Company, Ltd.; La Guaira Harbour Corporation, Ltd.; Manchester Edison Swan Company, Ltd.; and Montevideo Gas Company, Ltd. *Firms*—Messrs. Allan Bros. and Co., shipowners; A. and C. Bassano, photographic artists; J. B. and G. W. Crosby, brokers; Densham and Sons, wholesale tea dealers; Mackey, Mackey, and Co., drug merchants; Rowley and Davies, tea merchants; Summers and Roe, tea merchants; Taylor, Taylor, and Hobson (Leicester), photographic lens makers; Frederick Walton and Co., manufacturers; Mark Whitwill and Son, shipbrokers; Williamson, Cloudsley, and Webb, wholesale tea dealers. *Singles*—Messrs. F. Ammoneer (William Woollams and Co.), paperstainer; W. R. Betteley, South American merchant; H. Mills Branford, accountant; R. Bruzon, exporter of contractor's materials; T. Chapman (McLean Bros. and Rigg, Ltd.), merchant; Enrique Cortes, common merchant; Thomas Finney (Finney, Isles and Co.), merchant; E. L. Heatley, merchant; John Jackson, railway contractor; R. J. Jeffray, managing director; Union Mortgage and Agency Co. of Australia, Ltd.; Richard Keene (Derby), photographer; S. King-Church, merchant; B. Kühn, drysalter; J. Lillir Mitchell, general manager London Stereoscopic Co.; Thomas W. Road (Charles Taylor and Co.), coal factor; Rafarl Parga (Enrique Corks and Co.), common merchant; Marshall A. Phillips, managing director Dahlonega Co., Ltd.; W. D. Powles, South American merchant; Samuel Procter, consul of Madagascar; Edward H. Quicks, solicitor; D. Rowell, manufacturer of iron fencing; S. L. Simon (Lazard Bros. and Co.), foreign banker; William C. Taylor, wine owner; J. Thorburn, merchant; Robert T. Turnbull (Thompson, Ritcher and Co.), electrical engineer; M. S. Vanderbyl, Smokeless Powder Co.; Henry Vanderweyde, photographer; Carl Von Blick, engineer; John Berry White, chairman, Yokai (Assam) Tea Co., Ltd.; James E. Wilson, colonial merchant; S. G. Buchanan Wollaston, photographic artist.

ON THE DENSITY OF INTENSIFIED NEGATIVES.*

BY CAPTAIN ABNEY, R.E., C.B., D.C.L., F.R.S.

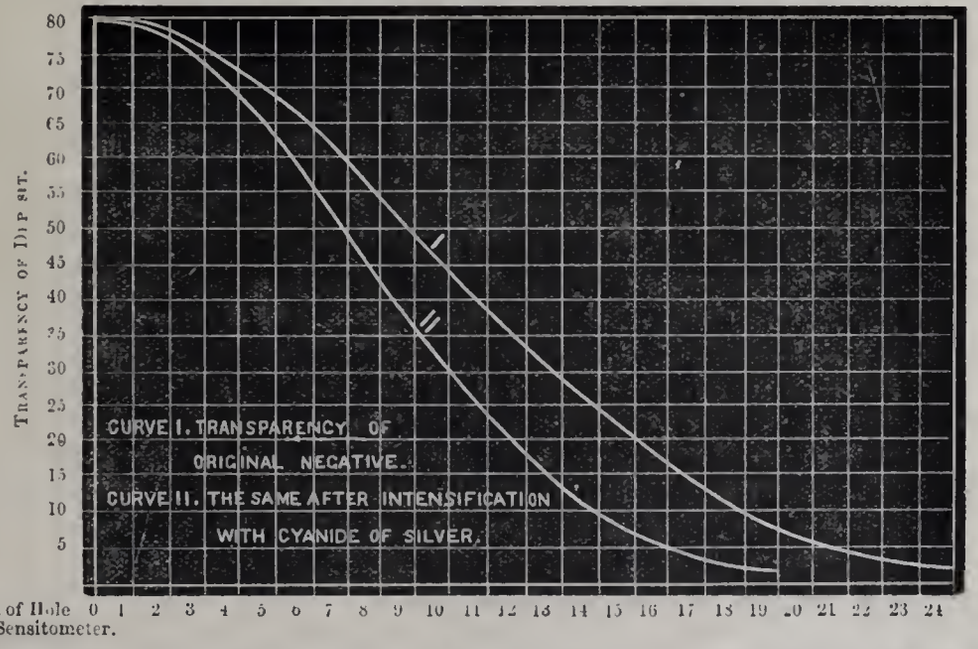
Naturally intensification of a negative has frequently to be touched upon by writers on photographic matters, but there seems to be only what I may term a qualitative knowledge of its nature. Indeed, the statements about density of deposit have always been more or less random. It was to see whether the density given by intensification had any exact relationship to the density given by mere development of a negative that my time has, to a certain extent, been employed. In a paper which I read at the Camera Club Conference, and which has appeared in its Proceedings, and in the pages of the photographic papers, I showed that the transparency of the different squares of a negative taken in a Spurge's sensitometer obeyed the law of error when the transparency of the square areas was represented by the ordinates to the curve, and the holes which admitted the light was taken as the abscissæ. I explained that the particles of silver reduced by the developer must be looked upon as being scattered at random over the different areas, and that the transparency of the negatives was caused by the light penetrating through the interstices left by these particles. In a paper read subsequently at the British Association, and which, in an amplified form, is printed in this *Journal*, it was shown that there was more than a probability that the *number* of particles deposited during development varied directly as the intensity of the light which previously had acted, and that the reason why the transparency of the different small areas did not also vary directly was due to the overlapping of particles owing to the random scattering. When the particles are once distributed, and intensification is carried out, it remained a question hitherto unsolved as to whether the diminished transparency obeyed any law. The sole answer possible to this question appeared to me could only be arrived at by direct experiment. It must be borne in mind that the positions of all the particles of silver which have been reduced by development are fixed; and it was a question if the intensified negative might not obey the same law as the unintensified negative. It must not be forgotten that intensification by the ordinary mercury and silver method implies that each particle of silver is increased in size, and that therefore in all probability the same formula would apply to the intensified negative as it did for the unintensified one. The experiment was carried out in the following manner:—A plate was exposed in a Spurge's sensitometer for a time sufficient to give nearly opacity on the area to which the greatest intensity of light was admitted, *i.e.*, with the light coming through the largest hole. The usual alkaline developer was employed. After development the plate was fixed, and the different opacities measured in the manner I have described on previous occasions. The curve was then plotted, taking for abscissæ

Table of Curves of Density.

No. of Hole (Sensitometer)	Original Negative.		Intensified Negative.	
	Calculated Transparency.	Observed Transparency.	Calculated Transparency	Observed Transparency.
1	79·6	79	79·2	79
2	78·1	78	76·8	77
3	75·8	77·3	73·0	74
4	72·5	73	68·0	68
5	68·8	68	62·1	63
6	64·4	64	55·5	56
7	59·7	60	48·7	49·5
8	54·4	55	41·8	42·3
9	49 1	48	35·1	36·5
10	43·8	42	29·0	29·0
11	38·6	38	23·4	23·5
12	33·5	33	18·5	18·5
13	28·9	28·6	14·4	15·0
14	24·5	24·5	10·9	10
15	20·6	21	8·2	8
16	17·1	16	5·9	6
17	14·0	13·6	4·25	4
18	11·3	11·5	3	2
19	9·1	9·0	2	2
20	7·2	8·0		
21	5·6	6.0		
22	4·4	4·6		
24	2·5	3		

Total Transparency = 80.

Remarks.—In the tables, the calculated curves were obtained from the formula $T' = T\epsilon - \mu x^2$, where T = 80. In the original negative $\mu = \cdot 00603$. In the intensified negative $\mu = \cdot 01015$. x in both cases being the No. of the hole of the sensitometer. N.B.—Each hole of the sensitometer admits $\sqrt[3]{2}$ more light than the one immediately following it.



* Read to the Photographic Society of Great Britain.

the number of the holes of the sensitometer, and for the ordinates the transparency of each part. The theoretical curve was then calculated as is ordinarily done, and the observed and calculated values, when compared, show their agreement. The negative was next intensified by the mercury and silver process. It may perhaps be of value, and make this paper more complete, if the formula for the intensification be given, more especially as I wish to call attention to the fact that negatives I have treated with it remained unchanged, which unfortunately is not the case with the old mercury method. I have called this in one of my works "the best intensifier," and I certainly think it is so:—

1.	Bichloride of mercury	100 grains
	Bromide of potassium	100 ,,
	Water	10 ounces
2.	Silver nitrate	100 grains
	Water	10 ounces

To this last is added a 100-grain (to the ounce of water) solution of potassium cyanide till the precipitate first formed is just *not* entirely dissolved. The plate is immersed in No. 1 till it bleaches thoroughly. It is then washed copiously and immersed in No. 2 till it is blackened right through the film, and again thoroughly washed. The sensitometer negative thus treated, after drying, was measured for a transparency. On applying the formula $T^1 = T\epsilon^{\mu x^2}$, x in terms of light, intensity being $2\frac{y}{3}$, where μ is the intensity of the light, where T is the total transparency, and T' that passing through a hole in No. x, x being reckoned in this case, and in the proceeding from the hole in which no deposit was to be seen. It was found that the formula applied in this case as it did in that of the unintensified negative. The zero of the abscissæ was found to be the same in both cases, as might be expected from the nature of things.

In the ordinarily developed negative μ was found to be ·00603, while for the same negative when intensified $\mu = ·01015$. Total transparency T having measured 80% on the rotating sectors. The formulæ became in the two instances $T' = 80\epsilon - 00603x^2$ and $T'' = 80\epsilon - ·01015x^2$ when T' and T'' are the transparency of the deposits in the ordinary and in the intensified negatives respectively.

We thus find that $\frac{T'}{T''} = \epsilon\, 00412x^2$, which shows that the density obtained by intensification is not directly proportional to that existing in the simply developed negative, as many have imagined, but increases more rapidly, in fact as the logarithm. The gradation is much more rapid in the intensified negative than in its original state. It is not hard to calculate what the difference in gradation is, for we shall find it when the intensities of the light come in through any particular square of the sensitometer. This being so, we have $I\epsilon - 00603x^2 = I\epsilon - ·01015x_1^2$. Taking logarithms on both sides of the equation, we get $\frac{x}{x'} = 1·297$. That is, the range of gradation of the one is about 1·3 times that of the first one, the range being reckoned as derived from the sensitometer. If a little thought be given to a negative that requires intensification, it will be seen that the highest light falls short of anything like good opacity. Suppose that the greatest opacity was such that $\frac{1}{10}$ of the light passed through it, then by intensification the density would be so increased that only $\frac{1}{10}$ of the light would pass. For printing purposes the $\frac{1}{10}$ transparency is nearly equal to total opacity. But the fact must not be lost sight of that intensification is absolutely hurtful if the opacity in the high lights is what it should be without it. The details in the high lights, which may be very delicate shades of light, will be represented very nearly as opaque as the highest lights themselves, and they will appear as blanks when the negative comes to be printed.

I trust that the results I have given will be of some scientific value, for the more we know about quantitative photography the more useful we make the art generally. I dare say to a large majority of those attending the meeting this paper will be voted as too mathematical; but I think even a dull mathematical paper, if it contains anything novel, should be read before the Society, whose *raison d'être* is to foster not only the art side, but also the scientific side of photography. I can conceive of no greater proof of this than to look at these walls on which are so many splendid examples of art, and then on the black board, where we only see formulæ and apparently shapeless curves. The connection between the two may seem remote, but I believe that it is by fostering the latter that the former will make any real progress.

THE ACTION OF LIGHT ON MOIST OXYGEN.

DR. ARTHUR RICHARDSON, in a paper recently read before the Chemical Society, stated that the presence of liquid water very much facilitates the oxidation of many substances under the combined influence of sunlight and oxygen. If, however, the water is present as aqueous vapour, the decomposition is exceedingly slow, and in some cases is entirely arrested.

He finds that peroxide of hydrogen, if formed when water containing pure ether is exposed to light in an atmosphere of oxygen, on shaking some of the ether with a solution of potassium bichromate, the ether at once assumed a decided blue colour.

From an extended series of experiments the following facts have been observed:—(1). The amount of hydrogen dioxide formed depends on the proportion of ether to water present. (2). No dioxide is formed when a mixture of water-vapour, ether-vapour, and oxygen is exposed to sunlight. (3). No dioxide is formed when water and ether are exposed in an atmosphere of carbon dioxide. (4). No iodine is liberated from potassium iodide by a mixture of water, ether, and oxygen from which light has been been excluded.

On exposing pure water, acidified with pure sulphuric acid, to light, hydrogen dioxide was found in the solution; this was estimated by permanganate of potassium. Water exposed to rays of low refrangibility gave no hydrogen dioxide.

On placing water which contained the dioxide, immediately after exposure to light, in the dark, it was found, after some time, to be free from dioxide; but hydrogen dioxide was formed on again exposing the solution to light. This process could be repeated indefinitely.

From these and other experiments the author is led to believe that the oxidation of substances under the influence of light involves in many cases initially an oxidation of water to hydrogen dioxide, and that the oxidation of the compound is the result of a secondary interaction between it and the hydrogen dioxide.—*Chemical News.*

THE *American Journal of Photography* is publishing a series of exceedingly interesting illustrated articles by Julius F. Sachse, on "The Genesis of the Camera."

THE EASTMAN COMPANY.—The Eastman Company have turned the English branch of their business into a limited liability company, under the name of the Eastman Photographic Materials Company, Limited. Capital, £150,000, in 10,000 ordinary shares of £10 each, and 5,000 ten per cent. preference shares of £10 each.

PHOTOGRAPHIC GENRE PICTURES.

BY C. F. HOFFMAN.

It is, perhaps, not superfluous, since *genre* pictures are in question, if I now mention a few things which already usually obtain as general rules for taking photographs. First might come the artistic arrangement of the figures and accessories. A landscape cannot be taken otherwise than it plainly is, and one is generally dependent upon the given natural conditions, even if quite often artistic principles can be taken into consideration to an extended degree, by a proper choice of the point of view. It is otherwise in the arrangement of groups or *genre* pictures. These allow a far greater arbitrariness, since indeed to a certain extent the material stands in the power of the arranger. It will be possible on this account for the latter to make more prominent the figure, upon which, above all, he wishes the attention turned; he takes care to set it out as free as possible, not restricted by the too near neighbourhood of other objects, and as complete as possible—*i.e.*, not hidden by anything else—or he brings it out from the general surroundings by brighter lighting.

Further, it will be possible for him by proper arrangement to provide for pleasing contours and for the necessary balance in the distribution of light and shade.

Whoever, indeed, is possessed of an educated artistic feeling, will be in a position to follow the principle that the prominent lines of a picture should constitute pyramids, which on their part unite to form a larger one. In this manner every oblique line is supported by one inclined in an opposite direction, and the necessary stability will be obtained. If we have the ability to follow these principles, we must not forget that very necessary one of variety. First of all, especially where many persons appear, must variety be found in their positions.

I will on this point again choose the theatrical art for comparison.

In operas and dramas it is often noticed with dissatisfaction that the persons forming the chorus are altogether too uniform in their motions. If joy, fear, ecstasy, &c., are expressed by various persons through the same gestures, it wounds our æsthetic sensibilities; but the unpleasant impression is a transitory one, since other scenes immediately efface it. In photography, however, or in pictures generally, every such defect will remain permanent, and the prejudical effect is, therefore, lasting. One is on this account to take pains to obtain the greatest possible variety in attitude, without, however, falling into the error of confusion.

The "Last Supper," of Leonardo da Vinci, offers a splendid and very instructive example of variety in expresssion and attitude, and yet internal harmony withal. Copies of this picture are so abundantly produced and so widely distributed that every one can find opportunity to see and study them.

Variety must also lie in the turning of the head. It is generally attempted in photographs to allow the three-quarter profile to dominate. Certainly, I need not insist upon the disagreeable effect this produces in *genre* pictures. Indeed, it is not necessary to distingnish every person; on the contrary, when the latter is not known, and, therefore, it does not matter, it is even well, when the treatment requires it, if a head is turned entirely away, or if it allows only a portion of the features to be seen. I have, heretofore, in remarking on the painting of Leonardo da Vinci, pointed out the variety of the facial expression of the figures, and recommended the picture for special consideration on account of its pre-eminence in this respect. It can be imagined that a picture in which a number of persons exhibit the same expression cannot please. The play of the mind and the gestures must contribute to the individual characterization, and require, therefore, much intelligence.

Whether it is proved by this that only expert mimics are to be chosen as models appear to me questionable. I believe, on the contrary, that when one wishes to see the individual thoughts expressed, it is much better to choose such persons as fit the picture. These persons will entirely unconsciously follow our intentions, and neither internal harmony nor adequate variety in the various looks and movements will be wanting.

It might be well to recall at this point that a very needful agent for artistic effect is rest—a position which can naturally be maintained for an instant only should not be photographed when it is a question of *genre* pictures. In instantaneous photographs, the problem is not to produce an artistic effect, and this rule, of course, does not apply. indeed, a scene may be so well disposed that life is not wanting, and yet that every individual person takes a position which can raise no question in the mind of the observer whether the position would be long easily maintained.

The effect of questionable positions is the same as that often produced by the consideration of a curtain, conscientiously pleated and confined by hidden fastenings in a position which does not correspond to the natural law of gravity, and which, therefore, seems strange to us. Artificial is not artistic! (Küntslich ist nicht künstlerisch!) This should always be borne in mind, and the photographer ought always in his work, to avoid appearing unnatural, otherwise the reproach brought against photography by many painters, that it is the cart in which Art is carried to the slaughter, is justified.

It is probably self-evident that, so far as the choice of the model is left to him, one should seek only those which make a pleasant impression. A disagreeable face will have a repugnant effect, and this must always be avoided.

Even if a disagreeable action, an unpleasant scene, is depicted, it ought not to excite aversion in the mind of the observer, to perceive it in mien and attitude. Indeed, he must be able to find a certain satisfaction in it, and must acknowledge the beauty even of the condemnable.

One will not answer me that even viciousness has its justification because it is true! I must reply thereto, that no one desires to see unpleasant truth represented.

The same obtains in still higher degree in regard to agreeableness. A pleasing attitude can even make one forget a want of beauty. Be an action never so ordinary, the artistic problem is fulfilled if it only produces its effect through its pleasingness; thus, for example, the following simple subject: A young woman stepping across a brook whilst a young man supports her, offers great possibilities for producing an excellent effect through agreeableness in the attitude and movement of both persons. The manner of raising the skirt, of leaning upon the cavalier, of cautiously setting the little foot upon the projecting stone, are clearly indicated means for the expressing by the young woman of whatever degree of anxiousness, coquetry, happy humour, or haughtiness she chooses; and likewise it will be possible for the young man to manifest, according as he wishes, modesty, boldness, cunning, power, astonishment, and whatever he may please. Withal the

surroundings will be useful to the picture if some tree-trunks in the background are so touched sidewise by the rays of the sun, that through them the needful plastic effect is obtained, and the more so as the foreground will naturally appear sufficiently interesting through the pretty variety which the shining surface of the water and the rocky bank offer.

Something might now be said in regard to the harmonious distribution of light and shade, but there must be a combination of very many favourable circumstances if one is to be in a position to accomplish this.

As seldom as power and gracefulness, beauty and wisdom appear united in one person, so seldom will one see every artistic precept carried into effect in a picture, much less if it is made by photographic means. Nevertheless I will not pass over it, so that we may at least partly consider those rules from the observing of which so great benefit is derived. The following short hints must suffice.

When light and shade are distributed without any control, it may very easily occur that through too bright light or too deep shade on unimportant points, the attention is turned from the principal objects, or that balance is wanting in the picture if light or shade are concentrated too much on one side, or it is lacking in breadth if light and shade are distributed throughout the picture in too great variation. All this must be avoided.

In a picture in which the shadows dominate, the principal object is brought out by concentrating upon it the brightest light, so that no neighbouring point is as brightly, or, at the least, not more brightly lighted. On the other hand, when the picture is brighter, the attention of the observer is turned to the darker objects. This action can be made stronger by—so far as naturalness allows—making a dimly-lighted point appear brighter through the immediate neighbourhood of shadows, and likewise transparent shadows can be materially deepened by joining them with high lights. Such opposition would produce hardness, which, however, can be mitigated by allowing all other tones in the same picture to appear in pleasing gradations.

Besides, it must not be forgotten that hardness is necessary at times, and makes a good impression.

Should, as before mentioned, perhaps on account of local conditions, light or shade be so distributed that one-sidedness results, there is a means of equalizing this by placing an object in the light or shade, which through its intensity balances the quantity of its opposite; that is, by placing over against the light or shadow which one desires to compensate, a small object which, however, is much darker or lighter than the former.

The principles according to which painters distribute light and shade in their paintings cannot be taken into consideration. If one should prescribe, for example, the placing together of the extremes of black and white in broad masses, and the keeping of the other portions in finely-graduated middle tones, or that one should make the deepest shadows from the centre, and so arrange the half-shadows that they form a dark wedge, which on one side fills the whole width of the picture, and converging toward the other side ends in a blunt point, whilst the upper corner of this side appears in the highest light, the lower in the brightest half light, it would be wrong.

All this is much easier prescribed than performed, and one can best follow such rules in landscape work by waiting until the natural conditions bring about the desired lighting.

Moreover, these last-mentioned considerations can generally be fulfilled in a roundabout way by taking separately the background, accessories, and figures, and afterward combining them. But in this case, one must first learn to overcome the technical difficulties of this procedure. The principal thing to be observed is that the perspective is not at fault, and that the lighting is from one side, so that the shadows do not fall part to the right and part to the left of the objects.

I am well aware of not having said much in the foregoing which in practice can be of direct service to the reader. But, as may be gathered from the introductory lines, this was not my intention, since I merely wished to give rise to some after-thoughts, and to point out those principles the regard for which places coveted success in tolerably certain prospect. I must leave it to my readers themselves to turn my hints to profit in proper manner, and the quality of their work will be not less dependant upon their greater or less artistic talent than upon circumstances.

In a future article I will endeavour to write something in regard to combination pictures.—*Wilson's Magazine.*

ROYAL INSTITUTION.—The Christmas lectures, adapted to a juvenile auditory, will this year be given by Professor A. W. Rucker, F.R.S., Professor of Physics in the Normal School of Science and Royal School of Mines, on "Electricity." They commence on Saturday, December 28th.

THE cracking of glue, which frequently occurs when glued articles become very dry, or are exposed to the heat of a stove, is prevented by an addition of chloride of calcium to the glue, which prevents it from drying so thoroughly as to become brittle. Glue thus treated will adhere to glass or metal, and can be employed for affixing labels to bottles.

THE *Picture and Art Trade* says that George Shorkley, New York, has patented a photographic camera, which consists of a swing-back and a universal joint connecting the swing-back with the camera casing, and is especially adapted for detective cameras, to hold the plate-holder always in a vertical position irrespective of the position of the camera casing, so that the objects photographed will appear in a natural position on the dry plate.

IMITATION WOOD CARVINGS.—Old oak or other carvings in low relief, it is said, may be very effectively and easily imitated almost in facsimile by the following process. Procure some "basil" leather and wet it thoroughly in warm water in which a small quantity of size or glue has been mixed; wipe it as dry as possible with a cloth, then cut a piece sufficiently large to cover the carving and allow a small margin; lay it upon the carving and press with the fingers all over, in order that the leather may take the shape of the carving as much as possible. Next, with a smooth pointed tool made of bone—say the handle of a tooth brush filed down till it assumes a blunt knife shape—go over the surface carefully, pressing the leather into all the interstices of the design, and smoothing the larger or bolder portions until you have succeeded in bringing out all details. Of course this process can only be applied to carvings which are not undercut. If the superfluous moisture has been removed from the leather in the first instance, it may now be easily taken from the carving without interfering with its shape, but if not it must be left until partially dry. When taken off, the leather should be placed in a warm place to dry thoroughly, when it will be found to be quite stiff, and may be coated thickly at the back with a layer of gutta-percha or with the following mixture: pitch, resin, plaster of Paris, equal parts. Melt the pitch and resin together, and then stir in the plaster of Paris. If a small quantity of wax candle be added to the mixture, it will be rendered tougher. The imitation may now be applied to the use for which it was intended, and, if treated with dark distemper oak stain and oiled, will look wonderfully like genuine carved oak.—*The Picture and Art Trade.*

PHOTOGRAPHY IN GERMANY.

BY HERMANN E. GUNTHER.

Development of Bromide Enlargements—Reducing Negatives—Acid Fixing Bath—Anschutz's Instantaneous Camera.

Development of Bromide Enlargements.—An experienced German professional photographer, Herr Joseph Junk, gives, in the *Photograph. Nachrichten*, his mode of development in the case of enlargements on gelatino-bromide paper. Though not entirely new, it will, perhaps, be useful to many a brother photographer. Very much depends on the exposure, and on the preparation of the developer. Slowly developed prints obtain beautiful velvety-black to bluish-black tones; quickly developed prints, however, greenish, unpleasing tones. For this reason, with delicate, soft negatives, requiring a short exposure to ensure slow development, vigorous prints with beautiful tones will be easily obtained. Addition of potassium bromide, where it is necessary, increases intensity. In the case of exceedingly soft and weak negatives, an old developer serves very well; but its quantity must be sufficient to make it possible to exactly determine previously the time of exposure by means of proofs. Vigorous, hard negatives, requiring long development with regard to the lights, and which are more quickly developed, give an unpleasant greenish tone. To develop them slowly without the lights appearing too white and the shadows too deep, the developing solution should be diluted with an equal, eventually with double, the quantity of water. Addition of potassium bromide should in this case entirely be obviated, because it exercises an injurious influence upon the tone of the print. It is well to pour off the solution just before the image has come out perfectly, and to watch the progress of the development. As soon as it is complete, the print is rinsed with water, treated, as usual, with a glacial acetic acid bath, and then thoroughly washed. Should the desired tone not yet have been obtained, it is well to allow the print to remain for a long time in the fixing bath, which renders the tone more pleasant. Prints requiring a large amount of retouching are best treated with an alum solution. For finishing with crayon, pastel, and oil colours, the latter treatment is superfluous.

New Method of Reducing Negatives.—In the *Archiv* an effective method of reducing gelatine negatives is recommended by E. Gosselin. The negative is for half-an-hour soaked in water, and then treated with—

Water	100 c.c.
Sulphuric acid	4 ,,
Solution of 3 parts of bichromate of potassium in 100 parts of water ...	6 ,,

This solution acts rather energetically on the negative; the action must therefore be carefully watched. The reduction takes place very uniformly, and no staining of the plate is caused, as is the case with other reducing methods. Plates so treated may be afterwards easily intensified.

The Acid Fixing Bath.—In a previous letter I have reproduced the formulæ for an acid fixing bath as it has been recommended for plates which have been developed with eikonogen. Recently, in a most instructive article in the *Photographen Zeitung*, Herr L. Belitski, of Nordhausen, has highly recommended this fixing bath again, not only for plates developed with eikonogen, but for plates developed with all the other developers, as it removes the well-known yellow stain, this being much more necessary with pyro than in the case of eikonogen. Belitski suggests avoidance of the sodium bisulphite which has been recommended for this purpose, because it must be procured previously, and which, besides, if exposed to the air, alters perpetually, and retains no definite composition. He recommends use of the neutral sodium sulphite, which is kept in stock by every professional photographer, and sulphuric acid. Still more, he prefers the formula given by Herr A. Lainer, with neutral sodium sulphite and tartaric acid, which latter can be weighed in the dry state, and which may be procured everywhere easily and at a low price. For using the acid fixing bath it is important that free sulphurous acid and undecomposed sodium sulphite be present in the liquid, and the following formula, which fulfils this purpose perfectly, is highly recommended by Herr Belitski :—

Water	1,000 c.c.
Neutral sodium sulphite, crystal ...	30 grammes
Tartaric acid	10 grammes

And, when both have dissolved, add :—

Hyposulphite of soda	250 grammes

This bath smells but slightly of sulphurous acid, but in an upright uncovered tank it remains perfectly clear, even if oftentimes used, giving no sediment whatever. For those, however, who after developing with the alkali pyro developer wash their negatives insufficiently on account of want of time or carelessness, it is necessary to increase or even to double the quantity of the sodium sulphite and of the tartaric acid in the above given proportion. This new acid fixing bath vastly differs from the old one, and warrants much more for the negatives treated with it than the often recommended dull mixture of alum and hypo, which, on account of its deposit of sulphur and aluminia, is inconvenient or even injurious. It is equally useful in the case of fixing developed positives on paper; not, however, for albumen prints produced in the usual manner, which by this bath an unpleasant cold tone.

Anschütz's Instantaneous Camera.—The wonderful and successful work which has been done in the field of instantaneous photography by Herr Ottomar Anschütz, of Lissa, Pösen, is, for the most part, due to the perfect and ingenious construction of his camera. It will therefore be interesting for many readers to learn that Herr Anschütz has now introduced his instantaneous camera into the trade, so that by the use of this apparatus every amateur, after some experience, will be able to produce the finest and most interesting instantaneous photographs. The construction of this patented camera has been fully described in the previous number of this journal; I shall therefore only add that the main feature of this ingenious instrument consists of the instantaneous shutter, it having a slit the width of which can be varied, and which moves closely along the sensitive plate. The camera can be used for instantaneous exposures as well as for time exposures, the manipulations being quite simple. Many of Mr. Anschütz's instantaneous pictures are well known to the readers of the Photographic News; they pertain, without doubt, to the best which have been produced, and especially his motion pictures and his photographs of animals of the Breslau Zoological Gardens are quite unsurpassed; all these have been made by the aid of the afore-mentioned instantaneous camera.

The American expedition to West Africa, for observing the next total eclipse of the sun, started towards the close of last month; it is under the superintendence of Professor Todd.

THE ILLUMINATION OF STUDIOS.

BY E. KIEWNING.

THE question, how can I regulate my light most suitably has certainly been asked by almost every professional photographer in the arrangement of his studio; how shall I place the curtains; and of what material and colour are the latter to be to obtain the best results?

I will try to discuss these questions, having repeatedly had opportunity during the last few years to collect experience in many studios.

The first consideration should be to remove all disturbing reflections which could not be avoided in the fitting up of the studio. This can be done in different ways. The glass, for instance, should be coated with a mixture of chalk and milk. This is particularly advantageous in the case of the top light, as this latter may effect the most injurious disturbances.

If the studio is openly located, which is generally the case in the larger cities, where most of the photographic studios are in the upper part of the house, it should not be neglected to shut off all sunlight by a careful construction of awnings and practically arranged blinds, giving, thus, during the busy hours, only diffused daylight. Herein is the central point of all illumination for photographic studios. Blinds deserve decidedly the preference, not only on account of their durability, but also in regard to the considerably more equal light which is produced by the same. Schaarwachter, for instance, keeps the rays off by blinds which have a flap offering no resistance to the wind when open, but shutting off the sun absolutely when closed.

Reflections from opposite buildings can easily be counteracted by coating the side light with chalk and milk; but in cases where this is not sufficient, a protecting screen, made of a frame covered with muslin, and painted grey on the inner side, should be fastened in an inclined position on the outside. It must be sufficiently high to catch all reflections from opposite buildings. An angle of 40 to 50 degrees will have sufficient effect in most cases, without taking away any useful light; on the contrary, it will contribute to obtaining a steady diffused side light. Studios situated towards the street can use the outside of this inclined screen for signs and so on. I saw this arrangement in the new studio of Schaarwächter, and can recommend it where circumstances require such an arrangement.

In a studio whose side light is only 1.20 to 1.50 m. high—and there are a good many of that size—and where the strongly slanting glass roof joins the side-light in a curve, such disturbing side reflections need not be feared if the low side-light is covered with curtains. Such studios are in that respect the most advantageous ones.

Where the construction is such that reflections do not exist—although this is very seldom the case—the above arrangements may be dispensed with; but at all events it is advisable to have an eye upon the quantity of the light entering from the side, so as not to injure the harmony of the portrait to be produced.

There are a good many operators working cleverly with a front light, and obtaining mostly good results; but the side illumination cannot be spared entirely, and care should be taken to make the same as steady as possible, the equality of the results being favoured thereby. It should also be considered that nothing excites the sitter more than an abundance of blinding light on entering the operating room, forcing him to close the eyes; but if proper care be taken to subdue the light we may hear the expression: "You have an agreeable light in your studio, having a pleasing effect to the eye." The comfort has a lasting effect upon the sitter while his picture is taken, and, of course, is of great advantage to the operator.

Even in studios situated on the ground floor, and exposed to all kinds of reflections, the above-described protective arrangement is of advantage, throwing a good diffused light into the gallery, in place of the unsteady or weak side light.

We come now to the question: How can the curtains be arranged? Of all arrangements which I have seen, I consider the following the most practical. The whole construction carrying the curtains should not be too high, as the effect of their movement can then be more easily observed. The curtain moves most advantageously in the longer direction of the studio; brass wires, at certain distances, should carry the curtains running on rings. The curtains should not be too long, about 1½ to, at most, 2 m., to obtain more conveniently the desired illumination. At both ends they should have a suitable rod sewn in, thus considerably facilitating their manipulation.

The arrangement of the side curtains is made in the same manner, to draw from below to the top, and likewise in the long direction of the gallery, and in such widths that three of the same are capable of shutting off the full height of the light space. The curtains here also run on wires and rings.

The question of what material and colour the curtains should be is not answered so easily. Schaarwächter chooses the usual dark blue material, which for years has been known to photographers, and is most largely in use; but to moderate his method of illumination he has fastened over the dark curtains white ones in the same manner, and according to requirement he applies one or the other, or combines both if necessary.

Friedrich Müller, in Munich, uses exclusively a light grey, yellowish muslin for his curtains, and obtains in this way his well-known artistic pictures.

Ludwig, in Magdeburg, whose studio is exceptionally high and large and entirely covered with corrugated glass, very seldom uses curtains, as he has the advantage that his studio is on the ground floor, adjoining a high building towards the south, so that the sun's rays can never enter.

Höffert operates with quite white, transparent mull, or gauze curtains.

Kameske, in the Hague, uses very little top-light; he has a very high, straight side-light, and uses a dark blue material for his illuminating effects.

Schuren, in Antwerp, lights his effective portraits with the aid of curtains of light blue material, arranged close to the background in very small widths.

Quite a number of efficient photographers I could still mention who differ in the selection of the material, and a definite rule for the same seems to be therefore excluded. It will be wisest to make arrangements according to circumstances.

If the studio is so situated that it has much light, a darker material will offer more advantages, and will admit of more plastic effects than could be produced with a purely white material.—*Photographisches Wochenblatt.*

PHOTOGRAPHIC CLUB.—The subject for discussion on Dec. 4th will be "Dark Room Appliances."

PHOTOGRAPHING CHILDREN.

BY C. BRANGWIN BARNES.

If the professional portraitist wishes to succeed as such, he must give special attention to the portraits of his younger *clientèle*. The way to a mother's heart is through her children, and a really good photograph of the baby will do the photographer much more good in the way of advertisement than half-a-dozen equally good portraits of the elder members of the family. I could name more than one firm in the metropolis whose business is based mainly upon the fact that they turn out uniformly good pictures of children. Over and over again I have heard people say: "We always send our children to Byrne or to Faulkner," and it must not be imagined that the business of either of these firms consists solely in children's portraits, for where the photographer gives satisfaction with the children, he can depend upon it the adults will follow. Such being the case, it behoves each and every one of us to leave no stone unturned that will aid us in this special branch of our art. It has always been a recognized fact that children, from their waywardness and restlessness, are more difficult subjects for the camera and lens than adults; but there is no difficulty that patience and perseverance cannot in the end overcome, and the photographic operator who has not his share of these two p's can never hope to attain to very high rank in the profession.

Photographing children is a very different thing now-a-days to what it was some years ago, and the operator who has only joined the photographic ranks since the introduction of the gelatine dry plate process can barely imagine the pleasant times those who were before him must have had when photographing, or trying to photograph, a group of young children in a poor light, with only the wet collodion process at hand. The operator of to-day can expose plate after plate in rapid succession without being compelled to coat and sensitize each of them previous to exposure, and develop each one before exposing another. In those days it was a standing joke that the dark room walls were the recipients of an unlimited quantum of big big D's, and that photographers were licensed to discharge some slight amount of profanity when once in that sanctum.

The very waywardness of children ought to be of assistance to the photographer rather than the reverse, so conducive is it to the production of picturesque results. Children lend themselves to the production of *pictures* in a way that adults rarely, if ever, can, and that this fact is grasped by artists can readily be seen by a visit to any picture gallery, by reference to the works of Millais, or the numerous presentation pictures which fill the windows of the booksellers' shops at this season of the year.

It is one thing to sit a child on a chair or a table, or to stand it on the floor, focus it sharply, and expose a plate upon it, and entirely a different thing to produce an artistic portrait that shall, at the same time, be a picture. By a picture, I mean a portrait that tells a tale. The frame of children's portraits exhibited by Mr. Faulkner at the late exhibition will explain what I mean by pictures. Children are mostly full of life and merriment, and should be represented as such. What matters a little extra time, or a little extra thought or labour spent upon your work, when that very extra thought, labour, or time, makes all the difference between an arrant failure and a success? It is not natural for a young child to stand bolt upright, like Tommy Atkins on parade, with one hand grasping a chair back and another a wooden spade, while his face presents a stolid look of utter indifference. Children never look indifferent in nature, and they never should be made to do so in art.

In taking groups of children, less care in posing—or perhaps I should say less *apparent* care—would often be an advantage. Adults, we know, will fall into ungraceful attitudes, but children are rarely able to do so, and a group of youngsters in natural positions playing with their toys, or at some of their childish games, or even studying a picture-book, is far preferable to a cold and studied pose, in which the children represent miniature men and women. When I say playing with their toys, I must not be taken to imply that they should be represented as though in a toy shop, though better that way than the other. All I want to see is a naturalistic result—children looking as children—thoughtless, happy, laughing children. If the daylight is not sufficient to aid you to obtain such results, bring the flash-lamp into play, and mind that first of the two p's—*patience*. Don't be hurried in exposing: watch and wait for the exact moment. If you let your shutter go when the expressions are only approaching what you want them to be, you will have the mortification of seeing them just right a moment or so after.

If you have exposed your plate, never mind; put in another and try again; don't give up. You have before you a chance of a splendid advertisement, better than any in the papers, and all it will cost you is perhaps half an hour's time and a few plates, for all of which you will be paid, and so obtain the advertisement free. If we always looked at the matter in this light—and I certainly think we always should do so—we should turn out fewer medium class pictures, be more satisfied with ourselves, and obtain much more work.

Let "the amateur professional" work away as he will, we have here a stand on which he can never hope to tackle us successfully. He may take away a portion of our outdoor work; he may even, by photographing his immediate friends and selling copies at cost price, reduce our general takings by a trifle; but if we work hard and conscientiously at picture making, the harm he can do us will be but infinitesimal. So much for the operator: now, Mr. Retoucher, a word to you. Leave the children's faces as nature made them. I say "made" advisedly; perhaps you would say "modelled," but I contend that children's faces are not modelled; the features are not marked, only indicated, and when your everlasting pencil sets to work to do what nature has left undone, and to "model" the faces, you take away all the charm of childhood, and destroy the work of the operator.

Orthochromatic Plates in the United States.—The researches of Dr. H. W. Vogel in the use of colour-sensitive—orthochromatic—plates have been so persistent, and have stimulated so many other workers, that it is now a very common practice in Europe to use this kind of plate. In Germany such plates are made and used by thousands, while here in the United States there seems to be very little done in this direction. Perhaps this may be due to the fact that up to the present time orthochromatic plates of the quality obtainable in Germany were not to be found in the American market. We are very glad to learn that this is no longer the case, but that our publishers now have orthochromatic plates—coside of silver—made expressly for them according to Dr. Vogel's latest formula. These plates are from a remarkably fine emulsion, and give the most interesting and useful results.—*Anthony's Photographic Bulletin.*

Notes.

The proposition of the Camera Club, that the next "One Man" exhibition should consist of the late Mr. O. G. Rejlander's pictures, is a very excellent one. We fear, however, that anything like a full and representative collection will be difficult to obtain. No doubt many friends of Mr. Rejlander possess copies of his best known works, but, by this time, they must present a somewhat melancholy appearance. What became of Mr. Rejlander's negatives after his death is the question which one would like to see answered satisfactorily. A portion fell into a dealer's hands, and prints from negatives which Rejlander himself would probably never have exhibited have been seen in a shop window in Wych Street, but this seems to be all that is known definitely. Perhaps some correspondent could throw a light on the matter.

Contrary to what has been advanced, it is said that the *Daily Graphic* will not depend so much upon "process," photographic and otherwise, as on wood engraving. The only advantage which photography has over wood is in its cheapness; in point of speed, wood-engraving beats it. The *Graphic* has, of course, a very large and experienced staff of wood-engravers, and the subdivision of labour enables a finished block to be turned out in an incredibly short space of time.

Platinotype printing has, during the last two months, received a great stimulus. The Photographic Exhibition, which showed unmistakeably the taste of the day, no doubt set amateurs, who hitherto had printed in silver, on to experiment with platinotype, and Mr. Lyonel Clark's paper read recently at the Camera Club gave a spurt to the movement. The result has been rather unexpected, and, from one point of view, not satisfactory, since the demand has sent up the price of the platinum salts. The manufacturing chemists who prepare the various compounds were taken by surprise, and their stocks soon became exhausted. The process of preparing the platinum salts is a long, tedious, and expensive one, and there is also the disadvantage attending it that the results are not certain to be of uniform quality. Hence a famine has almost existed during the last few days in the commodity.

Unfortunately the supply of platinum is not abundant, and an increased demand for its compounds is not likely to have the effect which is always produced in other cases when a chemical becomes employed in large quantities. An increased consumption of a chemical salt, as a rule, cheapens its manufacture; but, in regard to platinum salts, we are afraid the effect will be in an opposite direction.

Active photographic preparations are already being made in connection with the last of the series of important total eclipses which began in 1882. The last eclipse takes place in December, 1890, and after that there will be a cessation until April 16th, 1893. The *Observatory*, in noting the arrangements, says, drily, "The Royal Astronomical Society have, on the present occasion, undertaken the part of staying at home, and complacently issue stringent instructions to two observers some thousands of miles away." The points to be cleared up are: (1) Whether the photographed corona changes perceptibly in two hours and a-half; (2) Whether the supposed "extension" of the corona is a solar appendage, or diffused light from the sky; (3) What is the photometric intensity of the corona at different points.

The work, though apparently complicated, is, says the *Observatory*, very simple. The observers will be stationed many thousand miles apart on the central line; they are to be equipped with precisely similar instruments, and to expose a few plates for given times. A simple comparison of these plates will show whether the corona has changed in the two hours and a-half between the occurrence of totality at the two stations, and will, it is hoped, answer question one. The article from which we have extracted this information contains a description of Mr. A. A. Common's recently-constructed mirrors of twenty inches aperture and forty-five inches focal length, and said to be the most powerful instrument of the kind at present available.

A relic of old London, in the shape of an ancient staircase in an old house in College Hill about to be pulled down, has attracted the notice of the *Athenæum*. We do not know if the situation of the staircase renders it possible for any portion to be photographed, but if so, an amateur might make the attempt. Now that the Society for Photographing the Relics of Old London has been dissolved, the only hope for preserving records of ancient bits of London architecture rests with the amateurs. It is a matter apparently not worth the attention of the city of London. Indeed, we have doubts whether a complete set of the interesting photographs published by the Society is to be found in the Guildhall Library or Museum.

Apropos of the Corporation of London and photography, what has become of the application made some months ago by Dr. Sedgwich Saunders, the medical officer, for the funds wherewith to purchase a complete photographic outfit? The sum required by Dr. Saunders was, if we remember rightly, £50, and this amount seemed rather to frighten the civic fathers, who would not have hesitated a moment had three times the sum have been asked for a dinner. Anyway, the matter was referred to a committee, and there it now remains, for aught we know. Dr. Saunders' idea of the employment of photography was not very clear, but we fancy it was to be used more as a scientific than as an artistic adjunct to his office. Whether this were so or not, there is plenty of use for photography in the city. The photograph of one of the interminable

"blocks" in the traffic so trying to one's temper might stimulate the Corporation to effect some much-needed improvements. The picture of an unlucky horse which has fallen on the treacherous asphalte would perhaps wake the authorities up to a sense of humanity, and cause them to be a little more zealous and liberal in the strewing of sand on muggy, misty days. Photographs of neglected dust-bins could also be made use of with advantage. But all these would be only so many reproaches to the Corporation, and are not likely to come from the Guildhall. They can only be undertaken by the public.

Mr. Carey Lea, in the *American Journal of Science*, continues his interesting researches on the changes which take place in chloride of silver under the action of light. In regard to a point which almost everyone has noticed—namely, the curious pause in the action which takes place immediately after exposure, followed by rapid darkening—he offers a very reasonable explanation. Pointing out that light pink or violet proto-chloride is much more sensitive than white chloride, he goes on to say: "Now the first action of light on white chloride is to form this light-coloured photo-chloride, and whilst that is going on, but little visible effect is produced. As soon as the photo-chloride is once formed, the darkening becomes rapid. Hence the pause, and the subsequent rapidity of action."

Of another remarkable phenomenon Mr. Lea says no explanation has ever been offered. When pure moist silver chloride is exposed to light, the darkening goes on steadily to a certain point, and then virtually ceases, and though the chloride now seems perfectly black, analysis shows that the amount of chloride altered has been very small—perhaps a twentieth. Mr. Lea's explanation is that when light acts on moist silver chloride, acid products are formed, the nature of which has not been fully made out. These acid products would instantly destroy sub-chloride isolated. As long as the quantity of sub-chloride present, and combined with normal chloride, is small, the protecting power of the normal chloride saves the sub-chloride from decomposition. The ability of normal chloride to protect the sub-salt rapidly diminishes, as already mentioned, as the proportion of the latter increases. These forces in time find an equilibrium, in which the quantity of sub-chloride becomes constant, and any excess that is formed by light beyond the quantity which the chloride can protect is instantly destroyed; consequently, even tho most protracted exposure fails to increase the proportion of sub-chloride beyond its limits. The whole argument of the paper, which is a valuable contribution to the chemistry of photography, is that darkened chloride of silver is a proto-chloride, and not an oxy-chloride.

At the Camera Club on Thursday evening, December 5th, Mr. A. Horsley Hinton will read a paper entitled "The Standard of Excellence in our Art."

A NEW PLATINUM TONING PROCESS.*

BY LYONEL CLARK.

With regard to the sensitizing solution, I much prefer the variation in the ammonio-nitrate of silver as introduced by Hardwick, the strength I use being 60 grains to the ounce. The following is the method of preparation:—Dissolve the 60 grains of silver nitrate in ½ ounce of water; then add strong ammonia till the brown precipitate first formed is re-dissolved; then divide this mixture into two parts, and add nitric acid till it gives a distinctly acid reaction; then mix the two parts together, and make up to one ounce. This solution is ready for use at once, and only keeps in the dark.

This solution of silver oxide, dissolved in nitrate of ammonia, is undoubtedly the most rapid process; but, like other processes, when speed is desired, its manipulation is more difficult, and it does not keep. In this respect it is vastly superior, however, to the ordinary ammonia-nitrate process, which hardly keeps a few hours. Paper prepared with the above formula will, I find, keep a day, or even two, with care. A disadvantage is that it is impossible to float the paper on this mixture, but it has to be brushed over the surface of the paper, or applied with a glass rod, in the usual manner.

Therefore I largely use the ordinary nitrate of silver process, using a bath of the same strength—60 grains to the ounce. This bath can be used over and over again, and sheet after sheet floated till it is all but exhausted. With this bath, however, I prefer to slightly increase the amount of salt, making it, say, 90 grains. I find a paper so prepared to be fairly rapid, giving untoned prints of a rich colour. I find also that it is advisable to add citric acid to the above solution till all effervescence ceases, and the reaction is slightly acid. This is unnecessary if the paper be fumed, a process which, in very dry or very dull weather, I can most confidently recommend. For further details as to plain paper silver printing I would refer you to the pages of Hardwich's *Photo Chemistry* and *British Journal of Photography*, leading article, 1878, page 78 and *ante*, where full practical details are given.

I will assume, therefore, that paper has either been bought or sensitized at home, and the proof is in the printing frame. It is, of course, evident that the progress of the print can be watched in the usual manner, but the extent to which printing is to be carried on to compensate for loss in the subsequent substitution process demands a few words.

There is but slight loss from this cause in this process. Some diminution of tone is, of course, observable, but in giving working directions, I should say that the loss is about the same as that in gold toning, and I print therefore till the high lights just show signs of degradation. However, in the demonstration with which I will conclude this paper you will be able to see for yourselves the actual loss of detail. It must also be remembered that plain paper prints always lose in intensity proportionally more than albumenised prints. This loss takes place in the preliminary washing to remove the free nitrate. It therefore follows that these papers should be printed somewhat deeper than albumenised ones.

On removal from the printing frame the print should be well washed in several changes of water, till all the milkiness disappears. The presence of these free silver salts do not in any way injure the subsequent toning processes,

* Continued from page 761.

but they render the toning solution, which is used in a somewhat concentrated state, somewhat dirty and cloudy. I therefore prefer to wash thoroughly.

The toning solution is made up as follow :—

Stock solution A Chloro-platinite of potassium	60 grains
Distilled water	2 fluid ounces

This is the ordinary solution as given by the Platinotype Company :—

Take of A	1 drachm
Water up to	2 fluid ounces
Nitric acid	2 or 3 drops

I prefer to add HNO_3 to the solution to ensure its being in an acid condition, the least trace of alkalinity being sufficient to considerably retard the action, but with many papers it is unnecessary.

For those workers who do not use the platinotype formula, I would point out that the above solution means two grains to the ounce of water, and, therefore, the sixty-grain tube can be at once made up to thirty ounces, and duly acidified.

If the weather is cold, I prefer to warm the solution, say, up to 80° F.; this has always an accelerating effect, but too much heat should not be applied to a strong solution, or it will eat away the half-tones.

The prints can either be immersed in this solution, or if only a few are to be done, can be floated on a small quantity of the solution poured over a levelled plate-glass dish. With the above strength, the toning process takes place very rapidly, in from two to five minutes, according to the tone it is wished to obtain. If stopped at an early stage, the prints have a browny colour, whilst if carried on till all redness, as viewed by transmitted light, disappears, they become of the well-known platinum black. If several prints are to be toned at once, it is perhaps best to still further dilute the toning solution, or its action will not be under proper control. In fact, in all cases where it is wished to obtain warm tones, and to have the action well under control, I should advise a considerable weakening of the developer, and to make it up as follows :—

Stock solution A	1 drachm
Water	up to 8 fluid ounces
Nitric acid	2 or 3 drops

Several prints can then be immersed in the above bath, and turned over and watched as the toning proceeds.

After removal from the toning bath, the prints should be placed in a basin of water rendered alkaline by carbonate of soda or ammonia; this is to neutralise the free acid of the toning bath, which, if carried over into the hyposulphite, would cause a precipitate of sulphur, and a probable yellowing of the high lights of the print. Where only a few prints are being manipulated, the hyposulphite bath itself can of course be rendered alkaline. In the fixing bath, if the toning has been complete, the prints should not change colour, and lose nothing in intensity; but if the toning has been stopped at the reddish purple stage, they will change to a brownish black, this colour depending, however, somewhat on the process by which the print has been prepared. This change of colour is due to the silver salts that are left in the paper being altered in colour by the action of the hyposulphite of soda. When, therefore, it is desired to match any given tone, it is advisable to treat the prints before toning with a weak solution of salt in water. The action of this is to dissolve out all the purple sub-chloride, and leave only the red or brown sub-organate of silver. As I have mentioned in the early part of my paper, this has no influence on the toning action, if we except a very slight general reduction of intensity.

The several prints handed round to you have been prepared with the idea of showing some few of the different tones that can be obtained by different salting and sensitising mixtures, in connection with different materials. They are on silk, nainsook, satin jean, Whatman's rough surface drawing papers, Creswick paper of 1865, having a slightly yellow tinge; also a thin bank post paper that appears to promise excellent results, and is almost thin enough to permit of its being mounted in printed books, without bulging them too much. Many samples on ordinary commercial barium salted paper are also shown, and some on Watson's matt surface sensitised paper. Generally speaking, I may remark that the English animal-sized papers tone with more difficulty than the starch or resin-sized German or French papers. This is probably due to the fact that the decomposed sizing is in an alkaline condition, in which case a preliminary bath of citric or acetic acids would appear to be advisable.

Before I proceed to my demonstration, I presume I must say a few words as to the permanency of this process. I had hoped to find that the substitution of the platinum was complete, but I am obliged to confess that this is not so. It is possible to replace the silver to a very large extent, but not completely. This is equivalent to saying that the process is not as permanent as the ordinary platinotypes of Willis.

I have here silver prints toned by gold by my own process, and a print by the cold-bath process of Willis. These proofs were torn into strips and subjected to (1) chlorine gas, formed by the addition of hydrochloric acid to bleaching powder (hypochlorite of lime); (2) chromic acid; (3) sulphuretted hydrogen, formed by the addition of sulphuric acid to a soluble sulphide; (4) bichloride of mercury; (5) alum $AlK(SO_4)_2$ slightly acidulated with sulphuric acid, to represent the condition of a sour paste containing alum. I must here bear witness to the remarkable stability of the cold-bath platinum prints, which passed through the above ordeals absolutely unchanged. The gold-toned prints—gold chloride and carbonate of soda—were unaffected, or only slightly affected, by the mercury, showing that the toning was pretty complete; but the chlorine had entirely eaten off every trace of the image, leaving only white paper. The sulphuration first somewhat darkened, but then yellowed, the colour of the deposit. The alum also had a very decided lowering of the tone. In the prints prepared by my own process the mercury had not the slightest effect; the moist chlorine had, however, considerably damaged the image, but still there was a very considerable amount left. The sulphuration and the other tests had very much the same result as on the gold prints, but in a less degree. Some similar prints on plain fixed chloride and developed bromide of silver papers were, with the exception of the sulphuration and alum tests, of course absolutely destroyed.

From the above results I deduce, therefore, that prints prepared by my process, although vastly inferior to the ordinary platinotype prints, are yet a good deal more stable than those prepared in a similar manner, but toned with gold, and vastly superior to developed bromide papers. Looking at the well-known longevity of such prints, when carefully prepared, this may be assumed to promise them a fairly long life.

SETTLING TRADE DISPUTES BY ARBITRATION.

Some weeks ago the advantage of settling trade disputes by arbitration was pointed out in these pages, together with some particulars as to what the London Chamber of Commerce is doing in that direction. After a time the new Photographic Section of the Chamber will appoint arbitrators; meanwhile, the following list of arbitrators, already appointed in the Chemical Trade Section, may be of interest to photographers, as they are acquainted with many names therein, and will see that the men appointed are those whose decisions are likely to command confidence :—

Bauer, G. M., 16, Mark Lane—sulphate of ammonia, &c., nitrate of soda, guanos, phosphates, bone ash, &c. ; Barron, Richard Bankes (Barron, Harvey and Co.), Giltspur Street—drugs ; Beavis, William (Gray, Beavis and Co.), 17, Philpot Lane—products from coal tar and ammonia (gas residuals); Bennett, George (G. Bennett and Sons), 16, Mincing Lane—guanos, bones, phosphates, chemicals of all kinds, metals of all kinds, plant and machinery valuations, salvage, railway arbitrator, &c. ; Blagden, W. G. (Blagden and Angus), 1, Fenchurch Avenue—sulphate of ammonia and tar products ; Couper, W. G. (Couper, McCarnie and Co.), 1, Fenchurch Avenue—mineral phosphate of lime, bones, super-phosphate, and ammoniacal materials ; Dyer, Bernard, F.C.S., F.I.C., 17, Great Tower Street—manures, oilcakes, damage in shipping cases (salt or fresh water damage, heating, &c.), articles of human food, oils (other than petroleum) ; Elborough, T. (Lawes' Chemical Manure Company), 59, Mark Lane—chemical manures and materials employed in their manufacture ; Farries, T., F.C.S., F.I.C. (Burgoyne, Burbridges, Cyriax and Farries), 12, Coleman Street—chemicals and pharmaceutical preparations ; Fielder, Lewis P. (Pokorny, Fielder and Co.), 15, Fish Street Hill—tar products and chemicals ; Green, W. W. (Brookes and Green), 21 and 25, Mincing Lane—drugs, rhubarb, musk, vanilla, &c., and barks, drysalteries, shellac, tumeric, galls, &c., gums (arabics, animi, copal, &c.), india-rubber, mother-o'-pearl, and other shells ; Greenhough, D. W., 16, Mincing Lane—chemicals generally, excluding soda, extracts, and bleaching powder ; Hall, T. Farmer (T. Farmer and Co.), Dunster House, Mark Lane—manufacture of sulphuric acid and chemical manure ; Hopkin and Williams, 16, Cross Street, Hatton Garden—finer and purer chemicals for medicinal and scientific research ; Hovil, F. S., Dunster House, Mark Lane—gums, drugs, and drysaltery generally, but *not* chemicals pure and simple ; Hughes, J., 79, Mark Lane—phosphate materials and manures, oil and other cakes, analysis of sorts, &c. ; Manning, F. A., 18, Billiter Street—chemicals generally ; Mitchell, W. A. (W. C. Barnes and Co.), Phœnix Chemical Works, Hackney Wick, E.—chemicals generally ; Montgomery, W., 63, Mark Lane—nitrate of soda, guanos, bones, and materials for manures ; Ogston, G. H., 39, Lime Street—chemical products generally ; Preston, Alfred (Thomas Hodgkinson, Preston, and King), 81, Bishopsgate Street Without—drugs ; Price, H. W. (Price, Hickman, and Co.), 17, Mincing Lane—contracts for produce, &c. ; Prodham, William, 110, Cannon Street—coal tar products, and chemicals used in their manufacture, timber, deal, and railway sleeper business ; Redwood, Boverton, F.I.C., F.C.S., 85, Gracechurch Street—petroleum and allied products, paraffin, wax and scales, and solid hydrocarbons generally ; Smith, H. R. (E. F. Teschemacher and J. Denham Smith), 1, Aubert Park, Highbury, N.—as professional chemist where the case in dispute is one involving a question of chemistry and of quality of goods ; Steel, J. M. (Sadler, Forbes, Abbott, and Co., Ltd.), 85, Gracechurch Street—coal tar products, ammonia products, alizarine and aniline colours, acids, alkalies, and artificial manure manufactures ; Tate, Norman—candle products ; Tyrer, Thomas (May and Baker), Garden Wharf, Church Road, Battersea, S.W.—quality of chemical products and general ; Umney, Charles, F.C.S., F.I.C., (Wright, Layman, and Umney), 50, Southwark Street, S.E.—drugs and medicinal chemicals ; Watson, T. Donald, F.C.S. (Johnson and Sons), 23, Cross Street, Finsbury—chemicals (general), and market contracts relating thereto ; Wightman, Charles (W. Cauderey and Co.), 1, Fenchurch Avenue—chemicals, apart from artificial manures and pharmaceutical preparations ; Wilson, Spencer Miall, 6, Mincing Lane—drugs (gum, spirit, and water), essential oils, &c., drysalteries ; Yates, Francis, 64, Park Street, Southwark, S.E.—drugs and chemicals employed in medicine and fine arts.

THE ACTION OF LIGHT ON HYDROCHLORIC ACID.

M. Berthelet, in a communication to the French Academy of Sciences, states that after placing in a large flask full of air about 20 c.c. of very pure fuming hydrochloric acid, the flask has been exposed for several weeks to the sun without either the air or the liquid acquiring the odour of chlorine, or the power of decolourising a dilute solution of indigo. But if there are added to the liquid a few decigrammes of pure manganous chloride, it gradually becomes coloured, even in diffused light, or better in the sunlight, and it acquires the brown tint of the compound which precedes the formation of chlorine in its preparation by the action of hydrochloric acid and manganese peroxide ; or, it might be said, the hydrochlorate of manganese peroxide which has been described in the *Annales de Chimie et Physique*, Ser. 5, vol. xxii., p. 464. This tint augments for several days up to a certain limit. At the same time the air above is charged with gaseous chlorine, and the liquid below acquires bleaching properties.

This formation of chlorine results from the absorption of ordinary oxygen by the liquid, and from the dissociation of manganese perchloride hydrochlorate, formed in consequence of this absorption and of the presence of an excess of hydracid not saturated with water. If the chlorine in the air above is eliminated and replaced by hydrochloric acid mixed with oxygen, the phenomenon is reproduced, and it is clear that it may be reproduced indefinitely by reason of a known mechanism of dissociation, which incessantly regenerates a new dose of free chlorine, of hydrochloric acid, and of manganous chloride. But if we do not introduce hydrochloric acid the reaction will stop about the point where there only exist hydrochloric hydrates saturated with water, such that the gas no longer possesses any appreciable tension. In fact, the author has found that hydrochloric acid diluted with water, and not fuming, is no longer decomposed by oxygen, even in presence of manganous chloride.

Manganous chloride is especially apt to produce these phenomena. With ferric chloride added to fuming hydrochloric acid we obtain signs of reaction, but almost insensible and difficult to show.

Reactions of the same order intervening equally, with formation of dissociated intermediate compounds, occasion the displacement of the chlorine in hydrochloric acid by the oxygen of the air, and latterly it has been industrially utilised on the large scale.

We see, by these observations, how energies in some sort latent, and capable, in principle, of producing exothermic phenomena, but which, in fact, do not produce them under given conditions, may be rendered manifest by the intervention of certain agents acting only as intermediate stages, and capable of developing indefinite reactions. Here is the whole thermochemical theory of action of presence.

Potato Paint.—Those who paint their own plain or shaded backgrounds—and everyone should—will thank the *Oil and Colourman's Journal* for a new kind of paint that will answer their purpose admirably, and is in many respects better and more easily wrought than the ordinary "size colour." Take one pound of potatoes, peel and boil till cooked ; mash well, and add sufficient water to the consistence of thick cream, then pass it through a hair sieve. Add two pounds of Spanish white, or fine whiting, mixed with four pints of water, and the result will be a paint of a fine milk-white colour, which may be applied to canvas, wood, or wall with a brush in the ordinary way. This paint can be readily changed into black or grey by the addition of lampblack, and into red or yellow by the different ochres. The mixture dries rapidly, so that two coats may be applied immediately, one after the other, and its adherence is good.

TABLE OF SIZES OF LITHOGRAPHIC AND HAND-MADE PAPERS.

The following useful tables of papers have been drawn up, with others, under the direction of Col. H. R. Thuillier, R.E., by Col. J. Waterhouse, assisted by Mr. W. H. Cole, M.A., and Mr. T. Archdale Pope, for the Survey of India Department:—

Description.	Broad-side.	Long Folio.	Long Thirds.	Long Fourths.	Broad Folio.	Broad Thirds.	Long Quarto.	Broad Quarto.	Long Octavo.	Common Octavo.	Long 12mo.	Common 12mo.	16mo.	32mo.
LITHOGRAPHIC PAPERS.														
Special	59 × 38¼	59 × 19½	59 × 12¾	59 × 9 1/16	31¼ × 29½	38¼ × 19⅜	38¼ × 14⅜	29½ × 19⅛	29⅜ × 9 1/16	19⅛ × 14⅜	19⅛ × 9⅝	19⅜ × 9 1/16	14⅜ × 9 1/16	9 1/16 × 7⅜
Antiquarian	53½ × 31¼	53½ × 16⅝	53½ × 10 5/16	53½ × 7 1/16	31¼ × 26¾	38¼ × 17 5/16	31¼ × 13⅜	26¾ × 15⅝	26¾ × 7 1/16	15⅝ × 13⅜	15⅝ × 8 1/16	17 5/16 × 7 1/16	13⅛ × 7 1/16	7 1/16 × 6 11/16
Double Imperial... ...	44¼ × 30¼	44¼ × 15⅛	44¼ × 10 1/16	44¼ × 7 1/16	30¼ × 22⅛	30¼ × 14⅜	30¼ × 11 1/16	22⅛ × 15⅛	22⅛ × 7 1/16	15⅛ × 11 1/16	15⅛ × 7⅜	14⅜ × 7 1/16	11 1/16 × 7 1/16	7 1/16 × 5 1/16
Thick Special	40 × 20	40 × 20	40 × 13⅓	40 × 10	40 × 20	40 × 13⅓	40 × 10	20 × 20	20 × 10	20 × 10	20 × 6⅔	13¼ × 10	10 × 10	10 × 5
Double Elephant ...	40 × 27	40 × 13½	40 × 9	40 × 6¾	27 × 20	27 × 13⅓	27 × 10	20 × 13⅓	20 × 6¾	13⅓ × 10	13⅓ × 6¾	13⅓ × 6¾	10 × 6¾	6¾ × 5
Double Royal	40 × 25	40 × 12½	40 × 8⅓	40 × 6¼	25 × 20	25 × 13⅓	25 × 10	20 × 12½	20 × 6¼	12½ × 10	12½ × 6⅔	13⅓ × 6¼	10 × 6¼	6¼ × 5
Atlas	34 × 26½	34 × 13¼	34 × 8⅝	34 × 6⅝	26½ × 17	26½ × 11⅓	26½ × 8½	17 × 13¼	17 × 8½	13¼ × 8½	13¼ × 5⅓	11⅓ × 6⅝	8½ × 6⅝	6⅝ × 4¼
Imperial	30 × 22	30 × 11	30 × 7⅓	30 × 5½	22 × 15	22 × 10	22 × 7½	15 × 11	15 × 5½	11 × 7½	11 × 5⅓	10 × 5½	7½ × 5½	5½ × 3⅝
Super Royal	27 × 19½	27 × 9¾	27 × 6½	27 × 4⅞	19½ × 13½	19½ × 9	19½ × 6½	13½ × 9¾	13½ × 4⅞	9¾ × 6½	9¾ × 4½	9¾ × 4⅞	6½ × 4⅞	4⅞ × 3¼
WHATMAN'S HAND-MADE DRAWING PAPERS.														
Antiquarian	53¼ × 30½	53¼ × 15¼	53¼ × 10¼	53¼ × 7⅝	30½ × 26⅝	30½ × 17⅞	30½ × 13 5/16	26⅝ × 15¼	26⅝ × 7⅝	15¼ × 13 5/16	15¼ × 8⅞	17⅞ × 7⅝	13 5/16 × 7⅝	7⅝ × 6 11/16
Double Elephant ...	40¼ × 27	40¼ × 13½	40¼ × 9	40¼ × 6¾	27 × 20¼	27 × 13½	27 × 10 1/16	20¼ × 13½	20¼ × 6¾	13½ × 10 1/16	13½ × 6¾	13½ × 6¾	10 1/16 × 6¾	6¾ × 5 1/16
Atlas	33½ × 26	33½ × 13	33½ × 8⅔	33½ × 6½	26 × 16¾	26 × 11⅞	26 × 8⅔	16¾ × 13	16¾ × 6½	13 × 8⅔	13 × 5 7/16	11⅞ × 6½	8⅔ × 6½	6½ × 4 1/16
Imperial	30½ × 22	30½ × 11	30½ × 7⅓	30½ × 5¼	22 × 15¼	22 × 10½	22 × 7⅓	15¼ × 11	15¼ × 5½	11 × 7⅓	11 × 5 1/16	10½ × 5½	7⅓ × 5½	5½ × 3 1/16
Super Royal	27 × 19½	27 × 9¾	27 × 6½	27 × 4⅞	19½ × 13½	19½ × 9	19½ × 6½	13½ × 9¾	13½ × 4⅞	9¾ × 6½	9¾ × 4½	9 × 4⅞	6½ × 4⅞	4⅞ × 3⅜
Royal	24 × 19½	24 × 9¾	24 × 6½	24 × 4⅞	19½ × 12	19½ × 8	19½ × 6	12 × 9¾	12 × 4⅞	9¾ × 6	9¾ × 4	8 × 4⅞	6 × 4⅞	4⅞ × 3
Medium	22 × 17½	22 × 8¾	22 × 5⅝	22 × 4⅜	17½ × 11	17½ × 7⅛	17½ × 5½	11 × 8¾	11 × 4⅜	8¾ × 5½	8¾ × 3¾	7⅛ × 4⅜	5½ × 4⅜	4⅜ × 2⅞
Demy	20 × 15½	20 × 7¾	20 × 5⅛	20 × 3⅞	15½ × 10	15½ × 6⅔	15½ × 5	10 × 7¾	10 × 3⅞	7¾ × 5	7¾ × 3¼	6¾ × 3⅞	5 × 3⅞	3⅞ × 2 9/16

MR. W. K. BURTON IN JAPAN.

Professor Burton sends to *Nature* the following narrative:—

"A short description of a curious cloud appearance observed by me this summer may be of interest to your readers. It was noticed in Kiushu, the southernmost of the three great islands of Japan, early in July, at a distance of ten or twelve miles from the sea.

"The season had been, and was, after the time of the observation, an exceptionally rainy one, severe floods being produced in almost all parts of the country, but it was not raining in the place where I made the observation at that particular time. Time shortly after midday, thermometer about 80° F.

"The sky was clear overhead, but there was a great bank of heavy 'thunderous' looking clouds to the south. It is most difficult to judge even approximately of the distance of clouds, but these might be from one to two miles off; the lower edge was represented by a very nearly straight line, and there was an amount of blue sky visible under the clouds that would perhaps subtend from 10° to 15°.

"My attention was attracted to a sort of 'tail' of cloud stretching itself downwards from the straight under-side of the cloud-bank. It gradually extended till it reached some two-thirds of the distance from the cloud to the earth. It remained of about constant length for a little over ten minutes, the lower end continually waving about in a most curious way, giving the impression almost that it was feeling for something.

"Quite suddenly the filament of cloud straightened itself out, and extended itself towards the earth. The lower end became so very thin that, from the distance, it was impossible to see whether it actually made contact with the earth or not, but I have not the smallest doubt that it did, and that a silent discharge took place at the time. There was certainly no sound heard. Immediately after the contact the filament rapidly drew itself up to the cloud, and was incorporated with it. Almost immediately after this, whether as a mere coincidence or not I cannot tell, the cloud discharged a great amount of rain."

The German Photographic Association of Weimar proposes to erect at Munich a memorial tablet to Obernetter.

A New Use for Ultra-Violet Rays.—Prof. Righi showed, last year, that ultra-violet radiations reduce to the same potential two conductors, a plate and a piece of netting, applied to each other, the rays being thrown on the netting-side. He now points out (*Riv. Sci. Ind.*, July-August) that this suggests a very simple and convenient way of measuring differences of potential of contact. One notes the deflection of an electrometer connected with the plate—the netting being permanently connected with earth—then, having connected the electrometer for an instant with earth, makes the radiations act a sufficient time. He used a zinc electric lamp, and the metals examined were placed in some cases in a bell jar, to which some gas or vapour was admitted. From measurements of different plates with the same metallic net—copper, zinc, or platinum—the differences of potential of pairs of metals could be deduced. Prof. Righi found the differences sensibly the same in dry and moist air and in carbonic anhydride; but with hydrogen, very different values—from those in air—appeared, where one of the metals examined was platinum, palladium, nickel, or iron—doubtless owing to absorption. In ammonia all the metals, examined with zinc net, seemed to have become less oxidizable; and in coal gas, carbon and platinum behave like more oxidizable metals. A memoir on the subject will shortly appear.—*Nature*.

PATENT OFFICE LIBRARY

Patent Intelligence.

Specifications Published.

16,715.—*Nov. 17th*, 1888. "Improvements in Printing Photographs." Arthur Richard Brown, The Park, Harrow, Engineer.

This invention relates to improvements in the method of, and apparatus employed in, photographic printing; the objects of my invention being to make a portable apparatus for photographic printing, and one more simple, cheaper, and much lighter than the frames at present used. At the same time, to take out creases from a crumpled tracing, and also to enable two different tracings to be printed at the same time with one apparatus.

I effect this result by means of an air or fluid pressure cushion or bag, preferably made of india-rubber or some such material, in combination with clips for stretching the tracing, thus doing away with the heavy plate glass usually employed. The sensitive paper is kept tight against the the tracing by means of the air bag.

The clips for taking two prints at once may form a rectangular frame, open front and back. If one tracing alone is being printed, it is then desirable to have pieces of webbing or canvas, &c., to form a back to the frame.

The frame, when used, is made in such a manner that it can quickly be taken apart and rolled up with the bag.

The air bag can, if necessary, be used with only a drawing board or card board to form a back for the bag, and the tracing pinned or fixed by means of clips to the board.

Also the bag can be used by itself for taking prints of letters from a letter book or any book printed on one side, with a clip or its equivalent to hold the edge of the page down whilst printing.

The construction of the clips or frames, as will readily be understood, may be considerably varied, but I will describe some of the more likely forms.

Where a drawing board is used, simple spring clips may be employed in place of drawing pins for fastening the paper to the board. Where the drawing board is dispensed with and a frame of some kind has to be used, I prefer to employ light, wooden, longitudinal rods, say, for example, three, with cross bands of webbing where required, though in many instances the webbing can be entirely dispensed with. The papers are fastened by the ends, and for this purpose I employ any convenient form of preferably steel spring clips, which may extend across the whole length of each end, or may be divided, or several entirely separate clips may be employed. However, I prefer for this construction to employ a single long clip at each end, and so arrange it that, the papers having been turned over, a metal or other rod can be slipped in under the clips, which are sufficiently strong to prevent back-sliding; by this arrangement the papers are sufficiently firmly stretched, and the inflation of the bag will take out any unevenness, and also place the two papers in intimate contact.

If desired, a complete open frame may be made jointed at the corners, preferably by hinges with removable pins; a suitable groove or recess passes round this frame, and spring clips are so placed that, when the papers turn round, the rods are inserted in the groove, both rods and papers are securely held. Instead of using clips the frame-work may be divided at the groove, and when the rods and papers are inserted therein, the divided portion of the frame may be brought together in any convenient manner, as by screws and thumb nuts.

Instead of the bands of webbing above mentioned, a sheet of canvas or equivalent—paper or the like—may be used; and instead of the drawing board, a sheet of card or mill-board can be employed.

Where it is desired to take two prints at once, it will be understood that the bag is inserted in any suitable frame or clips, and lies between the two sets of papers, so that both are stretched as required.

The inventor claims:—

1. A frame for stretching and holding papers, tracings, or other matter, for the purpose, as described, of photographic printing or copying.

2. An india-rubber or its equivalent air or fluid pressure cushion or bag, for the purpose of pressing sensitive papers against tracings or matter to be copied or photo printed.

3. A pad made thick at the centre and tapered away on all sides, of felt or other suitable material, for use with apparatus for photographic printing, or copying tracings, or other matter.

4. The use of a card board, wooden board, or its equivalent, for the purpose of holding and pressing sensitive paper against tracings or matter to be copied or photo printed, in combination with a suitable apparatus for stretching and holding the same.

5. The use of a drawing board or other board in combination with means for holding the tracings or matter to be photo printed.

6. The general combination of parts forming my improved apparatus for photographic printing.

18,150.—*December 12th*, 1888. "Instantaneous Shutters." Emile Tourtin, photographer, and Lodoïse Parsy, gentleman, both of 8, Boulevard des Italiens, Paris.

Our invention is based on the observation of the following principle, the application of which by us is, we believe, entirely novel:—

If an opaque screen of a given shape is placed in sufficient proximity to a photographic lens, either in front of, at the back of, or between the system of lenses, like a diaphragm, the formation of images at the focal plane is not altered in any way; the sharpness remains as perfect, the luminous intensity only being reduced in the same ratio than that of the surface of the opaque screen to that of the lens.

If the screen so interposed in the direction of the luminous rays be in the shape of a grating, that is to say, with alternating plain and hollow parts, the above-mentioned fact will occur. In effect, the light rays emanating from an object situate at any distance greater than the focal length of the lens are in no way checked by the interposition of the grating, and are refracted in exactly the same manner as if there was no obstruction; the light rays striking against the plain parts of the grating are, it is true, lost, but the image remains quite as sharp, although it is less brilliant.

If another identical grating is placed in front of the former one, the plain parts of one corresponding to the hollow parts of the other, and is made to slide against it, it will, at both the beginning and the end of the journey, act as an "obturator," and meanwhile the openings of the fixed gratings will have been gradually opened and shut again, the greatest amount of light being admitted when the openings of the two gratings exactly correspond with each other.

If this apparatus is adapted to a lens placed in front of a camera and is operated, the usual luminous impression will be obtained at the focal plane with this advantage, that, as the displacement of the movable grating may be made as short as desired by multiplying the number of bars, the duration of exposure is proportionately reduced, and can be made to correspond to almost absolute instantaneousness.

But such a shutter absorbing a great proportion of the light—a minimum of one-half in the theoretical supposition, of the bars and the hollows being of equal widths—could only be used for photographic purposes in the case of an exceptionally intense light being available. The same reasoning applies to a shutter with bars and hollows radiating from a centre, but the latter offers this disadvantage, that the central rays of light, which are the more important, would be intercepted.

The arrangements described would prove very suitable for photographic purposes if the substances used were of a sufficient degree of sensitiveness; but with the materials actually to be obtained in the market, we construct our shutter with a series of parallel blades similar to those of a venetian blind, and which are acted upon by means of an appropriate mechanism; they turn together with the same angular motion, and without losing their parallelism.

Each blade is mounted on two pivots, one at each end, lodged in the casing of the camera, and also provided with a pinion. All these pinions are in gear with a toothed rack, the forward and backward motion of which causes all the blades to simultaneously turn in one direction or in the other. The motion of the blades could equally be obtained by means of

mechanical arrangements of any other description, such as pulleys, and tape or string, articulated levers, &c.

If the rack or rod is pushed home in one direction, the blades are all closed, and a spring catch maintains the shutter so constituted closed until it is released by means of the ordinary pneumatic india-rubber ball, or any other contrivance ; at that moment the rack or rod is shot to the other extreme position by means of a spring provided for the purpose. In the interval the shutter has been opened and shut again.

The tension of the spring, and the consequent degree of instantaneousness which it is desired to obtain, may be regulated at will by means of a thumb-screw, and is indicated on a dial by a pointer following the motion of the regulating thumb-screw.

The angular motion of the blades is about 180 degrees ; they overlap each other so as to constitute a perfect "obturator," and their number may vary from one single one to any number.

When the shutter is arranged to act in a vertical direction, the spring may be dispensed with if the weight of the rack or rod is sufficient to insure the working of the system ; the action of gravitation may even be retarded, if found too quick, by means of a brake or friction-piece, dash pot, &c.

The shutter may be fixed in front or at the back of the lens, or even between the system of lenses ; it is set in the centre of the apparatus by means of three set screws.

It will readily be understood that in our system of shutter the quickness obtained is greater than with the guillotine, either single or double, horizontal or vertical.

In the latter case, in effect, the light acts, at the same moment, upon the totality of the sensitised plate ; small at first, it gradually increases to gradually decrease again, and the motion of the object to be photographed affects the plate from the beginning to the end of the exposure.

With our shutter the plate is only gradually affected, the luminous beam travelling in a direction opposite to that of the blades ; the said beam is wider or narrower according to the distance between the blades and the width of the said. Consequently, should the width of the beam be equal to one-half of the height of the sensitized plate, the same quickness than that obtained with a guillotine shutter will be obtained with our blade shutter in half the time.

Another advantage of our system is, that its speed remains constant whatever the size of the lens, as the blades always travel the same distance.

As to the amount of light intercepted by the blades, it is almost insignificant, not exceeding the proportion of about 1 in 30.

Our shutter is applicable to other apparatus, such as magic lanterns, projection and other apparatus intended for the instantaneous sending or receiving of beams or flashes of light.

18,403.—*17th December*, 1888. "Improvements in Photographic Cameras." PAUL JULIUS GUITON, of 1, Boulevard St. Denis, Paris, Manufacturer.

With portable photographic apparatus, such as those used by tourists, there is always a difficulty in the replacing of the sensitive plates after each operation ; this replacing takes some time, and is somewhat difficult.

Now the object of my invention is to construct a multiplex sensitized plate carrier in which the changes of the plates can be quickly and readily effected. For this purpose I employ a frame divided into any suitable number of compartments, in which the sensitized plates or glasses are lodged. These compartments are uncovered in succession by an endless band furnished with slips of wood. A part of the surface of this band equivalent to that of one compartment is cut out, and at this place it carries the dark chamber. The dark chamber follows the movement of the endless band, and is therefore put in communication with each sensitized glass in succession ; it is separated therefrom by a shutter, which is drawn out at the time of the operation. At one of the sides of the frame I form opposite each compartment a notch, with which a small rod or stud fixed to the dark chamber engages. The chamber is thus guided to the proper position at each change, and its stability is ensured during the operation.

It will be understood that I can double the frame and have two rows of sensitized plates, and cause the dark chamber to turn around the frame ; or I can give a rectilinear movement to the band, and have any desired number of compartments ; or, the frame can be fitted to a fixed dark chamber, and in this case the frame would move.

12,853.—*August 14th*, 1889. "Automatic Apparatus for Displaying Intermittently Pictorial Effects." HENRY EDWARD NEWTON, 6, Bream's Buildings, Chancery Lane, London, civil engineer. Communicated from abroad by WILLIAM BARRACLOUGH, engineer, ERNEST CHARLES DAVIES, and CHARLES AUGUSTUS WYLIE, financial agents, all of 137, Elizabeth Street, Hyde Park, Sydney, New South Wales.

This invention consists of suitable apparatus for displaying intermittently panoramas, dioramas, advertisements, or other pictorial or printed effects, the changes being operated automatically. The effects may be rendered visible by night or by day through the medium of direct or reflected natural or other light from without, or by artificial light placed within the framework of the apparatus ; in the latter instance, the displayed effects would be known as transparencies.

The apparatus consists of a panelled framework of suitable dimensions, the panels being rendered transparent, either by the introduction of glass, or by leaving the panel space vacant, so that the displayed effects may be clearly seen from without.

Placed within the framework are one, two, or more pairs of nests of spring rollers, one of each pair of nests of rollers being placed within the framework, at the top, and the other at the bottom of each transparent panel. Each roller in the nest has a suitable picture or advertisement rolled upon it, the outer extremity of each roll or sheet being furnished with a batten or lath, the ends of which—when the picture or advertisement is rolled up on the roller—take into recesses or notches formed in the peripheries of discs that carry the axes of the nests of rollers, and the axis of each individual roller.

The pictorial or printed sheets are displayed by unwinding them alternately from the top and bottom nests of rollers.

THE FREE LIBRARIES OF PARIS.—The higher level than in England of the average education of the general public in Germany, Switzerland, and some other countries on the Continent is at the root of the great influence of foreign competition upon several home trades. The facilities for obtaining information are also greater in some nations in Europe, and France is far ahead of us in the matter of public libraries. In this respect how does London compare with Paris? *The Journal of the Society of Arts* says that in establishing popular free libraries, the Municipality of Paris endeavoured to supply a want quite different from those which were furnished by the large and rich collections of books like the National, Mazarin, Arsenal, and other libraries. The object was simply to place within the reach of all, the elements of labour and study, and for their moments of leisure, a salutary occupation, a means of public improvement, and of popular education for those who seek instruction and intelligent distraction. To the workman it is a species of school which competes with the tavern. The object long delayed has been to provide year by year a library for each of the eighty quarters of Paris. The hours at which these are open coincides with the time of cessation from labour, when most of the shops and factories are closed, and the libraries are easy of access for the work-people. The privilege of taking home books is important, since it enables the reader to choose his most convenient hour for reading, and thus associate his family with his study or pleasure. The number of municipal free libraries—which it is hoped will ere long reach eighty—is at present fifty-seven, without reckoning two specially devoted to industrial art. Each of the twenty mairies has a free library, besides thirty-seven others installed in the public schools. Although all under the charge and care of the Prefect of the Seine, that of each arrondisement or district is under the supervision of a committee presided over by the mayor, who select the books to be purchased. The expenses are all paid by the town. The staff consists usually of a librarian, sub-librarian, and a beadle. The books are ranged on shelves without any classification, according to the number they bear. Of the fifty-seven libraries, thirty-four have a reading-room.

Correspondence.

THE CAMERA OF ANSCHUTZ, OF LISSA.

Sir,—In reference to the Patent Specification of Herr Anschütz, published in the News of November 22nd, will you allow me to point out that a full description of the roller-blind shutter, to work next the plate, was published as a contribution from myself in the *British Journal Almanac* of 1882; and in the Almanac for the following year Mr. Howard Farmer described the method of regulating the exposure by altering the width of the slit or opening. Herr Anschütz is probably not aware that this form of shutter is already public property, and therefore cannot be patented. B. J. Edwards.

The Grove, Hackney, London, November 25th.

PROPOSAL FOR A NATIONAL PHOTOGRAPHIC UNION.

Sir,—I enclose a copy of resolutions unanimously adopted at the last meeting of the North Surrey Photographic Society.

I. At a meeting of this Society held on the 19th November, 1889, it was resolved that it is desirable to found a National Photographic Union so constituted as to fairly represent all photographers in the United Kingdom. The object of such union being to benefit photographers and all those connected with the art by watching over their interests generally; and being made representative by inviting every society to send delegates to sit on its Council. The scheme of its work to be drawn up by the delegates representing the societies.

II. That the foregoing resolution be forwarded to the photographic press and photographic societies; and that the latter be requested to give their opinion on the question, and to say whether they are prepared to co operate in forming such an union.

I may say that these resolutions are the outcome of deliberations of some months past amongst our members, which have assumed a more definite form owing to the notice of the Society being called to a proposal in circulation for an Institute founded on lines strongly objected to by the members. At present there exists no body representative of photographic interests to be consulted either for legislative or other purposes.

As examples of the utility of such Union, attention need only be directed to the great advantages derived from similar bodies at present existing in the angling and cycling worlds.

With a view of convening in London a preliminary meeting, all those willing to co-operate in the movement are requested to communicate with me at 369, Norwood Road, S.E.

November 23rd. J. Larcombe, *Hon. Sec.*

CELLULOID V. STRIPPING FILMS.

Sir,—In your report of the discussion on Major Nott's paper on "Film Photography," read before the Camera Club on the 14th inst., it would appear that I questioned the absence of granularity in the celluloid films submitted by Mr. Davison. Evidently I was misunderstood. My enquiry invited the expression of an opinion from Major Nott on the amount of granularity present in the stripping film, under certain conditions, and compared with the entire absence of this disadvantage in celluloid of *any description*, now being employed for negative purposes. The superiority of the latter article in this respect alone is, I think, now thoroughly recognised.

5, *Chandos Street, London, W.C., Nov.* 23. A. E. Hayman.

Blackpool Photographic Society.—A Photographic Society to be called by the foregoing name, and which will hold its meetings at the Adelphi Hotel, Church Street, Blackpool, at eight o'clock in the evening of the first and third Tuesdays in the month, has been formed in this town. The officers are as follows:—*President*—Alderman John Bickerstaffe, Mayor of Blackpool; *Chairman of Committee*—Mr. Samuel Beverley; *Treasurer*—Mr. Isaac Wilde; *Committee*—Messrs. F. Gregson, T. T. Thompson, J. Wright, M. G. Wilde, W. H. Terry, D. Mitchell, S. Beverley; *Secretary*—Mr. S. Woistenholme, Wellington Studio, Blackpool.

Proceedings of Societies.

Photographic Society of Great Britian.

At the technical meeting of this Society held on Tuesday last, the 26th inst., the chair was taken by Mr. Chapman Jones.

Several prints by the Typographic Etching Company were shown by Mr. A. Dawson. They were of varied subjects, including copies of paintings and some photographs from nature. Amongst the latter was one of those by Mr. Gale, shown in the late exhibition of the Society. The tone of ink used was for the most part of a sepia character. With respect to those which were reproductions of old paintings, Mr. Dawson said that it was surprising what effect orthochromatic plates and a yellow screen had in bringing out the dark colours of the originals.

Mr. Leon Warnerke asked where the yellow screen had been used.

Mr. Dawson said in front of the lens.

Mr. Warnerke observed that a screen so used injured the definition, and enquired if Mr. Dawson had not found it so.

Mr. Dawson replied that it did to a slight extent, but not, he thought, enough to be injurious with the subjects in question.

Mr. Warnerke said that it was best to use coloured light, and so not to interfere with the optical working of the lens. He used a magnesium lamp with slides into which he could fit glasses of any depth of colour desired. For copying paintings he used the lamp for half the time of exposure on one side of the picture, and changed it to the other side for the other half of the exposure. Irregularities of surface did not obtrude themselves when thus treated. There was also less chance of failure from inaccuracy of exposure, as the source of light was a constant one. He could also direct additional light to any part of the subject which he thought would be better for such treatment.

Mr. Dawson, in answer to enquiries, said that all the plates shown had been worked upon, mostly with the graver or burnisher, and all by biting in some portions more deeply, whilst other portions were protected. This extra biting-in was a necessity if many copies were required to be printed. For two hundred copies or so the plates might stand without this deepening, but when, as was generally the case, five hundred or more were required, it was absolutely essential.

Mr. Warnerke enquired whether Mr. Dawson had found trouble with caverns in the copper, and if so, to what did he attribute this defect.

Mr. Dawson replied that it was due sometimes to holes in the negatives, sometimes to holes in the copper, but generally, he believed, to cracking of the gelatine.

Mr. Warnerke said that in Vienna, copper deposited by galvanism was generally used for photographic purposes.

Mr. Dawson said that there was a kind known as French copper that was somewhat harder than English copper, and wore better.

Mr. Warnerke observed that not only was English copper defective, but that English brass wire very soon became so brittle as to be useless. This was not the case with foreign brass.

Mr. J. A. Harrison said that Bristol brass was better than that generally obtainable.

Mr. Atkinson would like to know whether the light from paraffin was used for copying to obtain orthochromatic effect, and if so, with what result.

Mr. Warnerke said that paraffin-lamp light was very good, but that for extreme orthochromatic effects a yellow glass must be used in front of it.

A Latimer-Clarke stereoscopic camera with single lens was shown as an interesting historical contrivance by Mr. J. H Harrison.

In discussing the distance at which lenses should be separated for stereoscopic work,

Mr. England said that he had never found it necessary to

separate them more than they were fitted in the two-lens camera; and

Mr. ATKINSON said that he had used them for distant views three feet apart.

Mr. W. E. DEBENHAM said that the effect of separating the lenses more than the normal distance of the eyes was to represent the objects as in a model on a smaller scale, or as they would be seen by a being whose eyes were as far apart as the lenses were separated. There was an instrument invented some years ago called a telestereoscope, by means of which distant objects which, in consequence of small parallax, appeared as if flat, could be made to show relief. As an absolute representation of what the unaided eye sees, the great distancing of the lenses for stereoscopic pictures might be called wrong; but if it was intended to show the relief of objects in a way that the human eye could not see unaided, this separation might be called successful. The moon, in spite of its distance, had thus been made to show its rotundity in the stereoscope.

Mr. FRIESE GREENE showed a number of specimens of a printing process sent by Mr. Victor Selb, of Antwerp. They were said to be produced by an emulsion containing starch and bromide of silver spread upon the paper and printed by development. There was in these specimens a remarkable freedom from that blocking up of the shadows generally characteristic of development processes for positives; indeed, it was remarked by some members that the richness and gradation in the blacks was more perfect than they had seen in any prints not highly glazed. Some of the prints were on matt surface, or nearly so, whilst one or two were highly glazed. The tone was mostly of a rich, deep, warm brown.

Mr. LESLIE MONTEFIORE showed some examples of platinum-toned prints by Mr. Lyonel Clark's recently published formula. The toning was very rapid and effective, both upon salted and albumen paper.

It was mentioned that, as the fourth Tuesday in December would fall upon Christmas Eve, the next technical meeting of the Society would be held on Tuesday, the 31st of December.

THE CAMERA CLUB.

November 21st.—Bedford Street, Strand, London, Mr. LIONEL ASHBURNER in the chair.

Mr. A. MASKELL read a paper on "The Progress of Hydroquinone," saying that in January last he had read a paper on quinol before the Club, and since then had gained more knowledge of its advantages as a developer, and that evening he would state his results, as an ounce of practice was worth a pound of precept. One commercial firm in this country had said that the sale of quinol during the past year had been four times larger than that of the preceding year, and another firm told him that it had been a hundred times greater, yet he thought that it was restricted in sale among professional photographers. He then exhibited some of his quinol, negatives and prints therefrom, also the negatives which Mr. J. W. Swan exhibited some time back before the Photographic Society. He said that Messrs. Swan, Cadett, Wilson Noble, and Lyonel Clark had read valuable papers on quinol before societies in 1889, and before writing his paper he had consulted others who had experimented with quinol, the use of which was recommended by Capt. Abney in 1882. Latterly it has attracted much attention in France, in which country M. Balagny is its chief advocate, and it has great hold on the Continent, whereas, by some in England, "the feeding bottle developer," and other derisive terms, had been applied to quinol. In some cases it does not seem to work well, perhaps in consequence of the kind of plates used. He preferred the word "quinol," yet somehow, in conversation, found himself using the word "hydroquinone." He had some specimens of the substance on the table, all but one of them from Germany, which seems to be the fashion now-a-days. The solitary English sample, he said, was made by Messrs. Hopkin and Williams. The purity of the carbonates and sulphites used with this developer he considered to be a matter of great importance, and he found that the proportion of quinol recommended in the formulæ of different workers varied from half-a-grain to six grains to the ounce. He would admit at the ouset, that in the hands of experienced operators, pyro gives better negatives than does quinol, but the superiority is very slight, and is counterbalanced by extra ease of working with the latter substance. Vogel says that over-exposure can hardly take place with quinol, and that plates differently exposed can be developed in the same bath and give the same result, which latter statement he (the speaker) did not understand, for he could not do the same. Balagny claimed, before the Photographic Society of France, that by the use of quinol he could develop plates in white light, and Londe explained this as due to the developer being on long enough to bring out the image impressed by a strong light, and not being on long enough to show the effect produced by the weaker white light used while developing. Some brands of plates, when under-exposed, will give a bad yellow fog with quinol. The mixed developer does not change much in colour with keeping; M. Londe says that it nevertheless goes on changing, but Londe's experiments on this subject do not seem to be altogether satisfactory; at all events, the deterioration is not practically serious. He (Mr. Maskell) held in his hand a bottle containing eight ounces of developer mixed on the 3rd of September last, and with which eight whole plates, eight half-plates, and six lantern plates had been developed, and they could see that it had not changed much in appearance. On bromide paper it worked well, and rendered the use of an acid bath unnecessary, whilst the resulting prints were as good in appearance as those by the platinotype process; indeed, Mr. Pringle said that with quinol he had produced prints which could not be distinguished from platinotype. The only disadvantage of quinol worth considering is its tendency to give hard negatives. The operator must follow the well-known rule to expose for the shadows, and leave the high-lights to take care of themselves; in this respect quinol stops short of pyro. The clear glass in the shadows, which quinol had a tendency to give, he thought to be largely due to a large proportion of sulphite in the developer. The quinol developer can be worked by means of a succession of baths, each succeeding bath increasing in its degree of energy, and the full amount of alkali can, if necessary, be added to the first bath, which in use becomes gradually charged with the powerful restrainer, bromide of soda. He recommended the employment of this "battery of baths," as it might be called. Warming the developer gives greater energy. For contrasts, use an old bath; for soft negatives, use a new one. He never threw away any of his quinol developer, for it was always useful. He preferred carbonates to the caustic alkalies in quinol development, although they work more slowly. The formula he preferred was that used by the Paris Photographic Club, namely:—Boil a litre of distilled water, and put equal quantities of it in a couple of litre bottles. While warm, put into one of these bottles 75 grammes of sulphite of soda, and into the other 150 grammes of powdered sodium carbonate, immediately before using, and shake until all is dissolved. To the sodium sulphite solution add 10 grammes of quinol, and shake well until dissolved; to this add from 8 to 10 drops of glacial acetic acid; then leave all to cool. When cold, mix by rapidly pouring the quinol solution into the carbonate solution, and filter the whole into a third litre bottle. The solution should be perfectly clear. For instantaneous work:—

Concentrated solution of pure carbonate of soda...	300	c.c.
Ditto ditto sulphite of soda ...	150	,,
Ten per cent. alcoholic solution of quinol ...	50	,,
Distilled water	500	,,

In considering Mr. Lyonel Clark's paper on the use of quinol, based upon experiments with the sensitometer, it must be remembered that he used artificial light, and that it is not certain whether that light agrees with the average kind of light dealt with in taking views. The speaker then exhibited a series of quinol-developed negatives upon Eastman's films, which were the work of the Chairman, Mr. Ashburner.

Mr. AUGUSTUS STRÖH had had the short experience of three or four months in the use of quinol, and had been favourably impressed thereby; so much so, that he had altogether discarded pyro. He used Thomas's formula with sodium hydrate. With

quinol he had found a difficulty in working stripping films, because the film became so hard and solid, but that was an advantage under certain circumstances. If the paper did not come away freely, he pulled off what he could of it, and then rubbed off the rest with a towel; the resulting negative did not suffer at all thereby. The developer could be used for all purposes, and that was a great advantage. He thought it desirable to get more density in the negatives when developing with quinol, than when using pyro, if the same class of prints were desired from both.

Mr. George Davison thought that to be due to difference of colour, the pyro image being brown, and the quinol image grey. He considered quinol to be a developer with which any kind of work could be done fairly well; but there, he thought, was an end to its utility, because it could not possibly be the best for all conditions. The power of varying the proportion of alkali was not given by Mr. Maskell's method. The proportion of quinol given in average formulæ was not large enough; about two grains to the ounce was usually recommended, and this, in his experience, was not sufficient. A peculiarity of this substance was, that if more quinol were added, the development was thereby rendered distinctly more rapid. He did not think that it was any advantage that pyro had a tendency to give a negative with a stain; if such were wanted, a coloured transparent medium might be placed, during the printing, over a negative free from stain. Did quinol give as good gradation as did pyro? He had used quinol on bromide paper, but the results were not the same in appearance as platinum prints. He then exhibited some rollable-celluloid negatives developed with quinol; also bromide prints therefrom also developed with quinol. In his experience quinol was not so good for bromide prints as ferrous oxalate.

Major John Fortune' Nott was not convinced that quinol had anything like the perfection of pyro for developing negatives, although if he wanted a developer for all purposes, he should select quinol, the pretty negatives of which he did not think printed so well as the brown ones produced by pyro. He liked the quinol developer for lantern slides. In cheap text-books photographers had long been taught that in portions of lantern slides they must have clear glass, but several members of that Club had educated the others into a more advanced state of knowledge, and had set up another standard altogether in artistic work. He should condemn quinol whenever it gave clear glass to the destruction of atmospheric effects, and it only gave these occasionally. The use of the meetings of the Club had been proved to him that evening, for the quinol-developed stripping-film negatives before them proved that he had been in error when he stated that the quinol developer would not do for that work, so he would withdraw what he had previously said on the point. If he did not wash quinol-developed plates, but put them straight into the hypo, the negatives were utterly ruined, so he could not account for the experience of those who stated that they put them direct into the hypo without washing,

Mr. Lyonel Clark had not changed any of the opinions about quinol which he had expressed at the Conference of the Camera Club in the early part of the year, and even the lecturer admitted that quinol was not the best developer. He would join issue with Mr. Maskell in recommending to anyone the use of any developer which was not the best for the purpose; they did not want to be like the flute-players in the street, always playing the same old tune, and never making any advance. He had noticed that of late the French had been "slating" the quinol developer severely, as they would see in M. Albert Londe's book. Quinol, not being very soluble, is not easy to carry about, unless the same solution is used over and over again, and that method is not right. The hydrates of the alkalies seem to be necessary when it is used, and they attack the skin —at least they attacked his own skin—when using the quinol developer. A statement had been made about exposing a plate while saturated with the quinol developer, and obtaining a negative. Curiously enough, that was returning to a method which dated about 1837, or at all events before the publication of Fox Talbot's photographic discoveries, for the Rev. J. B. Reade had before Talbot's time exposed iodised films covered with developer, and had thereby obtained photographs in microscopical work.

Mr. Davison agreed with Major Nott, that quinol was not the best developer for lantern slides. The best lantern slides he had seen had been developed with pyro and ammonia by Mawson and Swan's formula, but quinol was easier to work.

Mr. Maskell, in reply, said that although he had admitted that quinol was not as good a developer as pyro, he had qualified the admission by saying that the superiority of the latter was very slight, and that quinol was the best developer for those who were not at the top of the tree. He often did not want to add more alkali, for he had found that with quinol the addition of alkali beyond a certain point does not produce a corresponding effect. No remarks had been made about Mr. Swan's quinol-developed negatives, which had been handed round.

Mr. Davison understood that the operator who had performed the experiments under Mr. Swan, and had produced those negatives, liked the pyro negatives best.

Mr. Maskell denied that M. Londe had "slated" quinol, or was a man who would slate anything; he had read the book of M. Londe, also another mentioned by Mr. Clark, and did not find that they slated the quinol developer.

The Chairman remarked that there is evidently much difference of opinion about quinol; consequently it is best at present to let the question rest in that position, and to encourage the two schools to compete with each other to see which can turn out the best work. Quinol is said to be slow in operation, but if the plates be passed through successive dishes, with fresh quinol developer in the last one, and from which the plates are transferred to water, it will be found to be a rapid developer; at least, it will turn out six negatives in half-an-hour, which is not slow work for an amateur.

London and Provincial Photographic Association.

At the meeting on the 21st inst., Mr. John Nesbit occupied the chair.

Some further improvements made by Mr. T. Kerr in his hand camera were shown by him, the chief novelty being that the action of opening the lid to change the plates and set the shutter for the next exposure, and, at the same time, draw the exposed plate out half way, facilitating its being removed from the front to the back of the camera. The plates, held in sheaths, are changed in a bag attached to the top of the camera. Closing the lens also closed the finders. The camera held eighteen plates.

A question was asked whether, in changing the plates, dust from the inside of the changing bag caused any trouble.

Mr. Kerr had not found this to be the case.

The Chairman had heard opinions expressed that finders in hand cameras were quite unnecessary. He held a contrary view; he believed a finder to be an important accessory. It was not an unusual experience, after development, to find only half the intended picture on the plate. He thought the aperture *f*/6 of the lens used with the exhibit too large for general work. He would give preference to a lens working at *f*/12.

Mr. W. E. Debenham said that in the collodion days excellent instantaneous photographs were taken with lenses with apertures *f*/6 or *f*/8.

The subject of eikonogen was brought forward for discussion.

Mr. A. Cowan said that from the trials he had given it, he considered that the claims of the inventor were substantiated.

The Chairman said being able to develop several plates in the same solution was not altogether an advantage. During development free bromide was evolved, causing increased hardness of image with each succeeding plate.

Mr. A. Cowan said Mr. W. K. Burton had stated that detail was not stopped by restraining the developer.

Mr. W. E Debenham said that using a developer over and over again would cause a loss of range of gradation.

Mr. W. Cole said that without the addition of sulphite, eikonogen oxidized very quickly.

The Chairman, in referring to the period before the introduction of sulphite of soda, remarked about the good results in development he obtained then. He believed that the oxidization of the developer had a beneficial influence upon the quality of the negative.

Mr. J. B. B. WELLINGTON said that in some districts a developer would oxidize much more quickly than in others; this was due to the water used.

Mr. A. CLARKE said he had developed half-a-dozen negatives with the same hydrokinone developer, the time varying from a quarter of an hour to an hour and a quarter. No difference was observable in the results.

The CHAIRMAN said such a prolonged development as the last named would be a trial of patience, and the plate would in all probability be left, in which case mottling might be expected.

Mr. A. CLARKE suggested turning the plate over film downwards when left.

Mr. A. COWAN had tried this by leaving a plate in the position suggested for fifteen hours, using a developer sixty-four times reduced. It did not prevent the plate becoming mottled.

Mr. W. E. DEBENHAM asked if the preliminary bath of hypo and mercury recommended in the instructions sent out with eikonogen for rapid exposures, had been found advantageous.

Mr. A. COWAN said its use slowed development considerably.

A Member said no reference was made to this bath in the instructions now sent out.

Mr. T. E. FRESHWATER showed two bromide prints that had been developed with eikonogen with a good result. After an interval of about three weeks, the solution lost its developing action. The solutions were kept separately in corked bottles, but the bottles were only about one-third full.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

AT the meeting held on Friday, November 15th, Mr. H. BANKS was in the chair.

Mr. E. Orme was elected a member.

The Vice-President (Mr. MAURICE HOWELL) gave an address on the "Early History of Photography," illustrating the various processes by specimens of Daguerreotypes and a number of Talbot-types, these latter being his own work.

Two gentlemen were proposed as members, the meeting closing in the usual manner.

ACCORDING to the St. Petersburg *Listok*, during a recent trial for forgery at the Central Criminal Court, a photographer was employed to take photographs of some documents bearing on the case, and to exhibit the same in court by the aid of the optical lantern. The same newspaper announced that the Ministry of Justice had added a sworn-in photographer to the staff of the said court.

ALVAN CLARK AND SONS have just completed a new telescope for Harvard Observatory, to be used in star photography. It covers a space in the heavens about ten degrees square, and has a lens about eight inches in diameter. This new addition to the resources of the observatory is paid for out of the Draper fund, which has already done such excellent service for stellar photography.

ROYAL HISTORICAL ASSOCIATION OF IRELAND.—At a recent meeting of this Association Mr. John L. Robinson, C.E., read a paper on "Celtic Remains in England," which he illustrated with lime-light views. He gave instances of many crosses in various parts of England of Irish pattern, which had either been made by Irishmen in England, or by Englishmen under Irish directions. The lime-light views were good. A paper on "Megalithic Remains and Cromlechs of County Dublin," with views of its principal castles and ecclesiastical monuments, illustrated by lime-light views by Thomas Mason, Dublin, was described and explained by Mr. W. F. Wakeman. He showed a view of a cromlech at Golden Ball, The Scalp, county Dublin, which is the greatest one known in the world, its computed weight being ninety tons. He showed another one at Rathfarnham; also very large, but more regular. He also showed a miniature cromlech, discovered in the Phœnix Park about forty years ago, when the ground was being levelled. In the chamber there were two skeletons found in a recumbent position, with a chain made of shells and beads, and other articles, which could now be seen in the Royal Irish Academy Museum. A little further on, near Chapelizod, another was found with one skeleton, which appeared to be a relative of the others.

Answers to Correspondents.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper & Carter, 5, Furnival Street, London.

S. S.—Here are the facts of the case:—The paragraph appears in identical words at page 250 of the sixth edition, dated Oct., 1884; at page 282 of the seventh edition, dated July, 1886; and at page 330 of the present edition. The only variation arises from the references (between brackets) being of necessity differently numbered. The statement on page 3 is likewise the same in all.

F. W. L. (Ireland).—We have communicated with the person named in your letter, and you may expect a reply before the end of the week, if already it is not to hand.

C. F. B.—Your letter duly received; for card enclosed we return you our best thanks.

E. PENFOLD.—1. By all means choose one uniform colour, of medium shade, for your background; two colours would make the design too pronounced for a good general effect. 2. A putty of white-lead and linseed oil makes a thoroughly reliable watertight joint.

T. B.—You are mistaken; we cannot accept credit for the excellent review of Dr. Eder's new volume which appeared in our pages last week.

W. S.—In the official report a paragraph of five lines was devoted to the description of your camera and its special contrivances. Moreover, it was on view, in duplicate, during the whole term of the exhibition, and yours was one of the ten cameras passed in rapid survey before the members assembled at the Technical meeting of the 22nd ult. If patented, the specification will come in for notice later on. Such being the case, it cannot be said that your invention has been overlooked.

A. D. H.—Your instantaneous shots are for the most part excellent; the goats and ducks and trotting-horse ought to be enlarged; also the market place at Cannes. We have written to you about the lens and Kodak camera No. 2.

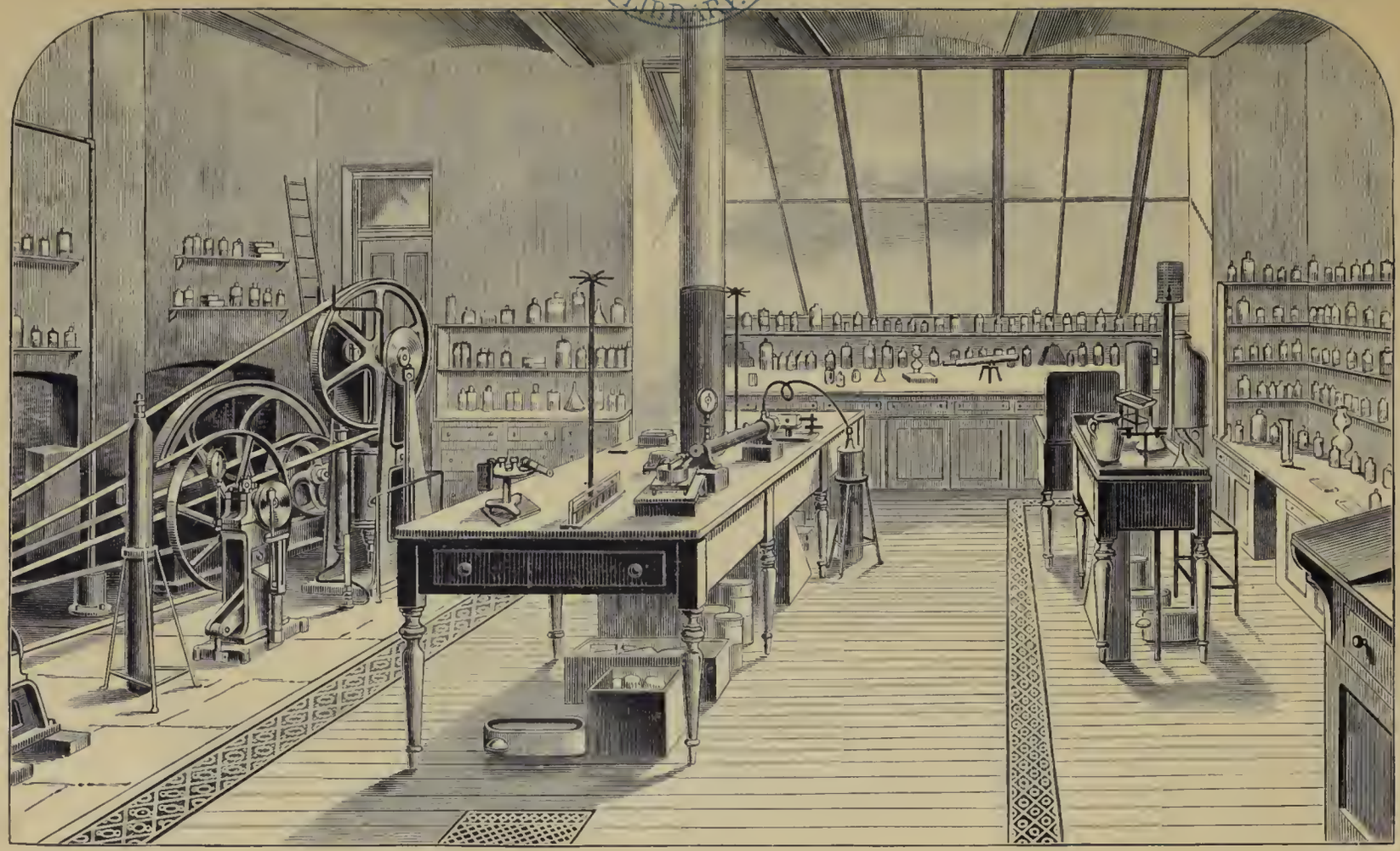
J. W. M.—In order to render the tracing-cloth more impervious, we should be inclined to advise a trial of hot gelatine or starch paste in which a certain amount of melted paraffin had been stirred up so as to form a kind of fatty emulsion. If this should fail, try the addition of chrome alum to the gelatine, or use a solution of white-lac in borax.

C. W.—The Meisenbach blocks in the *Illustrated London News* of the 2nd and 9th inst. are certainly very good, the picture of the Turacos in the Zoological Gardens, and the Burmese portrait, being particularly fine. Not so the four plates illustrating "Military Cycling: Formation for Resisting Attack of Cavalry," which are presented for public criticism. Here are ten riflemen, with a bugler and officer, in position of defence behind their machines, working with excellent effect as regards the rank and file, but with two non-effectives in the group: one is the bugler, who should certainly be armed, if only with a revolver; and the other an officer, who stands by him, idly looking on and breaking the first rule of military command, for he does not even take the trouble to draw his sword in position 4, "Actual contact with the enemy," when, if ever, his blade is supposed to be required.

F. MAXWELL LYTE.—Received with thanks a copy of your pamphlet, "The Dawn of Creation; or the Genesis of the Elements," reprinted from the *Westminster Review*. The subject is largely hypothetical, and deals with matter in its primordial form, entering a region of philosophy where we find ourselves unable to follow. The argument on page 8 is surely weak:—Because "carbon is known in three allotropic states, there is nothing inconceivable in the idea that any of the substances now accepted as elements should be able either to be dissociated or transmuted into other elements." We submit there is no analogy; for whether we burn the diamond, graphite, or a lump of coke in oxygen, the *same* gaseous product is evolved; and the element must be the same chemically, although presented in such very different physical forms. There is no transmutation here, or evidence that "we are fast returning to the days of alchemy." The most pleasing indication we have gathered from the work before us is the fact that our former honorary secretary of the Photographic Society has fortunately regained his health and activity.

A. F. (Ireland) and W. M.—Received.

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SUPPLEMENT TO THE "PHOTOGRAPHIC NEWS." DECEMBER 6, 1889.

DRAWN AND ENGRAVED ON WOOD BY JOHN SWAIN

The Physical Laboratory at the Royal Institution.

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THE PHOTOGRAPHIC NEWS.

VOL. XXXIII. No. 1631.—*December* 6, 1889.

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THE ROYAL INSTITUTION.

No. I.

THIS, the first of a series of articles in relation to the subjects of photography and light, as they have been dealt with at the Royal Institution, relates chiefly to the history of the Institution, a brief outline of which may be interesting, and more especially to readers in foreign countries, who may be unacquainted with the details. In the Royal Institution, Wedgwood made known in 1802, the particulars relating to his early photographs; in the same place Davy made his experiments in relation to the same subject; Young demonstrated the superiority of the wave theory to the emission theory of light, establishing the former in face of the opposing authority of Sir Isaac Newton and Lord Brougham; at the Institution Faraday made his discoveries in relation to light, and in more recent times Tyndall, Rayleigh, Dewar, Warren De la Rue, and others have made known there the results of their researches in various branches of science in which the readers of this journal are interested. Hence, it has been thought well to begin by giving some general particulars about the foundation of the Institution, accompanied to-day by a supplement consisting of an engraving of the present physical laboratory at the Royal Institution, before plunging into more technical details.

Count Rumford was the founder of the Royal Institution, and his proposals in relation to the work it should undertake were made towards the close of the last century. He then spoke of the slowness with which improvements of all kinds make their way into common use, suggested the formation of a collection of valuable mechanical contrivances, to which reference could be made as standards for the guidance of artificers. He said, by a kind of prophetic instinct, that important improvements might be "derived from the scientific discoveries of experimental philosophers," and added that there are no men in society "separated by a more marked line, than philosophers and those engaged in the arts and manufactures." Then he proceeded to speak of the value of original research independently of any utilitarian considerations. He thought that men of the two orders of mind just mentioned ought to be brought into closer communication with each other, to the advantage of both.

Rumford thought "the management of fire" to be among the most useful subjects the Institution could take up; it was a subject in which he had long taken great interest. He stated that he believed that half the fuel burnt in this country might be saved by proper methods, and were anyone to say the same to-day, he would not be far out. Rumford has published that he first drew up a sketch in the beginning of 1796 for the establishment of the Institution, but as he had to return to Germany, took no farther steps until he wrote from Munich in June 1798, to Mr. Thomas Bernard—a man who took great interest in improving the condition of the poor—saying, that a well-arranged "House of Industry," in which there should be something for the people "to see and to touch" was much wanted in London. Several consultations were subsequently held at Mr. Bernard's apartments in the Foundling Hospital, also in the house of the Bishop of Durham, and a committee was formed to try to carry out Rumford's ideas. This committee, which Rumford met on January 31st, 1799, to consult about the foundation of the Royal Institution, consisted of the Earl of Winchelsea, Mr. Wilberforce, the Rev. Dr. Glasse, Mr. Sullivan, Mr. Richard Sullivan, Mr. Colquhoun, Mr. Parry, and Mr. Bernard. They approved the principles of his plan, but asked him to modify them, as they went too far into detail. He asked that the Government should be informed of the scheme before any attempt was made to carry it out, and that it should also be informed that it was the intention of the founders to accept his services in the arrangement and management. He made this stipulation because he was in the service of a foreign power.

At a meeting of the Society for Bettering the Condition and Increasing the Comforts of the Poor, of which most of the founders of the Royal Institution were members, it was stated that the committee appointed to confer with Count Rumford reported that the

carrying out of his ideas would be highly beneficial to the public; it was therefore proposed that subscribers of fifty guineas each should be perpetual proprietors of the Institution, and possess certain privileges in relation to admission to the apartments and lectures, and that thirty such subscribers, when obtained, should have the plan laid before them, and proceed to elect the managers of the Institution. Soon after the circulation of this plan, fifty-eight subscribers came forward; Lord Palmerston was one of them, and the list included a good proportion of persons of note in English scientific and political history.

Count Rumford's proposals set forth that the Institution should have spacious and airy rooms for the exhibition of mechanical inventions. Among the models to be exhibited were to be included cottage fireplaces and utensils, a complete kitchen, a complete laundry for a gentleman's family, several of the most approved German, Swedish, and Russian stoves, also machinery in motion. The programme goes on to include economical grates, brewers' boilers, distillers' coppers, models of ventilators, hot-houses, lime-kilns, cottages, spinning-wheels, looms for the use of the poor, implements of husbandry, and models of bridges. The proposal said:—"A lecture-room will be fitted up for philosophical lectures and experiments; and a complete laboratory and philosophical apparatus, with the necessary instruments, will be provided for making chemical and philosophical experiments. . . . Care will be taken to warm and light the lecture-room properly, and provide for a sufficient supply of fresh air, so as to render it comfortable and salubrious." Among the first subjects for lectures suggested by Rumford were heat, combustion, warm clothing, vitiated air, preserving ice in summer, preserving food, cooling liquors in hot weather, vegetation, manures, changes produced by cooking, digestion, tanning leather, dyeing, bleaching, and making soap.

Nine managers were appointed, namely: Earl Spencer, Count Rumford, Mr. Richard Clark, the Earl of Egremont, Sir Joseph Banks, Mr. R. J. Sullivan, the Earl of Morton, the Right Hon. Thomas Pelham, and Mr. Thomas Bernard. Of these Sir Joseph Banks was elected chairman. At this point the Royal Institution may be considered to have fairly started on its useful career. How it began its operations, and some interesting particulars about the early Wedgwood photographs, will be narrated hereafter, accompanied by engravings of Sir H. Davy's laboratory, and the dark chamber thereto adjoining, which are both intact to this day.

ROYAL INSTITUTION OF GREAT BRITAIN.—General monthly meeting, Monday, December 2, 1889. Sir James Crichton Browne, M.D., LL.D., F.R.S., Treasurer and Vice-President, in the chair. Messrs. Charles Vernon Boys, F.R.S., A.R.S.M., Frederick Bayard Wiggins, and Alfred Fernandez Yarrow, M.Inst., C.E., were elected members of the Royal Institution. The Managers reported that they had re-appointed Professor James Dewar, M.A., F.R.S., as Fullerian Professor of Chemistry. The presents received since the last meeting were laid on the table, and the thanks of the members returned for the same.

MOUNTING LENSES.

BY G. L. ADDENBROOKE.

I SEE in a late issue of the PHOTOGRAPHIC NEWS that a patent has been granted for the use of a bayonet socket in mounting lenses. This can be looked at in two ways. It shows how little people look to see what has already been done in the same field before applying for patents, and it shows how easily the Patent Office will grant applications, and of how little value their consent and seal is in securing a monopoly. In America, if such a patent had been applied for, the examiners would have looked to see what had been done in the field before, and they would have found out that bayonet sockets have been used for mounting lenses from time to time for a number of years, and have from time to time been publicly exhibited.

Why bayonet catches have not come into use more, both for mounting lenses and fixing them in the camera, it is not very easy to say. Generally, I think they are that the optical trade has been up till lately a very conservative one, and that the need of some handy appliance for mounting several different lenses in one tube has not been so strongly felt in the past as it is getting to be now that photography is studied so much more in its artistic aspect, and the necessity is felt of having always at hand several lenses of differing focal lengths, in order to secure with the best pictorial effect the varying scenes one comes across. Our notions of what is pictorially pleasing have so progressed in this respect in the last few years that a picture would hardly be looked at now which a few years ago would have met with quite general approbation.

I have myself had a set of lenses mounted with bayonet catches which were exhibited at the Photographic Society, and described over eighteen months ago. In one way and another they have have been a good deal used since, and have besides made a voyage to Australia. I have never found the least difficulty from the bayonet catches; on the other hand, they have been always a great convenience and pleasure to use.

Like everything else, they want carefully making, with due regard to the principle of their action; but when once properly constructed there is no reason why they should not last well, and their possessor will find great pleasure and comfort in using them.

THE ROYAL METEOROLOGICAL SOCIETY.—At this Society a memoir was read about a comparison between the Jordan and the Campbell-Stokes sunshine recorder, by Mr. F. C. Bayard. As a result of a year's comparison between these two instruments, the author found that the Jordan photographic recorder registered nearly 30 per cent. more sunshine than the Campbell burning recorder.—"Sunshine," by Mr. A. B. MacDowall. This is a discussion of the hours of sunshine recorded at the stations of the Royal Meteorological Society.

A CHEMICAL BALLET.—At a banquet which was given at the conclusion of the German Congress of Naturalists and Physicians at Cologne, Dr. Hoffman alluded to the difficulty experienced by students in understanding the constitution of organic compounds, and suggested an original method of fixing these in their minds. The audience was then treated to a ballet in which the dancers were dressed in different colours, to represent the various atoms. At his command these coloured female atoms grouped themselves in various fashions to show the chemical constitution of particular compounds, and their reactions. The composition of benzole, and the formation of aniline and its derivatives, were particularly applauded. The ballet wound up by a representation of the formula for roburite, —the new explosive—the finale being a formidable explosion.—*Annals of Hygiene.*

PROCESS BLOCKS AT THE PARIS EXHIBITION.

The Mansion House Committee made arrangements for a number of British artizans to visit the Paris Exhibition, and report thereon in relation to their several trades. Mr. H. G. Walsh gave in the following report on "Process Block Making:"—

Exhibition—Goupil & Co.—Commencing with the Exhibition, I may dismiss it in a few words, as there were not any firms, either English or foreign, exhibiting the process or method of producing process blocks; and only one French firm—that of Boussod, Valadon, et Cie., successors to Goupil et Cie.—that had an exhibit of specimens of process block work. These certainly were very fine specimens of photogravure. I might mention those that struck my attention. They were all produced from wash-drawings by the artists named: "An Oriental Scene," by E. L. Weeks; "Horses and Foals," by R. Goubie; "Two Children Asleep," by L. Perrault; "The Sailor's Wife," and "Pushing off the Boat," by G. Haguette. There was but little in them to show the method of production, but they were most probably obtained by the ordinary grain-screen method in the camera. They were printed on fine, thin paper, and then mounted on cardboard. There were also other results produced by the half-tint process, in colours of an artistic nature. This exhibit was in the Liberal Arts Gallery.

Illustrated London News and Artists' Drawings.—There were some very good specimens of wash-drawings, suitable for the half-tint process, in the *Illustrated London News* exhibit, by Forester and Woodall, the shadows not being too heavy, and the high lights being toned down. This may be of some use to artists who wish to draw for the half-tint process. It may not be out of place to mention the conditions necessary to obtain the best results for line work, as frequently drawings are made not at all suitable. White cardboard should be used, and a black ink that dries a dead colour, not glossy. It is well to have a little gamboge or sepia in the ink. If the drawing has to be much reduced, the lines should be thick and wide apart, that is, the work should not be too fine. These hints, if acted on, would prevent both the artist and the process being brought into disrepute.

Obtaining Information.—It is very difficult to obtain detailed information of the process as worked by different firms in Paris; for although there are no secrets in the methods used in the trade, the details, on which so much depends so as to obtain the best results, are kept to themselves by the various firms. On the whole, the methods used by firms in Paris and London are the same in principle and general application.

Information obtained.—For much of the following information I am indebted to the firm of Messrs. Krakow and Michel, Rue de Fleurus, and to M. F. Perriot, Secretary of the Photogravure Society of Paris, and for confirmatory knowledge to the book published by the Labour Bureau, containing the answers to questions addressed to various trade societies.

Visiting Workshops.—Application was made to the following firms for information and permission to visit their workshops, with the result that a favourable reply was received from Messrs. Krakow; and an answer from Messrs. Boussod, Valadon, et Cie., that it was not their custom to give information, or to allow visits to their "ateliers," although they answered a few of the questions addressed to them; also from Messrs. Dutheil, stating that it was impossible for me to visit their place. From the others no reply was received.

The firms written to were:—

Firms applied to.—1. Messrs. Krakow; 2. Boussod, Valadon et Cie.; 3. Dutheil; 4. P. Dumont fils; 5. Garnier; 6. Lefman; 7. Minot; 8. L. Rolla; 9. Rose Victor; 10. Clicherie Générale; 11. Michelet.

Quality of Work—Materials Employed.—The work turned out by Parisian firms is certainly as good, and sometimes better, than by London ones; but the materials employed and the methods are, generally speaking, the same. No process depending on any new principle is employed, the improvement being more in the manipulation, depending on the individual workman, and the time taken, which is a little longer than is usual in England.

Prices—Cost.—This is a difficult subject to report upon, although it is a very important one, prices varying as they do in London, depending on the kind of work, the quality, and the trouble and time taken in obtaining a result. There are, I am informed, firms in Paris that take in any kind of work, cutting down the prices, and obtaining inferior results. Still, as a criterion, it might be mentioned that work is frequently sent to Paris from England, but seldom or never to London from France, which shows that the prices are less, and the quality as good in Paris.

Wages—Mode of Payment.—Wages are paid on the Saturday, with the exception of the photographers, who are paid monthly. Photographers are paid £14 10s. per month by one firm. The amount varies in Paris from £10 10s. to £18 15s. per month. Printers are paid about the same as operators. Transferers earn from £2 10s. to £3 10s. per week, and the litho. artists from £2 to £3 10s. per week. Engravers receive from £2 to £3 10s. weekly. There are about ten engravers in Paris who earn £3 18s. weekly. They are all paid in hard cash. In two firms, the men, I understand, share in the profits of the employer, and the employers assure the lives of their employés. There are no fines in the trade. It is not the custom in France to give any notice on either side, and the engagement may be broken at a moment's notice.

Hours of Work.—The hours of work throughout the trade are ten; this is the usual time for most trades in Paris. In one house they commence at seven and leave off at six in summer, and in winter they work from eight to seven. They have an hour, from twelve till one, for dinner. There is no Saturday half-holiday, and although Sunday is usually a rest day, in one firm they work on that day if necessary. They have about seven days holiday per year. Overtime is worked and paid for at 2½d. extra per hour over the ordinary time rate. There is work all the year; but for about two months trade is somewhat slack.

Piecework.—There is no piecework; it has been tried by the employers, but has not proved a success. There are no sweaters or jobbers, but there is the usual division of work—photographers, etchers, mounters.

Female and Juvenile Labour—Apprentices.—There is no female or very young juvenile labour.—There are a few apprentices, who are paid from 4s. to 12s. 6d. per week. They earn about 4s. 2d. per week for the first year, 10s. second year, and 12s. 6d. third year, besides which they have a Christmas-box, and also encouragement-money if they become useful. There is no premium paid, and the

agreement is usually for three years, commencing generally at about fourteen; but it must be understood that apprenticeship as in England does not exist in France: there is only a mutual arrangement, but it cannot be legally enforced by either side, and can, therefore, be broken at any moment. Improvers are paid about 25s. per week. The head of one firm said that he did not think it paid to employ much juvenile labour; and this is no doubt correct if the best work is desired.

Power.—Steam-power is largely used for driving the dynamos for lighting purposes, litho. machines, etching boxes, and saws.

Manner of Life—Living—House Rent.—They have only two meals a day in Paris; one from 12 to 1, and the other after 6:30. Their meals are principally obtained at the restaurant, or from the cook-shop, very little cooking being done at home. In the early morning they have a cup of coffee or wine, and a very little to eat; and in the afternoon the same while they are working. There is no tea-meal or supper, as we have in England. As to cost of living and house rent, it is a somewhat difficult subject, varying as it does with the ideas of the individual; but while living is about the same as in England, house rent is higher and clothing dearer—living costs about 7s. per week, and rent is from 1s. to 4s. per week higher than in London for the same accommodation. Workmen live principally in flats, there being very few small houses as in London. Their families are not so large as is frequently the case in England. Travelling is cheap by tram, 'bus, or boat.

Photography.—Steinheil's lenses are chiefly used in copying. Negatives are taken up to about 24 by 22. The wet collodion process is principally used, as in England. Bitumen is largely used for printing on zinc. In one firm, besides printing on zinc, the following well-known method is largely used:—Take an ordinary negative, and print on photo-transfer paper, transfer to stone, touch up and make perfect, pull transfer, and transfer to zinc, and etch in. This has advantages, if the original is imperfect; but printing direct on the zinc is better if the original is good, as in the transferrings one is liable to lose some of the work, as well as thicken the lines. In one firm an ordinary camera is not employed; the dark room is used instead, the lens being fixed on the wall, the copying board consisting of an iron framework carrying the board, and running backwards and forwards on rails. Inside the room, the ordinary dark slide, carriers, and bellows are dispensed with, the focussing screen and the plates being inserted in a framework with moveable sides, so as to take any size glasses. This plan has advantages over the ordinary way. The negatives were taken on plate-glass, nearly a quarter of an inch thick, were of a black colour, and very good quality. In the same firm, for half tint work, they printed on copper, affirming that, although it was more expensive than zinc, better results were produced. The Brush dynamo is principally used. In one firm the Dubosq electric lamps were used, but they are no better than the ordinary type employed in England.

Etching.—Two large plates are considered a fair day's work, and but little small work seems to be done. The boxes are driven by steam power; the method is very simple. A long iron rod is kept revolving by a strap from a pulley; on this, at intervals, are fixed eccentric pieces. These alternately push up and let down the boxes under which they are placed, imparting to them a rocking motion, which is more regular and less liable to stoppage than by using hand-power. The boxes are stopped by a lever which takes them off the rod. Gutta-percha is used for lining the boxes; it is said to withstand the acid better than pitch; one box having been in use for eight years, only having had a few repairs. The ordinary method of etching with nitric acid is used.

Mounting.—Mounting is done on mahogany, as in England. A circular saw is used for cutting the wood, but a fret-saw for the zinc. The fret-saw seems to have advantages over the circular saw, as it is able to cut round corners more easily. These are driven by steam power. A hand-drill is used for making the holes in the metal previous to mounting, and a plane, running in a groove, is used for planing the sides of the zinc.

Work in Paris for Englishmen—Trade Society.—I was informed that Englishmen who knew the process well, and were good workmen, could obtain employment in Paris; but it would be well to apply to the Chambre Syndicale of Photograveurs, by whom a registry and hiring book is kept. The Secretary is M. F. Perriot, and the address is Bourse du Travail, 35, Jean Jacques Ronsseau (Bureau 11).

American.—Although there is no American exhibit in the Exhibition, I should like to draw attention to the fine specimens of the half-tint process in American periodicals. I need only mention *Paper and Press*, *The American Art Printer*, *The Inland Printer*, *The American Annual of Photography*, and *Annual of Anthony's Photographic Bulletin*. These all contain numerous specimens of work by American engravers and printers.

The fine qualities of these specimens may be largely attributed to the good-rolled paper, black ink, and careful printing, to all of which it will be necessary for English printers to pay more attention, so as to get equally good results. As specimens of English process work might be mentioned the Guide to the Paris Exhibition, in English, printed by W. Clowes and Sons. This, although good, lacks the cleanness and brilliancy of the American productions. At the same time, I understand the price for a process block is greater in America than in England; but as cheap and nasty usually go together, it would be better to pay more and have finer results.

Map work is largely done by one firm; zinc blocks for chromo work and music work by another. For music work the usual method is practised; lines are cut in a hard alloy plate, the notes, &c., being punched in by a special punch. A transfer is taken from the plate and transferred to zinc, which is etched in the usual way.

As the firms visited were, I understand, the best in Paris, there was not much opportunity of obtaining information in regard to the cheaper kind of work done.

On the whole, the conditions of work and the workmen are pretty nearly the same in London and Paris. Although the wages are slightly higher, the hours are longer, being at least sixty per week in Paris to forty-nine in London, and the entire expense of living would be found slightly higher in Paris than in London. It seems to me that more attention should be paid here to the artistic side, and to the printing of the finished block in the letter-press machine, and we should soon equal our French neighbours and American cousins.

ANOTHER banquet to celebrate the jubilee of photography will take place in Paris on December 16th, says the *Moniteur*, at the Grand-Véfour.

THE LATE PARIS EXHIBITION.

In the *Journal of the Photographic Society of India* just to hand, the editor says:—I spent a pleasant forenoon in the photographic section of the Paris Exhibition. The collection was in one of the numerous galleries out of the path of the ordinary sightseer, and I had some difficulty in finding it. When I did I was in almost undisturbed possession of the section. Occasionally comfortable-looking French farmers and their wives strolled leisurely along, looking about them in vague wonderment at all the gorgeousness around them; but they kept mostly to the central paths, and lingered not by the way. The more I looked into the details of the collection, the greater regret I felt that I could only devote a few hours to its study; for there was evidence on all sides of its importance and interest. The arrangement of the collection was of the elaborate, finished kind for which the French are famous. The whole history of photography, from the time the alchemists of the sixteenth century noticed the change that took place in silver chloride by exposure to light, down to the latest experiments in orthochromatic photography, seemed to lie before me.

I am writing now, remember, of the impression made upon me by a too hurried visit; but, as far as I could judge, the collection from a historical and educational point of view was complete. I passed case after case of quaint, worm-eaten, old apparatus and materials; here a camera used by Niepce, there one by which he and Daguerre perfected their experiments; relic after relic of time and light-worn old records, specimen after specimen of heliograph and Daguerreotype, until, as I gazed, I felt how great was the opportunity I had lost, and hoped that some one with more time and a graphic pen would yet describe the collection as it deserved.

Passing on the exhibition of photographs, I confess to a feeling of disappointment. There was hardly anything amongst the figure subjects I saw which attracted me as being superlatively good. It is true my visit was a hurried one, yet my eye ranged over hundreds of the kinds of figure pictures one sees in a studio without being arrested by a single striking example. Indeed, the only pictures of this kind which, from an artistic point of view, really pleased me were in a case of Otto's (Rue Madeleine, Paris). The figures were mostly of boys and girls—extremely pretty children all of them—and they were represented some standing, others sitting negligently in big, old-fashioned chairs, the only back and foreground being the faint creamy and pearly greys of the paper on which they were printed. The shadows and outlines were so delicately, yet firmly, expressed that the pictures gave one the impression of being exquisitely finished pen-and-ink sketches more than photographs. These ethereal little subjects were set, quite a number of them, in long narrow frames, and on bands or strips of cardboard running diagonally over a large, flat, wooden frame, coloured light sage green, the margins of the bands being champered and edged with silver. The figures were arranged in vertical position, each a step or two higher in the band, and each band contained perhaps seven or eight pictures of the same boy and girl in different positions. The figures were all in repose, so that it was difficult to guess even whether they were produced from cap or shutter exposures; but I cannot help thinking that the little ones must have had training as models: the pose in all was too perfect to expect from a child placed for the first time within range of a camera. How they were done I know not, but the general effect was good.

Some of the departments of the French Government service had collections of photographs, each illustrative of the application of photography and its kindred processes to their particular purposes. There was, for instance, a show of maps and plans by the Survey department, done by the photo-zincograph process; another by the Military department, in which were some curious and interesting panoramic views of country and town taken from balloons. The Medical department had perhaps the most extraordinary collection of photographs, some of patients taken during the various stages of mental and bodily disease and injury, others illustrative of the disposition of patient, operators, and assistants at an operation. Indeed, as far as I could judge, there is attached to some of the French hospitals, and at the disposal of the medical staff, a regular professional photographer with his apparatus and materials. Again, in the Prison department the value of photography as a means of identifying criminals would appear to be recognised much more clearly in France than with ourselves. Besides photographs up to cabinet size in full, half, and three-fourth face, the palm of the hand is also photographed on a scale which shows in minute detail every line and mark upon it. These photographs are pasted upon official forms, having columns for the most elaborate personal description and measurements. Photography is also brought to bear upon the identification of the little waifs and strays of the cities, as also of the bodies of those poor miserable creatures who find a temporary resting place from their troubles in the morgues. The prints I saw in this particular section, although wanting altogether in the qualities which go to make up a pleasing picture, were yet so full of the grim realities of life as to exercise a strange fascination over me.

There was an extensive show of apparatus and materials of all kinds both by French and English makers, but here again the collection as a whole was not distinguished by that excellence of design and workmanship which one looks for in an exhibition. It goes without saying that the English makers took the cake. Somehow the ordinary French camera is a complicated looking article of the toyshop order. It has little plated handles and mountings like a lady's reticule. The contrast between the flimsy jauntiness of the one, and the more solid quiet style of the English camera was most marked. It was the same with the appearance of their lenses. I kept wondering how any one could possibly comprehend the intricate-looking shutters glistening in front of the cameras, and gave it up. One extraordinary-looking camera, with a lens peering out from a frilling of india rubber set in a semi-circular box, attracted my attention. It was called Le Cylindrographe. There were two models—one a Cylindrographe Photographique, and the other a Cylindrographe Topographique. The former was a simple-looking instrument as compared to the other, which was surmounted with an ingenious-looking modification of protractor and sextant devices, of which I could learn little. The dark slide of the cylindrographe is flexible, and it lies round the arc of the circle behind, so that only flexible films can be used. The lens is worked by clock-work, and, being hung in the centre in front, it moves horizontally on its axis, and, when open, transfers the image to the semi-circular films behind it. It was aggravating to wish to know more about this ingenious camera, and to have to confine myself to gazing at it through the glass case in which it was shut up. But pic-

tures taken by it were on view, luckily, so that one could judge of its performance. They were very good indeed. Long sheets of panoramic views, full of detail and without distortion of any kind; it seemed to be the realised dream of the wide angle lens photographer. For panoramic views of the snowy range I can imagine nothing more applicable, but there arose before my mind's eye a perspiring amateur developing a yard and a-half of slippery film in a temperature approaching the hundreds, and I shuddered.

THE PHOTOGRAPHIC EFFICIENCY OF TELESCOPES.

THE following communications appear in this month's *Knowledge*:

DEAR SIR,—Visually, I presume there is no difference of opinion that the faintness of a star which may be seen with a telescope depends almost entirely on the square of the diameter of the lens, and is independent of the focus. If the seeing is very bad, of course the large glass labours under a slight disadvantage; but we are assuming reasonably good astronomical conditions. In looking for faint stars, we would naturally use as low a power as the telescope would bear.

Photographically, diffraction has very little to do with determining the size of the image of a star. The size depends chiefly on the steadiness of the air, the accuracy of the following, and the correctness of the lens. The formulæ expressing it must therefore be only approximate and entirely empirical. It has been found that, under favourable conditions at Cambridge, with a 3-inch camera lens, the images of the fainter stars were ·035mm. in diameter. With an 8-inch camera, they were ·028mm.; and with a 13-inch telescope, ·047mm. The two latter instruments were finished by the Clarks. If the same had been true of the former, the images would undoubtedly have been smaller.

If faint star images were always of the same size, the faintness of a star which we might detect by photography would be inversely proportional to the square of the aperture of the instrument, and independent of its focus—the same as for visual telescopes. As stated in my former communication in connection with the formula then given, this is perhaps hardly fair to other larger instruments, as an increase of focus gives slightly larger images, and a modification in the formulæ is therefore introduced.

In Cambridge, under favourable circumstances, with the 13-inch lens, the diameter of a photographic star image is about 2″.

As regards the Orion nebula, I have been more delayed than I had expected, as I find on close examination that our negatives show much more detail than I had at first supposed. This involves a good deal more work, but I am hoping to have my results in final shape in the course of a few weeks more.

W. H. PICKERING.

Harvard College Observatory, Cambridge, U.S.A.

[The diameter of 2″, mentioned by Prof. W. H. Pickering, is very small, and would seem to show that at Harvard the atmosphere is occasionally very tranquil. With two instruments of equal diameter, one double the focal length of the other, we should expect the same atmospheric inequalities to cause double the swing in the longer focussed instrument, that is, the luminous image of a star would travel over an area four times as great on a photographic plate in the focus of the longer instrument, than on one in the focus of the shorter instrument. But the disc and rings are of double the diameter, and, area for area, of one-fourth the intensity in the longer focussed instrument. The actual difference in the diameter of the initial patch of photographic action needs to be determined by experiment before photographs taken with different instruments can be used for comparing the tranquility of the atmosphere at two stations.—A. C. R.]

THE ceremony of cutting the first sod on the site of the International Exhibition which is to be held in Edinburgh next year took place a few days ago.

THE MANUFACTURE OF GELATINE.

THE term gelatine, says a contemporary, although usually applied to only one variety of the substance obtained by dissolving the soluble portion of the gelatinous tissue of animals, nevertheless properly belongs also to isinglass and glue, which are modifications of the same material. Vegetable jelly is also analogous, and will be mentioned under this head. Gelatine and glue signify the more or less pure and carefully prepared jelly of mammalian animals, but the term isinglass is applied only to certain gelatinous parts of fishes, which, from their exceeding richness in gelatine, are usually dried and used without any other preparation than that of minute division for the purpose of facilitating their action.

Gelatine proper is prepared for commercial purposes from a variety of animal substances, but chiefly from the softer parts of the hides of oxen and calves and the skins of sheep, such as the thin portion that covers the belly, the ears, &c., also from bones and other parts of animals. The general method adopted with skin parings or hide clippings is first to wash the pieces very carefully; they are then cut into small pieces and placed in a weak solution of caustic soda for a week or ten days, the solution being kept moderately warm by means of steam pipes. When this process of digestion has been sufficiently carried on, the pieces of skin are then removed into an air-tight chamber lined with cement, and here they are kept for a time, determined according to the skill of the manufacturer and the kind of material employed, at a temperature of 70° F. They are next transferred to revolving cylinders supplied with an abundance of clean cold water, and afterwards are placed, still wet, in another chamber lined with wood, in which they are bleached and purified by exposure to the fumes of burning sulphur; they next receive their final washing with cold water, which removes the sulphurous acid. The next operation is to squeeze them as dry as possible, and transfer them to the gelatinizing pots, which are large earthen vessels enclosed in wooden cases made steam tight. Water is poured in with the pieces and kept at a high temperature by means of the steam in the cases surrounding the pots. By this means the gelatine is quite dissolved out of the skin, and is strained off while still hot; it is poured out in thin layers, which, as soon as they are sufficiently cooled and consolidated, are cut into small plates, usually oblong, and laid on nets, stretched horizontally, to dry. The cross-marking observable on the plates of gelatine are the marks left by the meshes of the nets.

Another process consists in treating pieces of calfskin by water alone, without the soda and sulphur processes; the pieces, after simple washing, being transferred at once to the pots to be acted upon by the steam. Undoubtedly this is the purest, but expense of preparing it prevents its general use. Inferior gelatine is made from bones and other parts of animals, and it has been stated by an eminent authority that in Paris the enormous number of rats which are occasionally killed in the sewers and abattoirs, after being deprived of their skins, which are reserved for other purposes, are all used by gelatine makers. These materials are placed in cages of wire, which are placed in steam-tight boxes, where they are submitted to the direct action of steam at 223° F., but at a low pressure; and cold water, supplied by another pipe through the upper part of the box, is allowed to flow slowly and percolate through the contents of the cage. The water and condensed steam descend to the bottom charged with gelatine, and are drawn off by a stop-cock placed there for the purpose.

The French manufacturers succeed better than any others in clarifying the inferior gelatines, and they rarely make any others; they run their plates out very thin, which gives them greater transparency and apparent freedom from colour; and they colour them with most brilliant colours and form very fine rolled sheets, tempting the eye with an appearance of great delicacy and purity, which would at once disappear if the material were made up into thicker plates.

The purity of gelatine may be very easily tested thus:—Pour upon dry gelatine a quantity of boiling water; if pure it will form a thick, gluey, colourless solution, free from smell; but if made of impure materials it will be of a very offensive

odour, and have a yellow, gluey consistence. No article manufactured requires such careful selection of material and such nice and cleanly manipulation to insure a good marketable character; and those anxious for purity should avoid all artificially-coloured varieties, however temptingly got up, unless they are required for merely decorative purposes, and not for food.—*American Druggist.*

THE CALCUTTA PHOTOGRAPHIC EXHIBITION.

His Excellency the Viceroy, who is always foremost in encouraging art, has signified his intention of presenting a special medal to the Society, to be awarded at the forthcoming exhibition. This medal, I learn, is to be struck from a very handsome die which Lord Lansdowne has had cut, bearing the likeness of himself and Lady Lansdowne. The committee have not yet decided what class or classes shall bear away this, the blue ribbon of our exhibition, but it has been suggested that it ought to be awarded to the best picture or set of pictures in the whole exhibition.

The following members of the Society have also promised prizes either in money or medals:—

Vice-President, the Nawab Ashanallah, of Dacca, a gold medal; the Honourable Sir Comer Petheram, Kt., Q.C., Rs. 100; H.H. the Maharajah, of Kuch Behar, a gold medal; H.H. the Maharajah of Tipperah, a gold medal; Colonel J. Waterhouse, a silver medal; Mr. P. Donaldson, a silver medal.

These are pleasing assurances of support and goodwill, and few societies can show a braver list. In reply to inquirers, I may add that the cost of presenting a medal can be ascertained from the Hon. Sec., Mr. A. Flemming.

Of exhibitors whose works we have seen before at our exhibitions, the following will be well to the front:—

Mr. H. P. Robinson sends six 15 by 12 silver prints, chiefly haymaking scenes, and one large platinotype called "Merry Fisher Wives."

Messrs. West and Son, of Southsea, send eight yacht racing studies.

Mr. C. R. Pancoast, United States, sends a collection of nine various subjects.

Mr. John Dumont, United States, photogravure pictures and lantern slides.

Mr. Deen Diyal, four frames, containing in all 36 pictures.

Messrs. Bourne and Shepherd will be large exhibitors, and ask for space equal to three panels.

Messrs. Johnson and Hoffmann, ditto ditto.

Messrs. F. Kapp and Co. will be exhibitors. No application for space yet received.

Of new exhibitors—

Mr. Lyd. Sawyer sends nine studies in platinotype, some of which (first time shown) have just been medalled at the Pall Mall Exhibition in London, and others have received many medals nearly all over England.

Mr. Alfred Werner, of Dublin, three direct platinum prints from 24 by 18 plates.

Mr. Richard Keene, of Derby, 33 whole-plate pictures in platinotype of views in Derbyshire and district.

Messrs. George Washington, Wilson, and Co., of Aberdeen, stereoscopic transparencies and lantern slides.

Surgeon Newland, I.M.S., one of our members, sends Burmese sketches, many of which have already appeared in the *Illustrated London News* in connection with last year's Chin expedition.

From Madras we have, up to date, received advice that Mr. Dunsterville, the Honorary Secretary of the Photo. Society in that Presidency, sends lantern slides.

Mr. Horsfall, eight pictures, Madras scenery.

Exhibits are also advised from Rangoon, Simla, and Bangalore.—*Journal of the Photographic Society of India.*

PHOTO-CHEMICAL ACTION.*

At a recent meeting of the Chemists' Assistants' Association, Mr. W. Lloyd Williams read a paper on "Photo-Chemical Action," in the course of which he said:—

It has been stated with much truth and terseness that "the art of photography runs considerable danger of outstripping the science." Practical details for the production of gems of photographic art may be found in abundance, but the elucidation of the principles upon which the success of the operator depends has not kept pace with this artistic progress.

One might, though in a more restricted manner, apply the same simile to pharmacy. The tendency of the day seems to be for the rank and file to devote its attention to the development of elegant pharmacy, and to neglect the examination of many constantly occurring phenomena which are as yet incapable of satisfactory explanation.

Every pharmacist knows that exposure to light, in the case of many substances, induces in those substances changes, not only of a chemical but also of a physical nature, and it is often a difficult matter to decide as to whether a particular manifestation is the result of physical or chemical activity, or of a combination of the two.

The transformation of crystalline sulphur into its amorphous and insoluble modification, and of white into red phosphorus, may be cited as instances of the physical changes brought about by solar influence; the combination of hydrogen and chlorine is sufficiently familar as an example of chemical change, whilst the colouration which is characteristic of the decomposition of iodo-compounds is due in part to chemical metamorphosis, and in part to physical disturbance.

As iron occupies a prominent position in the remedial *impedimenta* of the medical man, and many of its compounds are remarkable for their extreme sensitiveness to light, it forms a convenient centre for the observation of similarly affected substances. Ferric salts in the presence of reducing agents lose some of their oxygen or other negative radical, and if any substance capable of absorbing the negative radical when eliminated be also present, the decomposition is accelerated. Alcohol is such a reducing agent, and the products of oxidation, aldehyd and acetic acid, increase *pari passu* with the reduction of the ferric compound.

The reactions are much more vigorous and the results more pronounced when free exposure to light is ensured, results which were demonstrated some years ago by Mr. Schacht in the case of a mixture which contained glycerine and tincture of perchloride of iron.

As organic compounds are, according to the general rule, more readily oxidized than their inorganic analogues, so to speak, it may be inferred that the organic derivatives of iron prove no exception to the rule; indeed, so regular is the decomposition under appropriate conditions, that the oxalate and ammonio-citrate may be used for estimating the intensity of light.

The behaviour of the salts of silver is well known; but I refrain from making in a short paper any observations on a branch of my subject which in itself has assisted in laying the foundations of a science, has served to promote the progress of art, and has proved a healthy and harmless source of recreation to thousands of individuals.

Mercurial combinations are only a degree less actively influenced than their argentic relatives.

An aqueous solution of the bichloride, when exposed to the direct rays of the sun, precipitates calomel and evolves oxygen, and just as in the case of the iron salts a body capable of absorbing oxygen facilitates the decomposition, so here the same train of circumstances involves the same effects, and consequently the addition of tartaric acid to a solution of mercuric chloride, which came under my notice recently, was not in accordance with the canons of science from our present point of view.

The oxides of mercury are other compounds of that element which require careful preservation, and so do the iodides; mercurous oxide has an ill knack of changing into the higher oxide and the metal, and the unstable nature of the lower iodide served to help it out of the present Pharmacopœia.

* Abridged from *The Pharmaceutical Journal.*

Lead is not a metal whose compounds are very readily decomposed. Nevertheless, if the moist iodide be freely exposed to air and sunlight, free iodine is soon developed, and a mixture of oxide and carbonate of the metal remains.

The lower chloride of copper becomes changed from a pale coloured composition to a dirty violet or brownish black, resembling silver chloride somewhat.

Even the salts of gold and platinum are readily reduced.

Uranium compounds exhibit the same phenomenon, but they are of minor interest to the pharmacist.

The brownish colour which appears in long kept and slightly damp iodide of potassium is partly due to the action of sunlight, and ammonium iodide is even more susceptible to its influence.

Nitric acid, according to Seebeck, is decomposed by sunlight into oxygen and nitrous acid, and is simultaneously coloured yellow.

The reddish discolouration of slightly impure carbolic acid is most easily produced in a light situation; the greenish colour which is seen in long stored decoction of aloes; the greenish tint assumed by both the tincture and the gum of guaiacum, and the yellowish shade which often characterises santonin, are due to the same disturbing influence.

Great as may be the influence of light in bringing about chemical change, it is highly probable that more is laid to its charge in this respect than a careful examination of the facts would justify. There is little doubt that in many instances the traces of moisture and the presence of atmospheric air are indispensable links in the endless chain of decomposition.

I know of no experiments which have had for their object the avowed intention of demonstrating the necessary part which the above factors play, but such an investigation would well repay the one who has the means, the skill, and the patience to undertake it.

Pharmacists know how much more rapidly the discolouration of certain liquors and syrups of iron proceeds in bottles which are partly emptied, as compared with well-filled and tightly corked samples. Again, guaiacum does not become green unless it is in contact with air; hence, the disturbing influence of atmospheric oxygen is of the highest importance in such cases, surpassing perhaps that of light itself.

Still another factor must be considered, that of temperaure. In many respects light and heat resemble each other; there is, however, one great difference between them; heat is capable of fulfilling the double office of decomposition and recombination; light, except in one instance, acts as a decomposing agent only.

The exception must be mentioned, for it has to do with the elaboration of complex molecules in the growth of plants which only goes on in the presence of sunlight.

That a certain elevation of temperature is necessary was proved by Amato, who found that a mixture of hydrogen and chlorine, when cooled to -12°, could be exposed to the sun's rays for hours without any combination taking place.

Exposure to warmth and light facilitates the decomposition of volatile oils; hence the necessity for preserving them in a cool, dark place.

Mr. Elwood said that, respecting the decomposition of potassium iodide, it had been established that the presence of carbon dioxide hastened the process, and was probably essential. He did not think the difference in colour which santonin underwent was to be attributed to light. He mentioned that rhubarb, aloes, and bismuth preparations were all liable to be affected.

Mr. Stark thought that little or nothing was known definitely of the action of light in producing photographic prints. It was by no means settled whether the colours were due to metallic silver or to various degrees of oxidation. The instability of most silver prints seemed to point to the latter view. He was unable to agree with the President in his statement that light was not the cause of santonin turning yellow. His own experiment pointed to an opposite conclusion. He thought that the action of light as a combining agent was as powerful almost as a decomposing agent. The formation of phosgene gas was an instance of this, for chlorine and carbon monoxide placed in sunlight quietly united to form $COCl_2$, and there were many other instances.

Mr. Richards said that pharmacists were indebted to photographers for the elucidation of many points respecting light and its influences, and he alluded to a paper read some years ago before the British Pharmaceutical Conference by the late Mr. John Williams.

Mr. Mason said that he could confirm from actual experience the suggestion that Mr. Williams had made that blue bottles did not protect their contents. In the bleaching of oils it might be thought that a white glass bottle would effect the desired object most readily, but as a matter of fact the dark blue Winchesters were infinitely superior for the purpose.

Mr. G. Roe said santonin was undoubtedly decomposed by light, and mentioned some anomalous reactions that he had observed in bismuth compounds.

Mr. Williams, in reply, said it was a commonly accepted fact that santonin did undergo decomposition when exposed to light, and the product photo-santonin differed in several important particulars from santonin which had not been exposed. It had been suggested that the appearance of free iodine in a decomposing sample of potassium iodide might be due to the temporary formation and speedy breaking up of potassium triodide KI_3. He was glad to find that his theoretical deductions had been practically confirmed by the observations of Messrs. Philp and Mason. Whilst acknowledging a certain degree of indebtedness to the followers of photography, he thought they could not claim credit for all the work that had been done in connection with the subject, and remarked that very great uncertainty existed as to the composition of the silver film which formed in the photographic process, though recent work pointed to the conclusion that it was an oxy-salt rather than the sub-chloride, bromide, or iodide, of which they had heard so much.

PHOTOGRAPHING A FUNNY MAN.

THE following was published by the funny man of *The Referee*, who is so anxious to avoid publicity that we now keep his name a profound secret:—"Weeks ago I was interviewed by *Cassell's Saturday Journal*, and the photographer arrived with Monsieur the Interviewer, artfully concealing his apparatus, and merely describing himself as the artist fresh from the capture and subjugation of Lord Wolseley and Sir John Lubbock. I learned afterwards that he was chuckling with delight at the triumph he was going to have over me—over the one man in London whom it takes wild horsss to drag into the photographer's chamber of torture. But the interview had not proceeded far before I caught the photographer, who pretended to be walking round the room and admiring the pictures, making mysterious preparations in a dark corner. He had actually fixed his apparatus; he was lighting a piece of paper to take me by his 'flash' process; in a moment I should have been safely landed! With a wild cry of terror I flung myself flat on my face, and all that the photographer found on his plate was my favourite tom cat in the act of spitting at a new china pug which ornaments my library fireplace.

"From that moment it was war to the knife between us. The photographer and the interviewer rushed at me, and, in spite of my struggles, put me back in the chair. 'It's no good making a fuss!' exclaimed the artist; 'I'm here to photograph you, and I'll do it, so you may as well try and look pretty.' I screamed and yelled for assistance, but nobody came. Albert Edward was in the conspiracy. I believe he had been bribed by the proprietors with two shares in the company not to interfere.

"I crawled under the table—they photographed me there. I pulled the waste-paper basket over my head—they photographed me thus. It wasn't an apparatus that photographing fiend had with him—it was an infernal machine. It swung on a pivot, it could be pointed up at the ceiling or down at the floor in a second, and the photograph was taken by a flash of light artificially produced at the required moment. Heaven only knows how I shall come out. Probably I shall have to buy up the entire issue in self-defence. It is awful to be photographed for publication against your will, especially when you have only just got up, with a bilious headache, and a chronic congested liver of forty years' standing, plus three carbuncles on the back of your neck, and gout in the left eye."

MORE ABOUT EIKONOGEN.

Mr. A. Cowan recently publicly stated that he thought eikonogen to be the best developer for positives, but he gave no details. A few particulars on that point are included in the following experiments recorded in the *Scientific American*:—The stainless nature of the developer adapts it admirably for the production of line work negatives on dry plates, for the development of lantern slides, and for positive prints on gelatino-bromide paper or porcelain. So satisfactory is the working on paper that we have substituted it for the ferrous-oxalate developer. Its particular merit is that every copy on paper is beautifully clear in the high-lights, which is a point of great importance in making bromide enlargements.

For shortly exposed plates and bromide paper the following formula for a one-solution developer works well:—

Sulphite of sodium c. p.	2 ounces
Carbonate of potassium	1 ounce
Distilled, melted ice, or rain water ...	30 ounces
Eikonogen	1 ounce

Dissolve in the order named. Eikonogen is perhaps ten times less soluble than pyro. We tried to dissolve the ounce in 10 and 20 ounces of distilled water, but without success. In using this developer, it is advised that from six to eight drops of the following accelerating solution be added:—

Hyposulphite of sodium	60 grains
Bromide of sodium	360 ,,
Water	8 ounces

We simply added 3 or 4 grains of bromide of potassium to 5 ounces of the developer, and obtained good results.

It is not necessary to mix the carbonate of potash to form one solution. It may be kept separate and dissolved in concentrated form in the proportion of 160 grains to the ounce of water. Taking 5 ounces of the sulphite and eikonogen solution, and adding thereto from a $\frac{1}{4}$ to $\frac{1}{2}$ drachm of the potash solution as a developer, will bring out an ordinarily well-exposed plate as rapidly as if a strong pyro and potash solution were employed. After the image is well out and there are some details in the shadows that do not appear, it is only necessary to add a drachm of the potash solution to the developer to easily bring them out. There is no fogging of the film whatever by the developer. Hence, though the image may appear suddenly and be well developed within a minute after the developer is applied, one need not fear to leave it on long enough to acquire sufficient density. If the developer operates too fast, it may be improved by diluting with water and adding a few grains of bromide of potassium. Or the developer may be poured off and a weak bromide of potassium solution be poured on. A developer for lantern slides need not be as strong in eikonogen as for negatives. We recommend the following proportions:—

Sulphite of sodium c. p.	10 grains
Carbonate of potassium	2 ,,
Eikonogen	5 ,,
Water (distilled or rain water)	1 ounce

The above may be used as one solution, and will develop a number of lantern slides. As soon as it begins to work slowly, 2 or 3 grains of carbonate of potash added will accelerate it. The high-lights will be absolutely clear, while the black portions will not be too dense for the lantern. The tone is bluish black.

Eikonogen and Soda Developer.

A.—Sodium sulphite (crystals, c. p.)	4 ounces
Distilled water	60 ,,
Eikonogen	2 ,,
B. Sodium carbonate (crystals)	3 ,,
Distilled water	20 ,,

Dissolve in the order named. A developer is made by adding to 3 ounces of A, 1 ounce of B.

Single Solution. Eikonogen and Soda Developer.

Sodium sulphite (crystals c. p.)	4 ounces
Sodium carbonate	3 ,,
Distilled water	80 ,,
Eikonogen	1 ounce

Dissolve in the order named. Add a few drops of the hypo-solution during development. All of the formulæ are based on 437½ grains to the ounce.

The usual alum and fixing baths may be employed.

We notice that the developer permeates the film more evenly and rapidly than with pyro, and acts with an energy which is astonishing. For under-exposed or instantaneously exposed plates it is especially adapted, and will make the production of such pictures a pleasure.

We have developed in seven ounces of solution twelve 10 by 12 plates in succession without replenishing it. After four plates have been developed, the solution should be filtered to eliminate the floating particles of gelatine that become detached during development. The colour becomes yellow when it is exhausted. It is probably unnecessary to rock the tray. We are glad to know that eikonogen is to be supplied to the trade here in large quantities. As a universal developer for dry plates, it stands at the head.—*Scientific American.*

Photographic Society of Great Britain.—Ordinary meeting Tuesday, December 10th, at 5A, Pall Mall East, at 8 p.m., when papers will be read by Mr. W. E. Debenham, on the "Estimation of the Efficacy of Plate Backing," and by Mr. G. M. Whipple, Superintendent of the Kew Observatory, on "Photography Applied to Meteorological Purposes."

Developing-Room Illumination.—M. Carey Lea advocates the use of yellow-green light for developing-room illumination. Not only does it afford better illumination than the ruby light, but it also is less irritating to the eyes. In many of our developing rooms, we have found that yellow light is taking the place of ruby, even where very sensitive plates are exposed. The sodium lamp, which gives a pure yellow blaze, and considerable illuminating power, has been found to be perfectly safe, and far more pleasant than the old argand burner with the red chimney.—*American Journal of Photography.*

Fatal Accident with Flash Powder.—Another unfortunate accident from flash powder occurred in Philadelphia, on November 11th, killing three men and injuring several others. Wiley and Wallace, chemical manufacturers, on North Seventh Street, had manufactured flash powder with various mixtures of permanganate of potash and bichromate of potash, and had become nervous about their presence round the factory. Wishing to get rid of the dangerous mixture, Mr. Joseph Wiley, a member of the firm, concluded to throw some mixture of this kind down the sink, and while he was handling it, the explosion occurred, killing him, together with Charles Rhinedollar, a chemist, and Rudolph Lippmann, an employée. William Kidd, another employée, was seriously injured, and may not live; while Alfred Moffatt, an engineer, was also badly hurt. A number of others were also injured. The moral of all this means: Don't use magnesium mixtures with oxidizing substances. Pure magnesium used in a flash lamp will give all the light necessary for any work of this kind, and is not explosive. —*Anthony's Bulletin.*

Notes.

There are some enterprising photographers in Munich, as a well-known artist discovered the other day. He had seen some photographs which took his fancy greatly, of one of the fairy-like palaces built by the crazy King Louis. Nothing would satisfy him but a visit to the spot for the purpose of making some sketches. Accordingly he set out for his destination, arrived at the romantic place where the castle is situated, and toiled up a mountain which he imagined commanded the view of the castle he had seen in the photograph. But when he reached the top of the mountain and looked at the castle, it did not seem the same as it had appeared in the photograph. He was greatly puzzled, for there was the front of the castle taken in the photograph staring him in the face, and no other spot save the top of the mountain available for the planting of a camera. Yet the picture was different. He made enquiries, and discovered the reason. The photographer had had himself tied to a rope, and had been lowered a hundred feet or so down the perpendicular side of the huge rock, and so had obtained the view he wanted.

It is a sign of the progress of photography when a paper which caters for the general public asks amateur photographers to send in photographs possessing some novelty for reproduction. This is the request of *City Life*, a new illustrated paper which proposes to deal with social, personal, commercial, and financial life in London in its lighter aspects. If this request be followed by similar ones from other papers, it will not be long before some method of direct reproduction is found which will be cheaper and more effective than those already in use.

The retouched photograph is an abomination to the artist who has to copy it for newspaper purposes. When all the salient lines of the face are so softened as to be almost obliterated, when an artificial sparkle is given to the eye, and a line of light introduced on the nose, so as to effectually put that feature out of drawing, so far as correctness is concerned, then the artist's task of translation is difficult indeed. It is, in fact, impossible to convey much of whatever resemblance the photograph may have to the original, because everything is so hazy, so nebulous. The best likenesses are those which seize the characteristic expression of a face often conveyed by some little lines near the mouth or eyes, which the retoucher does his best to destroy because he thinks they are not flattering. Some of the photographs done in the recent craze of so-called "natural colours," are to the artist like so many portraits of the figures in Madame Tussaud's.

The name of M. Davanne, one of the veterans of photography, is among the nominations in connection with the Paris International Exhibition for enrolment in the *Legion d'honneur*. The honour is worthily bestowed.

The Moniteur de la Photographie is inclined to think that the Exhibition judges have not treated photography with the liberality to which the art is entitled. Our contemporary expected more encouragement from the Government. In what way it does not say, but we presume in the direction of the awards. As the *Moniteur* very rightly points out, photography has rendered such great services to science, and to so many branches of industry, that it ought to have received more recognition.

Mr. Schrank makes a rather puzzling statement in the *Photo. Correspondenz.* The translation of his article in the *Printing Times* says: "Mr. Schrank states that the English company which has been working the Meisenbach process has allowed it to fall into the public domain. He asks himself if the change of system is an artistic process, or if it is simply the working of typographical processes at a much reduced price." This is rather obscure, but we take it to mean that the Meisenbach Company permits anybody who chooses to work their process; if so, the company is only doing what the photo-zincographers have been compelled to do long ago. The whole essence of reproduction from photographs lies in the skill of a particular operator. He may use exactly the same process as half-a-dozen other men, but will get far superior results because of some little "dodge"—to use a convenient term—known only to himself, and which he would not patent for worlds. The Meisenbach Company may allow their process to "fall into the public domain," but they cannot give the skill of their operators to the world. As for Mr. Schrank's speculation on the probable effect of the "change of system," it seems scarcely worth discussing.

Mr. J. L. Toole's reminiscences just published abound in references to photography. This is not surprising, because actors and actresses pass about three-quarters of their leisure hour in the photographic studio. Directly a piece is a success, a visit to the photographer, in order to be taken in character, follows as a matter of course. Mr. Toole, who is a born practical joker, on more than one occasion of this kind could not help indulging in his favourite propensity. When he was photographed with the Adelphi favourite, Mr. Paul Bedford, as the policeman and soldier respectively in the "Area Belle," he slipped out of the studio while the plate was being developed, and figured in the street as a real guardian of the peace. It was in a country town, and of course every policeman knew every other policeman. Naturally Toole excited the attention of a real constable, who was terribly fogged by the apparent genuineness of a mysterious policeman whom he did *not* know. He at once "shadowed" the counterfeit, and it was only by "doubling" artfully that the actor harked back in safety to the studio. Another time, when being photographed with Mr. Lionel Brough in the leading characters in "Dearer than Life," both

of them in thin, shabby, and ragged dress, slipped out in the same way, and, calling at a mansion in Grosvenor Square, horrified a haughty footman by telling him that two friends of his master had called! Mr. Toole really has a great fancy for photography. Witness his inimitable description of the chemistry of photography, which appeared in these columns a year or two ago.

PHOTOGRAPHIC TRIFLES.

I REMEMBER, in the long, long ago, of hearing or reading a story to the effect that a little boy, on his way from school, was asked as to his position in the class, and he replied that he was second *dux*. The question, "How many are in the class?" was then put, and the answer was, "Me and another lassie." I had thought that in the idea that whether a picture was a work of art or not depended on the method of its production. Mr. J. W. Stillman was a school all by himself until I saw in the September *Beacon* an extract from the meanderings of a Miss Lucy Crane, which revealed the fact that there is at least "me and another lassie" in the case. Miss Lucy says, "A photograph contains all the elements and material of a picture; but for want of selection, combination, composition, and the action of a human mind and soul on the material, it is not a picture." It is evident that Lucy's acquaintance with photographic possibilities is very limited. If, before she again mounts the rostrum, she will take the trouble to examine the works of Rejlander, Mrs. Cameron, Robinson, McMichael, Ryder, and a few others equally well known, her ideas will be modified, her knowledge increased, and her authority as a teacher a little more worthy of consideration.

I have read of a widow who advertised her business on her deceased husband's tombstone, and knew a photographer who inserted a glass-covered silver print in that of his departed wife; but it has been reserved for a Hampton, Iowa, photographer, if a report in a Hampton paper be correct, to inaugurate a new method of usefulness on the part of the "better half" of creation, by converting them into advertising media.

It would seem that the gay folks of Hampton organized a ball, a "dress" ball, it is called. In my ignorance of such matters I had thought that all balls were "dress" affairs, and sometimes very expensive affairs, too; but this may have been a "fancy dress" business, which is a very different thing. At all events, the Hampton photographer made it, so far as his wife was concerned, ludicrous enough for any fancy gathering, and took good care to have an eye to business at the same time.

We are told that over her dress, which was of "India linen," whatever that may be, she had points of Surah silk, each point having the portrait of a prominent citizen photographed on the silk—I wonder how the prominent citizens liked the idea of being made to dangle on Mrs. Upton's points every time she danced—"puffs" on the arms, with pictures photographed on them; and, more wonderful still, and if possible in worse taste, portraits of children photographed directly on the bare arms near the shoulders, the tint of the skin being said to have given a life-like effect to those pictures.

As if this was not sufficiently conspicuous, the lady, we suppose in lieu of a fan, carried a torch of a square form, three sides of which were opal transparencies of children, and the fourth the monogram or autograph of the owner and advertiser.

Mothers with marriageable daughters, cheer up! The demand in the matrimonial market will certainly increase consequent on the inauguration of this new field of usefulness, especially among those who can most easily turn it to a good account.

We are always learning; that is, if we are wise and willing. Here is what will be news to many. Mr. Lanyon, at the Cornwall, England, exhibition, told the members that in America a policeman entering an illegal drink shop took an instantaneous flash-light photograph of the scene, and it was produced in court as evidence.—*The Beacon.*

PRESERVATION OF PHOTOGRAPHIC PICTURES.

BY F. H. VARLEY, M.I.P.E., F.R.A.S.

THE term "permanency," as applied to photographic pictures, is purely relative. In the earlier days of the art it was considered that if silver prints on albumenised paper had been sufficiently toned, properly fixed, thoroughly washed, mounted on good card, employing for this purpose the best quality of starch-paste, that neither spotting nor fading would happen. Spotting, undoubtedly, does not happen when good paste is used; we have, therefore, only the fading difficulty to meet, although there are in existence photographs which have and still retain all the half-tints, showing no indication of fading, being in every respect as perfect as when they left the studio. On the other hand, we are continually meeting with portraits in which all their virtues have departed, every half-tint vanished, and only a pale presentment with hard outlines left.

The modern panacea is the platinotype process. I hope I shall not be considered heretical if I venture to cast a doubt as to the absolute stability of these prints. That they are to be preferred to silver there is little question; but can we rely so confidently upon their degree of permanency as to be sure that they will last for centuries, and may with advantage be employed for records to be preserved in the National Archives? Leaving for a moment the question of platinotype photographs, to be dealt with in the latter part of this communication, I will revert to the spotting and fading of silver prints when mounted on card. Imperfectly cooked paste is subject to rapid decay; the first indication is, that after standing for a day or two, it becomes watery, and finally dotted over with mildew. In paste made of wheaten flour, the active centre from which this starts is the gluten, which is much more readily decomposed by fermentation than the starch, and is the stronghold for the germination of bacteria.

Wheaten paste, properly cooked—or, still better, re-cooked three or four times, say, at intervals of twenty-four hours between each cooking—will be freed from all living bacteria or germs; such paste will dry quite hard without fermenting or mildewing. The preference given to starch paste is obviously due to the absence of gluten; it does not ferment so readily, and can therefore be employed with safety, and the prints mounted and dried before fermentation sets in.

The spotting, due to bad paste, takes place at those parts where gluten containing living germs sets up a fermentation; all paste should be sufficiently well cooked, so that the bacteria are destroyed and the germs sterilised.

Fading of silver prints from insufficient washing is a fruitful cause of the earlier pictures vanishing.

The second cause, one which I believe to be worthy of more consideration, is the fact that gold is attacked by chlorine when finely divided, if in the presence of moisture, although perfectly dry chlorine has no action. For many years I possessed a tube hermetically sealed filled with dry chlorine into which gold leaf was placed; though exposed to the action of this gas for some years, yet no change could be discerned. Again, it is now well known that gold leaf is readily dissolved in chlorine water. The gold used for toning affords the best possible example of the metal in a finely divided state, and it only requires a small degree of humidity, which paper readily holds, and the presence of a small trace of chlorine in the atmosphere, to effect the fading of the prints. How far platinotype pic-

tures will remain permanent or absolutely stable under the same conditions remains to be seen.

The corollary deduced from the foregoing is Oliver Cromwell's advice: "Keep the powder dry."

The writer's father, the late Cornelius Varley, preserved his water-colour drawings by a process he termed "bottling up." He also made microscopic and chemical observations into the causes of the fading of colours, and he came to the conclusion that vegetable pigments such as indigo, gamboge, carmine, lake, indian yellow, and rose pink, were subject to decomposition by fermentation, and that even when cobalt was used fermentation of the gum liberated the fine particles, which fell off the surface of the paper as a blue dust. He found that by "bottling up," this fermentation was not only prevented, but also that the colours remained permanent.

In mounting the drawing-paper he always employed the thrice cooked paste, and dried it thoroughly before commencing its application.

The finished picture was effectively dried and put into the frame in such a manner as to exclude moisture. This he did as follows:—In the rabbet of the frame where the sheet-glass usually rests, he pasted in strips of strong brown paper folded lengthwise at right angles, the width of the narrower fold being equal to that of the rabbet, the broader about one and a-half inches wide.

The broader portion of the paper strips was turned over, and firmly pasted to the back of the frame; the rabbet thus lined with paper was again coated with paste, the glass then put into its place, and pressed until all air-bubbles—between the paper strip and the margin of the glass—were forced out, the excess of paste being removed by a soft duster; corresponding strips of paper were then pasted on the back margin of the glass, and the frame set before an open fire to dry, after which the picture was placed in the frame, and the backboard fixed in with brads in the usual way. Over this a sheet of stout, well pasted brown paper was squeegeed down on to the back-board, and extending over to at least about an inch of the back of the frame. The picture was then set to dry with its face toward the fire, and so kept until all moisture was expelled, and the back quite dry. He then varnished the back with two successive coats of japanners' gold size, allowing sufficient time for each layer to dry. This process of air-tight sealing preserves delicate vegetable pigments from both organic and inorganic chemical reagents, and should prove effective in preserving silver prints. I have some photographs at least twenty years old as perfect now as when I first received them. They have been mounted in a somewhat similar manner against a glass plate. It would be interesting to treat a platinotype picture by alternately fuming it with ammonia and hydrochloric acid vapours. This would, I believe, settle the question of the degree of permanency. It is well worth the trouble even with platinotype pictures to employ air-tight mounts, and all photographs of value should be so protected.

SKIN-COLOURATION BY LIGHT.—Some observations on the natural colour of the skin in certain Oriental races, by Dr. J. Beddoe, F.R.S., were read before the British Association. The author made numerous observations of this kind in the course of a voyage round the world. In most cases he found the colour of the clothed and protected body much lighter than is generally supposed. The capacity to tan, or become darker by exposure, varies much; thus, the Melanesians are naturally lighter than the Australians, but they burn much blacker.

THE TANNING OF CHLORIDE OF SILVER GELATINE PICTURES.*

BY F. STOLZE.

THE use of chloride of silver gelatine paper has lately become more and more familiar, particularly among amateurs. In comparison with albumen paper and its particular manipulation, the former is so convenient that its substitution cannot be wondered at. Of course, it has still certain defects, to which may be added the circumstance that in the ordinary treatment the gelatine film remains always somewhat sticky, so that the finished pictures cannot be dried between blotting-paper, or be mounted in a moist condition, like albumen paper prints. The effort to remove this defect is therefore certainly justified.

E. Vogel has lately recommended a hardening of the finished picture with tannin for this purpose, and as a disagreeable colouring of the film results, he adds sulphite of soda and muriatic acid to the bath, so that sulphurous acid is liberated, which, by its bleaching effect, prevents the colouring of the film. This bath, indeed, fulfils the promises of the inventor. But certain considerations connected with the same should also not be concealed. In the first place, the strong smell of sulphurous acid from the liquid is very obnoxious, irritating the breathing organs to coughing, and the bath itself is not very constant. If used in an open dish—which is unavoidable—the largest part of the sulphurous acid escapes, and the bleaching action ceases. The bath cannot be kept for repeated future use.

The question therefore arises why ordinary or chrome alum cannot be applied in place of tannin. If a test is made in this direction it will be found that the pictures so treated will show a yellowish colouration in the white parts after drying. If acetate of alumina is used in place of the alum, this colouration is particularly striking, and the strong acid reaction of this salt points to the fact that the acid plays a part in the yellow colouration.

Make a solution of chrome alum, 1:100, add ammonia in drops until the light green precipitate, which first forms, disappears again while shaking. The liquid will now become intensely green. If a persistent muddiness remains, the bath should be decanted or be cleared by filtering. The ready washed pictures should remain in this bath from one to three minutes, then be washed once in clean water. They may now be treated exactly like albumen paper prints—dried between blotting-paper, and mounted moist. The whites are fully preserved in the bath, while the latter can be kept for some time, and has no disagreeable smell. The additional labour involved is very little, and is sufficiently balanced by the very much easier treatment of the pictures in mounting and drying. To this may be added that tanned pictures resist much better all moisture and the handling with fingers, and the pictures squeegeed after tanning will keep their gloss much better.

The tanned pictures should not be left to dry before they are squeegeed, but the latter manipulation should be taken in hand at once after the final washing, provided that a high gloss is to be obtained. A film which is tanned in such a way can also be easily retouched; only care has to be taken that the brush is thoroughly dry.

For these reasons we recommend the application of the neutralized chrome alum bath for gelatino-chloride pictures.

THE *Photographic Messenger* is published at St. Petersburg, and there are six photographic societies in Russia.

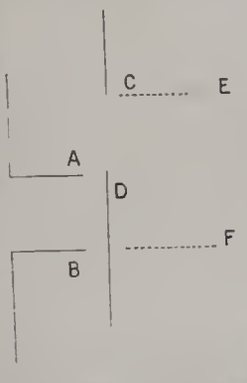
*Translated from *Photographisches Wochenblatt* for *Anthony's Bulletin*.

THE ROLLER-BLIND SHUTTER.

BY E. J. EDWARDS.

Among the many mechanical contrivances for the rapid exposure of sensitive plates, the roller-blind shutter, which I first showed and introduced ten years ago, has latterly come a good deal into use, and is preferred by many on account of its simplicity and efficiency. A full description of the shutter will be found in *The British Journal Almanac* for 1882. The shutter has since been made and sold by various manufacturers, with little modification from the original except in one important particular, to which I now propose to call attention; the difference being that, whereas I used the shutter immediately in front of the plate, the shutters which are supplied commercially are usually arranged to work in front of the lens. This change of position is of more consequence than at first sight would appear, as it has the effect of enormously diminishing the total efficiency of the shutter. It is easy to demonstrate that under ordinary conditions the actual amount of light which reaches the plate is reduced to one half, and the utility of the shutter sacrificed to that extent.

Let A B represent the diameter of the lens, and C D the opening in the roller shutter, which slit or opening we will suppose to be the same diameter as the lens. It is evident that during the exposure the shutter must travel a distance equal to twice the diameter—*i.e.*, from E to F—in order to complete the uncovering and closing of the lens, during which time the mean effective aperture of the lens is exactly equal to half its diameter; that is to say, it is being opened or closed during the whole time of exposure, the full aperture being only used for a fractional part of the actual time. On the other hand, if a blind shutter having a slit of the same width be made to work next the plate, any and every part of the sensitive surface will be uncovered and re-covered in the time taken for the shutter to travel the width of the slit, or just one-half the distance; and as during the whole time of exposure the sensitive surface is exposed to the full aperture of the lens, it will receive—provided the shutter travels at the same speed—the same amount of light in just half the time; or, if the shutter be made to travel at half the speed, the plate would receive double the exposure in the same time.



These results are proved by actual experiment. There is, moreover, another point in favour of the shutter next the plate, which appears hitherto to have escaped notice, and that is the effect of the diminished aperture, or stopping down of the lens, upon the density and gradation of the negative. It has been assumed that a diaphragm shutter, or a shutter opening and closing upon the lens, is a decided advantage in securing sharper pictures, owing to the shutter acting as a stop, and this would doubtless be the case with full or prolonged exposure; but when moving objects have to be taken in the fraction of a second—a time very often insufficient to render anything like full detail in the darker parts of the picture—this inevitable stopping down of the lens becomes a serious objection, inasmuch as it destroys still further the detail in the shadows, and renders the high-lights unduly prominent. This effect is easily seen on comparing two pictures of the same subject taken with a minimum exposure, one with the shutter working on the lens, and the other next the plate. Upon development the high lights in the former will be found too prominent, the latter giving a much more harmonious picture.

One objection, in fact the only one which has been urged by theorists against the moving slit in front of the plate, is that in the representation of moving objects there would be appreciable distortion, owing to the fact that the various parts of an object in motion are not all depicted at the same instant of time.

It has been argued that if a railway train or a vessel, moving rapidly at right angles across the field of view, were taken with a shutter having a very narrow slit combined with a very slow rate of motion, the upper part of the moving object having, during the prolonged exposure, altered its relative position, would be represented in advance of the lower part, and therefore the masts of the vessel or the funnel of the engine would be shown sloping forward at a certain angle. This has been attempted to be proved by calculating the amount of displacement which would take place with a slit—say a quarter of an inch in width—travelling from the top to the bottom of the plate in one second. The theory is ingenious, and true to some extent; but every one who has worked the shutter knows that in actual practice nothing of the kind takes place. A more correct estimate for quick work would be an inch aperture, with a speed of five inches in the twentieth part of a second; this would give an exposure of one-hundredth part of a second to every portion of the plate, which would be in nearly every case sufficiently rapid to show neither movement nor distortion. Also, it appears to have been forgotten that in any case the amount of distortion, if at all appreciable, can only equal the amount of blurring of the image which would appear under the same circumstances with the shutter working next the lens.

An incidental matter of convenience, when using the shutter next the plate, arises from the fact that various lenses may be used without displacing or interfering with the action of the shutter, which also appears to be the only one yet designed which conforms with the definition of the theoretically perfect shutter, in which the whole efficiency of the lens is utilised during the entire period of the actual exposure. For this reason, it is a matter of surprise that this form of shutter is not more universally adopted. Possibly, to quote Mr. Howard Farmer, "on the principle of the survival of the fittest," it may yet be universally used for instantaneous work. It is not protected by patent, but is free to all; therefore it will only remain for manufacturers to supply the demand.

Photographic Club.—The subject for discussion on Wednesday will be "Orthochromatics up to Date."

The Royal Society will hold its anniversary meeting on Saturday. After the meeting the Fellows will dine together.

A Monument to Daguerre!—By a resolution passed at the Boston meeting of the Photographers' Association of America, it was decided that the Association should invite photographers and others throughout the country to join with it in raising a monument to the memory of Louis Jacques Mandé Daguerre, the father of photography. There is no doubt that a large number of both professional and amateur photographers will be glad to join in this laudable undertaking, and in order to give everyone a chance to contribute, it has been decided to invite subscriptions of one dollar to this fund. President McMichael, of Buffalo, has supplied us with a subscription book, and we shall be very glad to receive contributions from all interested in the work.—*Anthony's Bulletin.*

PHOTOGRAPHY AT THE PARIS EXHIBITION.

BY DR. H. W. VOGEL.

I made a short trip to Paris, to take a look at the exhibition before its close. There has so much been said in praise of it, that a mild criticism, expressive of "nothing ever like it," would hardly be in order. It was, indeed, a sight to make one feel dazzled and confused. Everything is so luxuriously and tastefully arranged that one is taken completely by surprise. This, of course, applies also to the photographic division, although each country has its own exhibits scattered over the building, and one has difficulty in finding them all.

The largest of all is, of course, the French, and the luxury with which the photographers are exhibited here is worthy of admiration. Pavilions draped with costly oriental tapestry and carpetings, and adorned with magnificent Chinese and majolica vases, palms, rich armour, &c., have been set up in the large hall. The latter contains a fine top-light, but even this is surrounded by a sky of painted glass windows. There is a profusion of magnificent frames and cartoons, and many exhibits. For instance, the pavilion of Nadar must have cost thousands, in comparison with which the decorations of the Berlin exhibition look very modest.

Passing now from all this luxury to a closer examination of the photographic work, I must declare that the progress is not so great as might have been expected. Yes, I might even say that portrait photography, aside from the enlargements, shows no progress whatever.

In vain we look for Adam-Saloman, who by his new style gave a fresh impulse to the art, and in vain we look for some new characteristic individuality. What we find is the so-called fine picture. Everything nicely burnished, handsomely mounted on cardboards, glazed, enamelled, and heaven knows what else. More elegance than art. That recourse was had to new means, like the bromide of silver paper for enlargements, which we find here worked masterly with crayon, is, therefore, not to be wondered at. But, after a close examination of all the photographs during several days, I must confess I expected more.

Even with photographic printing processes I have not been satisfied. The Paris art market supplies the heliographer and the zinco relief printer with so many orders that the highest might be expected from both. Firms like Goupil (Boussod Valladon) retain their reputation. The latter works not only in photo-engraving, but also in colour-zinco relief printing for the journals. After Goupil I would mention Dujardin, with his photo-engravings. This designation is quite arbitrary. Phototype, photo-engraving, helio-engraving, heliography, are used sometimes for this, and sometimes for that kind of work, and one is oftentimes embarrassed to recognise the character of the work.

Somewhat remarkable appears to me the Woodbury prints in the French division. Four firms had exhibited under the name of photoglypty and obtained silver medals. The unfortunate inventor received only a bronze medal in 1867.

Carbon pictures were prominent; particularly some very good enlargements—direct prints after enlarged negatives. Carette and Forgeot made in this respect quite a respectable exhibit; their brown intensified negatives (with uranium?) of 1¼ meter were faultless. The firm of Braun in Dornach, whose chief lives in Paris, and is domiciled in France, exhibited, of course, the products of their establishment in a grand style. Again there were pigment reproductions in which Braun proved his masterly superiority. Quite a respectable accomplishment is the picture of Van der Helst, the banquet length, nearly two meters; also carbon pictures in two tones, made with apparently two transfers. Cherry Rousseau, in Etienne, exhibited also similar coloured carbon enlargements.

Burnt-in photographs were well represented, but not better than at the Paris Exhibition of 1878—particularly upon enamel by Deroche and Comte Roydeville. Both were restricted to small sizes only. Leisner's porcelain photographs would have had a decided effect in comparison with these.

In architectural photography there was nothing to be seen in comparison to the work of Ruckwardt, in Berlin; Schmitz, in Cologne; or Van Delden, in Breslau.

Colour-sensitive processes are not so much cultivated in France as in Germany. Only two exhibitors could be found with parallel views—that is, views of the same object with colour-sensitive and ordinary plates side by side—namely, Attout Tailfer, in Paris, and Boissonnas, in Geneva; while at the Berlin exhibitions there were more than a dozen. Boissonnas still works landscapes upon ordinary eosin plates with yellow glass, superseded long ago in Germany by eosin silver. Tailfer's pictures by gaslight, without yellow glass, were made better in Germany three years ago. His parallel views of spectra with ordinary and eosin plates give for the latter a yellow sensitiveness, which at most is twice as great as the blue sensitiveness, while ten times the yellow sensitiveness has already been obtained with eosin silver plates.

With regard to spectrum photography, the French division is very weakly represented, while the Berlin exhibition could show quite a goodly number of participants. I mention only Kaiser, Eugen von Gothard, and Pickering.

Rowland, with his large spectrum, was also represented in Paris in the American division.

In other respects the scientific division of the Paris Exhibition did not offer, by far, so much with regard to photography as at Berlin. Henry, it is true, was represented by six star-charts, but his planet-photographs were missing. Janssen exhibited six pictures of the sun's surface, showing excellently the original "grain structure." There were also some portraits of delirious and hypnotised subjects at the Salpetrière. Of the interesting nebulæ pictures of Common, Pickering, and Gothard, of the wonderful star spectra of the second, his moon pictures, the aurora borealis views, Cohn's eye photographs, Tschirch's botanic views, solar eclipse pictures we had in Berlin, there was nothing to be seen at the Paris Exhibition.

Greater recognition can be paid to the balloon views. Here the French War Department exhibited four well enlarged views from a height of 1,000 metres, taken obliquely downwards; and Nadar, Jr., had also succeeded in accomplishing something quite respectable in this line. Still, they did not surpass the pictures of Freiherrn von Hagen, which, unfortunately, were not exhibited at Berlin. It must be acknowledged that Nadar showed a greater variety in his exhibit than any one else. Besides the usual elegant portraits in all possible shapes to life-size, he excelled in some magnificent transparencies. He had constructed in his pavilion a particular window, in which, by means of some mechanism—the same as in a stereo-changing apparatus—different tableaus could be inserted following each other, which contained pretty transparent portraits, and others which were not transparent. A new

frame appeared every five minutes. Nadar is the agent of the Eastman Company, and exhibits their apparatus and papers in the most extensive manner.

Other French portrait photographers have also become photo manufacturers, *i.e.*, dealers—Lumiére, in Lyons, and Frank de Villecholes, both of whom now manufacture dry plates. Platinum pictures are not so well represented at the Paris Exhibition. Bogez (successor of Van Bosch) excelled here mostly. He was also the only one who exhibited photographs produced with artificial light.

Panoramic pictures, which were missing entirely at the Berlin exhibition, were represented in Paris by two exhibitors—Neurdein and Moessard. The former showed in his architectural views the well-known curved lines in a more than striking manner.

Marey cannot compare with Anschütz in instantaneous pictures. Besides Marey's, there were several quite handsome amateur instantaneous views by N. de Perpignan—surf and marine views, ball players, in $\frac{1}{150}$ second.

The Lichtpaus picture was better represented than in Berlin, although the greatest part was made by the Prussian blue process. Aniline prints were entirely missing. Maison Clande, in Paris, and Rochereau furnished also black pictures, which evidently had been treated with alkali, washed and coloured with gallic acid. Only one carbon process without transfer was to be seen, apparently similar to the one described in Volkner's reproduction photography.

Amateur photography was well represented, but could not always be recognized as such. Particularly should be mentioned Rongier, editor of the *Amateur Photographe*, and David, whose specialty is military groups from all countries; also Demarchy. Bazard made some good instantaneous views without a tripod. Particular mention must also be made of the Balagny films, which were exhibited not only by the inventor, but also by several imitators, in rolls of 4 meters length and to 40 cm. width. They are of great advantage to amateur photography and in the field. Its superiority to Eastman paper, which is not suitable for enlargements on account of its grain, and the complete transparency and lightness, are qualities which cannot be too highly esteemed. The films can easily be sent by mail, and it is also an advantage that they can be used on either side. Their flexibility has given rise to the construction of a simple panoramic apparatus by Moessard, in which a cylindrical curved Balagny film serves as a picture surface, and where only the lens is turned, the apparatus being stationary. The samples exhibited deserve consideration. The original Balagny films are made by Lumière in Lyons, apparently not larger than 30 by 25. Lamy furnishes, however, rolls for twenty-four to forty-eight pictures. The longest film is furnished by Grasse and Jongle through Grieshaber, 10, rue de Tresor, Paris.

Another specialty of the French Exhibition was the photographs upon wood. Grüne, in Berlin, made these twenty years ago for wood-cuts. At the exhibition they applied these photographs upon wood for decorative purposes and ornamentation.

The exhibition was very abundantly supplied with apparatus, and decided improvements are to be noticed in it. Mahogany has, to a great extent, taken the place of walnut, and English styles are more or less imitated. The Stirn camera is known in France as photo-eclair, and has been imitated by Fetter, Paris. The American Detective Camera exists here in many forms and under many names, of which I might mention the "Ideograph," by Martin. The finder is generally separated from the camera, and is sold in a separate little case, which can be attached to the apparatus.

Particularly new or original constructions I have not been able to discover. With regard to the solidity of work, the French apparatus does not come up to those of English or German construction.

Of foreign countries the United States were better represented than any other. Germany had no exhibit whatever, and Austria had only two exhibitors. The American division had its place upon a gallery of the first floor. The majority of the pictures were fastened to a screen which was turned towards the skylight, placing the pictures on the shaded side, in a bad position. I would mention here Falk, from New York, with first-rate portraits; Scholten and Guerin, St. Louis, with portraits and *genre* pictures; Barker, Niagara Falls, with good landscapes; and the New York Amateur Society.

Most effective in the American division were the landscapes of Jackson, Denver, particularly his surprising transparencies, and the gigantic solar spectrum of Rowland, Baltimore. The latter certainly is the highest scientific photographic accomplishment of the whole exhibition.

The absence of Kurtz, with his beautiful reproductions and artotypes, is to be regretted. He could have easily placed in the shade a number of similar works in the French division. England was not sufficiently represented. The most prominent were Walery and Van der Weyde, who tried to surpass their French neighbours. Byrne, of Richmond, and Sutcliffe, of Whitby, deserve also honourable mention.—*Anthony's Bulletin.*

Patent Intelligence.

Specifications Published.

418.—*January 9th*, 1889. "An Optical Magnifying Instrument." A communication from abroad by Theodore Simon, of Paris, in the Republic of France. George Cecil Dymond, M. Inst. M.E., of the Ageney for Foreign Patents, Solicitors, 6, Lord Street, Liverpool, and 6, Bank Street, Manchester, and 323, High Holborn, Patent Agent.

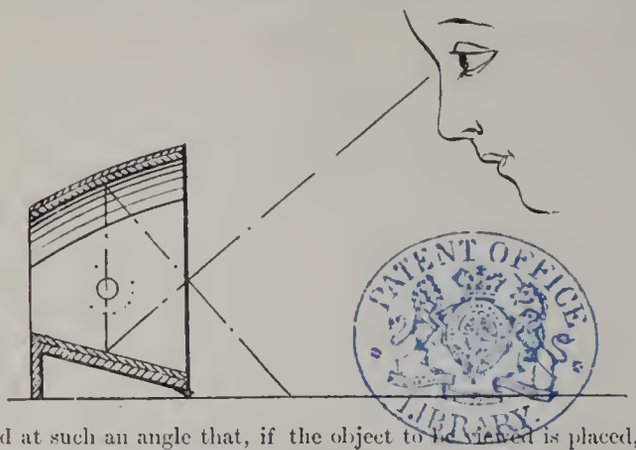
The optical instrument forming the object of this application may, in many cases, replace with advantage the ordinary magnifying glass formed of a lens, which is used for magnifying very small objects, signs, or characters.

It is for this reason that my correspondent proposes to give the name "magnifying glass" to the instrument, although, as will be explained, it is constructed with mirrors.

Magnifying glasses made of a glass lens magnify by forming an image of the object looked at, the luminous rays of which only reach the eye after passing through a certain thickness of glass, whereby they are considerably weakened. Again, the range of action of these magnifying glasses is limited. The magnifying glass, the object to be looked at, and the eye of the observer, must occupy relative positions and distances which cannot vary to any great extent, and especially for reading very small text it is very inconvenient that the eye should be constrained to keep at so slightly variable a distance. It is, therefore, proposed to replace the lens by reflecting mirrors, chosen and arranged in a suitable manner to greatly magnify the object, and to form an image, the rays of which will reach the eye without being appreciably weakened.

The following arrangement has been adopted, which forms a simple and convenient instrument for attaining the object in view. Among other advantages, it does not prevent the light from illuminating the object to be observed, and it enables the observer to read very fine text without being obliged to move

the instrument laterally, and without being constrained to keep his eyes at any fixed distance. The apparatus is composed of a curved mirror, and a plane mirror placed one above the other,



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and at such an angle that, if the object to be viewed is placed, say, for example, in a suitable position on the plane on which the apparatus rests, its image, reflected and magnified by the curved speculum, will be reflected by the plane mirror to the eye of the observer. The degree of magnifying power depends —according to the laws of optics—on the curvature of the mirror. By a curvature suitably chosen, it is easy to include within the rage of the concave speculum the whole width of the object to be microscopically examined, such, for example, as printed characters, so that it will never be necessary to move the apparatus laterally, and it will therefore be sufficient to move it only backwards and forwards.

It is easily understood that, if written or printed paper is placed in front of the observer in the aforesaid plane, all that he need do is to place upon it the reflecting microscope or magnifying glass a little beyond the part to be magnified, and to look into the plane mirror, taking up any suitable distance at any suitable distance which suits his own convenience.

The apparatus being open at both ends, the part at which the observer looks is illuminated on nearly all sides, a circumstance which further facilitates the observation.

If the instrument is constructed with mirrors of a small curvature, it may be used for examining an object of small dimensions with greater magnifying power. The plane mirror may also be replaced by a curved mirror, which will itself alter the dimensions of the reflected image. The two mirrors are each fixed in a frame, and the two frames are fixed in a suitable position by means of two side plates, each furnished with a stud or thumb-piece, by which the apparatus can be held. The mirrors may be of glass or other substance in ordinary use, with a coating of quicksilver or entirely of metal with a plate or coating of silver if desired. The frame may be furnished with handles, rings, or other appendages, according to the use that is to be made of the apparatus.

14,671. *September 17th*, 1889. "Improvements in Magic Lanterns." Communicated from abroad by JAMES BENNETT COLT, of No. 88, West Washington Place, New York City, United States of America, Manufacturer. WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., Patent Agents, Southampton Buildings, London.

This invention relates to magic lanterns or stereopticons, and consists of a lantern constructed in the manner shown in the accompanying drawing, in which

Fig. 1 is a side elevation of the lantern.

Fig. 2 a vertical section of the reflector.

Fig. 3 a rear view of the hood of the reflector detached from its support.

Similar letters of reference indicate like parts in the several views.

This invention relates more particularly to the construction, combination, and arrangement of the reflector. The inventor affixes to the lamp A a reflector B, which is as nearly as may be parabolic in form. This reflector B of the form described is mounted upon the lamp A of any suitable construction, but to give a satisfactory result the flame from this lamp must be relatively of large proportions, and therefore send out a high degree of heat, and this heat, if allowed to pass freely and un-

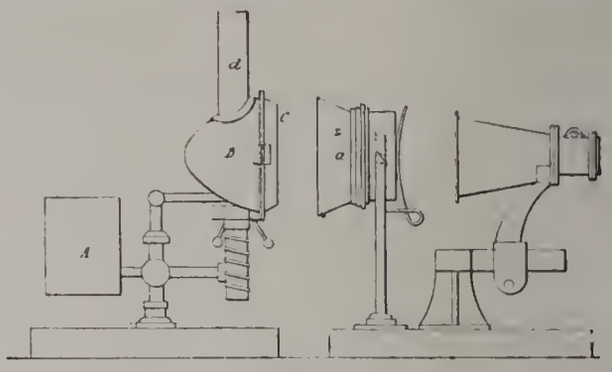


Fig. 1.

obstructed from the face of the reflector, would in time warp the metal of the lamp, and in some instances fracture the condensing lenses *a*.

To maintain the bright light without injury from its heat, he provides the reflector B with a hood C. This hood is hinged

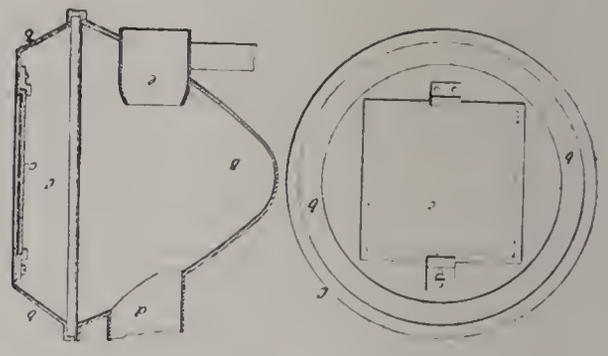


Fig. 2.

Fig. 3.

or otherwise fixed to the reflector, so that it fits over its face. The hood is made of metal, and it is in form a truncated cone with angular sides *h*, and with its face or front side fitted with g window *c*.

It is found in practice that the reflector B, when fitted with the hood above described, permits a large and brilliant light to be used without injury to any part of the apparatus from the heat of the lamp, since, as the heat is generated, it is retained within the chamber formed by the reflector and hood, until it passes off through the chimney *d*.

By this construction and combination of reflector and hood it is possible to burn oil lamps of great flame and brilliancy in a stereopticon lantern, as well as, if desired, the ordinary lime light. The chimney *d* is made of metal and attached to the reflector, and the burner-case *c* of the lamp passes into and is also attached to the reflector.

Another improvement in connection with the reflector and lamp consists in inserting the burner of the lamp A in the reflector B, so that the flame shall be in the same vertical line or coincident with the opening in the reflector for the chimney *d*, causing the current through the chimney to be sufficient to supply the burner with the necessary air, which passes up through and around the burner for sustaining combustion, and also to carry off through the chimney the smoke, &c. By this arrangement of lamp, reflector, and chimney, he does away with a glass chimney surrounding the flame.

The inventor claims :—

The combination of the lamp ; the parabolic reflector, having the chimney *d* secured to one side, and a burner case to the opposite side ; and the hood C, having the window *c* ; the burner of the lamp being received within the burner-case, by which the reflector is supported, and the reflector and hood constituting the combustion chamber.

16,827.—*Nov. 20th*, 1888. "Photographic Printiog Frames." Albert Towers, 1, Victoria Terrace, Egerton Street, New Brighton, Cheshire, Fancy Goods Dealer.

A spring attached to photographers' printing frames for printing from negatives. I place my spring at the back of the frame as is usual in these frames, but secured so as to have no sliding action. The springs hithertofore in use are usually secured to the frames by a pin, rivet, or screw, and move upon it as a centre in applying or removing the pressure of the spring to the pressure board or back; the sliding action of the spriog, so worked, acting upon the pressure board or back causes it to move, thereby causing a corresponding movement in the negative or sensitized paper, damaging or destroying the copy.

My improvement is a bow spring hinged to the side of the frame at the back, so that direct pressure only is applied to the pressure board, when applying or removing its pressure, all sliding action being avoided—and the securing of the spring when pressed down, by an arrangement similar in action to an ordinary bolt for doors.

Proceedings of Societies.

Camera Club.

On Thursday, Nov. 28th, the usual monthly exhibition of lantern slides took place at the Camera Club. Numerous slides were brought by members.

Mr. Elder exhibited a series illustrating the river Thames from London round to the Essex coast, and gave an interesting description with the photographs. Mr. Hansard contributed pictures of Spanish and Algerian life, scenery, and architecture. Mr. Laurie some instantaneous views. Mr. Howlett's and Mr. William's sets included excellent work. Mr. Rodgers's slides from negatives taken on the "down river" excursion, and Mr. Humphries' transparencies from hand-camera negatives, including one picture of a scene by the St. Gothard tunnel of a weird character. Capital slides were shown also by Messrs. Pemberton, Sands, and Charters-White. A few sent by Mr. Gale concluded the exhibition.

The subject on Thursday, December 12th, will be "Timing Shutters"; Mr. Charlton Wollaston will open the discussion.

London and Provincial Photographic Association.

At the meeting on the 28th ult., Mr. Archer Clarke occupied the chair.

Mr. P. Everitt, who had been announced to read a paper on the subject of the re-development of over-exposed negatives, expressed his regret that he had not been able to prepare a paper, but had brought down to the meeting the results of some experiments in that direction. These consisted of a number of plates, some of which, after development, had been immersed in a solution of ferricyanide of potassium, and others in a bath of ferricyanide of potassium with the addition of bromide of potassium. The image being thoroughly bleached, the plates were washed, re-developed with pyro, and then fixed. In one instance, as much as eight times the normal exposure had been given. Mr. Everitt contended that it was possible by re-development to render amenable for printing purposes a negative that, from over-exposure, would be with ordinary development worthless. He has been led in the direction of these experiments by a mishap that occurred during the development of a plate about two years ago. In exposing a plate in contact with a negatsve to daylight, the door of the dark room stuck, consequently the plate was considerably over-exposed. A thin image flashed out on developing. Wishing to strengthen the developer, he added what he believed was pyro, but which he afterwards discovered to be ferricyanide of potassium. The image disappeared. The plate was washed, and a fresh developer poured over it, which restored the picture; but the result, to his surprise, was a negative from a negative. He stated that he had made many trials to repeat this, but had not succeedeed in doing so. The strength of the ferricyanide and bromide used was twelve grains to each ounce.

Mr. A. Haddon would expect to find negatives stained; this being characteristic of treatment with ferricyanide of potassium. Captain Abney had explained, in his "Instruction in Photography," the phenomenon of a reversing action taking place after a plate had been exposed alternately to white and red light. Mr. Haddon explained a theory he held in reference to this, by illustration on the black-board, how a negative from a negative was quite possible.

Mr. T. E. Freshwater exhibited photographs of a Wimshurst electrical machine just completed. It comprised six pairs of plates 18 inches in diameter, and would give a continuous spark 7½ inches long.

Hackney Photographic Society.

Dr. Gerard Smith, the President, gave an interesting carbon demonstration last Thursday. He prefaced the paper by giving a history of the carbon process, tracing it from Mungo Ponton's discovery of the photographic properties of bichromate of potash up to the present time. The lecturer exhibited a piece of carbon tissue, which, being black, the action of light could not be seen; consequently he, when printing, had used an actinometer consisting of six miniature negatives of different intensity, testing by means of sensitised chloride paper, and comparing those to be printed. He had found that carbon tissue deteriorated in a fortnight. The action, after printing, still continued when in the dark, and for which allowance should always be made. He transferred double and single tissues; the former was on opal, and was successfully done.

Mr. Hubert, who presided, in opening the discussion, said that the paper had been very interesting, and hoped the members would derive much benefit from it.

Mr. Wall recommended ether being used instead of turpentine in the waxing solution, which permitted of its being used at once.

Mr. H. Smith wanted to know whether water would affect the film, and if varnish were required.

The President said the picture consisted of insoluble gelatine, and did not need it.

The Secretary: Is the enamelled surface affected by the mounting, and is it possible to obtain, at will, rough or smooth surface?

Dr. Gerard Smith: Prints, being enamelled, only ought to be glued at edges; any surface can be obtained.

Dr. Roe and Smith asked what action took place when immersing prints in an alum bath?

Dr. Gerard Smith said chrome alum was formed.

Liverpool Amateur Photographic Association.

The twenty-sixth annual meeting was held in the Association's Rooms, No. 3, Lord Street, on Thursday, the 28th November. The President (Mr. A. W. Beer) occupied the chair. There was a large number of members and friends present.

The following gentlemen were elected members of the Association:—Messrs. John Woolfall, R. McGowan, and R. H. Webster.

The Treasurer's report shows a balance remaining to the credit of the Association of £48 13s. 8d., after investing the sum of £194 14s., and writing off £14 5s. 4d. as depreciation on club room furniture, &c.

From the Secretary's report, there has been an accession of seventy-four members during the year, this being the highest number of new members since the formation of the Association. There are now 238 members.

The following members were elected as officers for the coming year:—*President*, Mr. Paul Lange; *Vice-Presidents*, Mr. William Tomkinson and Mr. W. D. Mead; *Treasurer*, Mr. Joseph Earp; *Secretary*, Mr. Walter Hughes; *Auditor*, Mr. A. Bradbury; *Librarian*, Mr. J. McDonald Bell.

The competition prints sent in by the members had been adjudicated upon by the following critics: Messrs. G. W. Webster, John Finnie, and E. R. Dibdin, who had awarded the Association's medals as follows:—For pictures (in sets of six) over half-plate size, J. L. Mackrell and D. Cunningham; for half-plate and under, T. B. Sutton and William Tomkinson;

for set of two enlargements, F. K. Glazebrook and J. L. Mackrell. For the best single picture, Mr. F. Anyon and Mr. J. L. Mackrell were bracketed equal in merit.

Lantern slides were judged by Messrs. G. S. Thompson, E. L. Grundy, P. Lange, and W. D. Mead, medals for the best and second-best set of six being awarded to Mr. A. J. Cleaver and Mr. T. B. Sutton.

The whole of the slides (138) were then shown in the lantern.

Announcement was made that a "Social" or smoking concert would be held on Tuesday, 17th December, at 7·30 p.m. A nautical sketch, entitled "All at Sea," written and arranged by Mr. A. J. Nicholls, would be given.

Also that the celebrated pictures of Mr. H. P. Robinson (Tunbridge Wells), consisting of about seventy frames, would be on view in the Rooms, No. 3, Lord Street, from the 16th December to the end of January.

BATH PHOTOGRAPHIC SOCIETY.

November 27th.—Mr. W. PUMPHREY, President, in the chair.

Miss ASHLEY exhibited a number of large direct photographs representing scenes in Colorado, Wyoming, and Mexico, the work of Jackson, of Denver.

Mr. FRIESE GREENE drew attention to developed prints made with an emulsion containing starch. He complained of the sunken-in character, and attributed this to the base or coated surface being unsuitable.

Mr. J. DUTTON showed some old wet plate films which had been transferred from glass to paper.

Circulars anent the formation of a Photographic Institute were distributed; also copies of *Scraps* and other trade price lists, which had been sent for the purpose.

Mr. H. M. SMITH, lecturer and demonstrator for the Eastman Company, then discoursed on the subject of "Enlarging on Eastman Bromide Paper." He commenced by describing the method of illumination available, giving preference to an arc lamp of 2,000 candles power; next in sequence the oxy-hydrogen jet, then paraffin oil containing a small proportion of camphor. When daylight is used, a room facing north might be darkened, and a hole made in the window-shutter large enough to take the negative, but no larger; interpose a camera and lens between negative and wall, and then move nearer to or away from negative until an enlarged image is seen on the opposite wall. Tables are in all the Year-Books which give the exact distances necessary for a given result. He was often asked whether an ordinary magic lantern would do, and he answered yes, provided the condensers were 4½ inches in diameter, and the negative not more than three; but if it be desired to enlarge from a half-plate, then condensers not less than 8 inches in diameter should be used. Attention was drawn to such details as well warming the apparatus before starting, the effect of a smoky flame in the enlarging or optical lantern, and of oil spilt about the burners. The advantage of a rectilinear type of lens, and the employment of a negative fully exposed, were referred to. Under-exposed negatives, said the speaker, are no good at all for the purpose; they will be sure to yield chalky prints.

The question of permanence was next dealt with, and the liability of fading from well ascertained causes clearly laid down. Provided the emulsion be pure, the paper pure, and the manipulatory details following exposure be carefully carried out, there was no reason why prints on the bromide papers should not last as long as on any other. Mr. Smith next explained clearing, developing, and fixing, demonstrating these manipulations before the audience. Finished specimens were also handed round for inspection. Mr. Smith then drew attention to the new celluloid negative films, which the Eastman Company will shortly place on the market. These negatives appeared to be about the same thickness as the well-known stripping film negatives, but more transparent, and possibly of less weight. The advantages claimed for the new Kodak detective camera were also explained; there are several improvements in construction of lens, shutter, and general get up.

The CHAIRMAN hoped that celluloid would replace the paper in the roll-holder; it would be much more easy than the plan of film stripping, without increasing the weight, an important consideration to tourists.

The next meeting will take place December 18th, when the President will give an illustrated lecture on the "Cities of Italy."

At the 13th annual exhibition of vacation sketches and paintings, opened at the Jubilee Hall, Bath, December 3rd, the special prizes given to pupils studying at Mr. Harbutt's Art School, for series of artistic and skilful photographs, were awarded as follows:—G. Thomas, 1st prize; J. Stillman Gill, 2nd prize. Messrs. W. Pumphrey and W. M. Ashman were the chosen judges.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE annual meeting of the above Society was held at club rooms, Colmore Row, on Thursday, November 28th, Mr. W. JEROME HARRISON in the chair.

Hon. Sec. J. H. Pickard read the report, from which the following is extracted:—

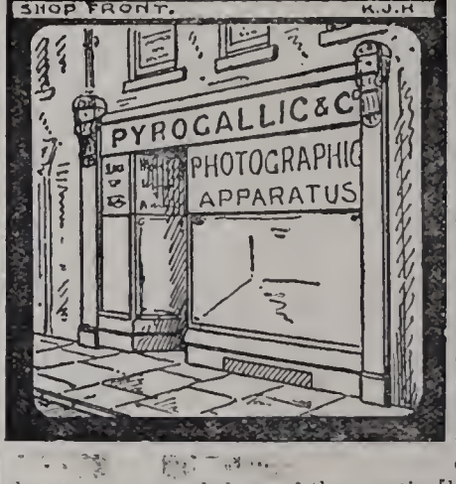
"Your council, in submitting their Fifth Annual Report, congratulate the members upon the steady progress made by the Society during the year, notwithstanding the increased entrance fee and subscription, in consequence of removal to more suitable rooms in the Grand Hotel, Colmore Row, affording better facilities for lectures, demonstrations, and social meetings. Your council were aware that this step would probably cause some withdrawals, but they are pleased to report that the number of these, together with those struck off for non-payment of subscription, is only 52. This has been largely compensated for by the addition of 20 new members, leaving the register roll at 172, as against 204 last year. The average attendance at fourteen ordinary meetings held at the new rooms has been 74, and at three at our late room, 63."

The papers read, demonstrations arranged, awards made at the exhibition, were reported, together with other matters which have been duly recorded in our columns.

The Excursion Committee, bearing in mind the experience of past years, suggested that the number of excursions be materially reduced, and considered it desirable to limit them to one month.

The Lantern Committee reported a successful year, with a numerous attendance at all meetings at which the lantern was the prominent feature, showing that this method of exhibiting photographs is becoming one of the most popular. Forty-nine slides, including copies of prize pictures, had been added to the Society's collection during the year, making a total of 286. The exchange box, which contained a goodly number in quality and quantity, had not been in much demand, and unless distributed during the coming season, it would, perhaps, be advisable to empower the Lantern Committee to dispose of the slides to the best advantage.

Attention was again directed to the marking of slides. The proper method of labelling a lantern slide is to attach the name or title so that it may be seen on the front of the picture—preferably at the top—when viewed in its correct position. All slides for exhibition should be 3¼ inches square, and properly mounted. They should bear the title legibly written.



The Librarian reported that members have made good use of the library during the past year.

The council repeated their recommendation of last year that a more extended use of the question box be made, as much valuable discussion is obtained thereby. Members were also reminded that it is of great assistance and mutual benefit to

inspect special apparatus, negatives, and prints, and hope was expressed that more such exhibits would be brought to the meetings.

A letter was read from Dr. Hill Norris, resigning the Presidency of the Society, which he has held uninterruptedly since its foundation; whereupon it was

Resolved—"That Dr. Norris's resignation be accepted with regret, and the hearty thanks of the Society be given to him for his duties as President for the past five years, and that Dr. Norris be elected an honorary member of the Society."

The election of officers was then proceeded with, and resulted as follows:—*President*—J. B. Stone; *Vice-Presidents*—W. J. Harrison, E. H. Jaques, B. Karleese; *Librarian*—S. T. Holliday; *Treasurer*—T. Taylor; *Council*—J. J. Button, A. A. Bonehill, W. S. Horton, S. G. Mason, E. C. Middleton, Dr. Nicol, William Rooke, G. A. Thomason; *Hon. Secretaries*—J. H. Pickard, and A. J. Leeson.

The HON. SECRETARY read a circular calling attention to a special meeting of the Society on December 11th, when Mr. W. J. Harrison will read a paper on "Photo-Surveys."

On a proposition that a subscription should be made towards the fund for a lantern, a number of members present subscribed together a sum of over £10; this, with fund in hand, leaves the Society with over £14 towards the purchase of a first-class optical lantern.

The following is a copy of the circular:—"At the meeting held on November 1st, 1898, the following memorial was received by the Council of the Birmingham Photographic Society: 'That the Council be requested to call a general meeting (special) to consider the feasibility of a photographic survey of Warwickshire, the object being to secure an accurate and unbiassed record of the scenery, monuments, life, natural history facts, &c., of our county as they now exist.' This memorial was signed by eighteen members of the Society. In accordance with the rules, the Council have, therefore, resolved to hold a general meeting at their rooms at the Grand Hotel, Colmore Row, Birmingham, on Wednesday, December 11th, at 7.30 p.m., to consider the question, when your attendance is cordially invited. The President of the Society, Mr. J. B. Stone, J.P., F.G.S., F.L.S., will preside, and Mr. W. Jerome Harrison, F.G.S., will read a paper introducing the subject, which will then be open for discussion. It is hoped that the other photographic and scientific societies in the County will render their assistance in the work, and they have been invited to send representatives to the meeting."

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

A MEETING was held on Wednesday evening, November 6th, the president, Mr. FREDERICK GRAFF, in the chair.

The SECRETARY reported that at the Conversational Meeting, October 16th, Mr. Milburn, of the Eastman Dry Plate and Film Company, exhibited before the Society the new Eastman transparent films, and gave a practical demonstration of their use and development.

The film consists of an exceedingly thin and transparent support, coated with a highly sensitive gelatine emulsion. One of the chief characteristics of the film is its flexibility, which adapts it for use on roll holders in the same manner as the company's old film, in which paper was the support. It has the further great advantage, however, that no stripping, oiling, or other after processes are necessary, it being treated in all respects practically like a glass plate. After the final washing it is soaked for a few moments in a special solution of glycerine, alcohol, and water, which prevents its curling or cockling in drying. It is then pinned up on any perpendicular surface to dry.

Mr. WALMSLEY showed Eastman's Kodak Camera, No. 2. This little box is precisely the same in outward appearance as the well-known Kodak that has been before the public during the past year; differing from it only in size. The older form makes a picture 2⅝ inches in diameter; the new one, or No. 2, 3½ inches. The lens has a fixed focus, all subjects over five feet distance being sharply delineated. It has also a diaphragm shutter, easily rotated, which gives three sizes of openings, thus greatly increasing the efficiency of the instrument in time work on interiors, and also where great excess of lighting prevails, as in seashore views. The camera is loaded with the new "Transparent Film" for one hundred exposures. A view finder is attached to the front of this camera, enabling the operator to see what he exposes upon at the moment of so doing. Mr. Walmsley also exhibited a number of negatives, made from his own exposures with this camera, as well as prints and lantern slides for same, all of which showed great capacity in the camera and lens.

A fine view camera, using 5 by 7 plates, and made also by the Eastman Company at their London works, was also shown by Mr. Walmsley. This camera and its accessories combine the most recent advances in this direction, and in all respects seem suited to the requirements of the most exacting demand. The entire outfit, consisting of camera and three plate holders, was made of Spanish mahogany; the box itself folding with a thickness of one and a half inches when closed. At the same time the perfectly rigid bed was capable of sufficient extension to admit the use of a lens of nineteen inches focus. By an ingenious arrangement, the back could be advanced toward the front, so as to permit the use of wide angle lenses of very short foci without including the bed plate in the field of view, as is the case with all cameras in which only the front can be moved to and fro. A *single swing back* only is provided; but the *front* is so constructed as to permit of a very wide lateral swing to same, whilst the rising and falling front has a very wide limit of adjustment. The back is reversible for horizontal or vertical exposures. The folding tripod legs are attached directly to the base box of the camera by a revolving brass carrier, and both back and front are provided with automatically moving pendulum arms for levelling the camera. The focussing is effected by a finely cut rack-and-pinion, controlled by large drilled heads. The plate holders, three in number, are of the folding or book form, with the slides hinged to fold back on withdrawal, as usual in the English form of cameras, but the leakage of light through this joint, so often complained of in this form of camera, is entirely avoided by the employment of a double rabbet at the joint, which precludes the possibility of any light entering thereat. The whole outfit is carried in a water-proof canvas case, with sling straps as in a knapsack. It is made in three sizes: 4 by 5, 5 by 7, and 6½ by 8½.

Mr. JOSEPH M. WILSON related some interesting experiences in connection with a trip made through several European countries during the past summer. He carried with him a Scovill hand camera and material for about seven hundred exposures, most of which was made use of before his return. The camera, in which several ingenious modifications and improvements had been made by Mr. Wilson, was shown, and also a light and convenient alpenstock tripod of his own design, which had been carried throughout the trip.

DR. C. L. MITCHELL showed a Blair Compact camera mounted on a single leg or "unipod" for use in instantaneous work in situations where a regular tripod could not conveniently be set up, and where more steadiness was desirable than could be maintained by holding the camera in the hand. With a large camera on board a yacht, or in street work, when setting up a tripod would attract a troublesome crowd, the unipod had been very useful.

Mr. WILKINSON showed a hand camera obtained by him in Germany, the invention of Dr. Krugener. Glass plates 3¼ inches square were used, thirty being carried on the camera. The box was of oblong shape, about a foot long, and four or five inches square. The camera proper was in the centre of the box, the lens opening being at the side. Before use the plates were contained in a magazine at one end of the box, and by an ingenious contrivance after each exposure the plate used was removed to a second magazine at the opposite end, and a fresh plate brought into place ready for the next exposure. The operation was continued until all the plates were exposed and transferred.

Mr. FRANCIS BURROWS also showed a new hand camera of his own design, which he described as follows:—"The Ultimate is a 4 by 5 hand camera. It is compact, measuring 5 by 5¾

by 9 inches, and yet by drawing out the telescopic front, it will accommodate an eight-inch focus lens. The front of the box opens, allowing access to the lens and shutter, while in the rear of the lens a flap shutter may be closed during this operation. This box is fitted with a 4 by 5 Pantograph lens of $5\frac{3}{4}$ inch focus, and working *f*-6 approximately. The shutter is of the rotary type, but is peculiar from the fact that its movement is always in the same direction. A small crank on the front board sets it by a part revolution, and a little further movement of the same exposes; by this means the shutter is set without exposure of the plate, and generally at the last moment. With the spring at this tension the exposure is rapid enough to make all ordinary work, including landscapes, marine views, or animals. However, the shutter disc is double, and by releasing this small catch one-half may be revolved independently of the other, thus making the effective opening in the shutter one-half, one-quarter, or one twenty-fifth of its full size, and so giving the same fraction of the ordinary time of exposure. By releasing the spring the disc may be entirely revolved by hand, and the exposure timed. The opening and closing by this method being one simple movement, it is practicable to make the exposures very short. The rear compartment, opening at the bottom, contains a new locking arrangement, which holds one plate-holder rigidly in place, while the other three drop loosely in back of it. A slight pull on this lock loosens the plate-holder and lifts it out, while a strong pull draws the entire mechanism from its place, and makes place for a $3\frac{1}{4}$ by $3\frac{1}{4}$ Eastman roll holder, which slides into its bed with slight pressure. The plate-holders are of new design, very small, and of metal; they are double, and are loaded by removing both slides and the movable plug from the top. As any lens from $4\frac{1}{2}$ to 8 inch focus may be fitted, the question of focussing comes up. With this lens the front is drawn out about three-fourths of an inch, and there is a line drawn. In this position the lens cuts sharply to within about twenty feet. With an *f*-8 or *f*-11 stop everything beyond this distance is very sharp; practically, I make all views at this point. About one-sixteenth of an inch back of this is another line. When drawn out to this we get better foreground effects, but the horizon will not be quite distinct, and should not be allowed to show unless it is possible to use a stop, as, for instance, a well-lighted subject, or one allowing time exposure. In case I find it necessary to time a plate I am generally able to find something to place the camera upon—a railing, bench, or stone; or I have made very sharp photographs of several seconds' exposure by holding the box firmly against the side of a house or tree. For those who will carry a tripod I can suggest nothing better."

It is proposed that a meteorological station shall be established at the Bermuda Islands after the completion of the telegraph service between them and Nova Scotia. Many vessels leaving Halifax, the masters being unaware of the approach of storms from the West Indies, are dismantled before they have been out three days. The establishment of the proposed meteorological station would, therefore, be of great value, and the Canadian Government has willingly consented to bear half of the cost.

RECEIVED.—From Messrs. Marion and Co., "Revised Formulæ for the Production of Chloride and Chloro-Bromide Lantern Plates," a little book which will, no doubt, fulfil the hope of its compilers that it may prove useful. The same firm sends also a new patent vignetter styled the "Norser." Among the advantages claimed, are that the vignetting opening—which can be placed close to or high above the negative—can be produced in a few seconds; that the vignetter never moves during the production of any number of prints, and that it can be attached to any printing frame.—Wormald's Symmetrical Masks, for lantern slides by reduction, are intended to obviate the difficulty and time occupied in cutting, adjusting, or making masks to cover the margin of reduction slides. The masks have one side of the paper black, the other side being left white for writing names and titles, and for distinguishing the face of the slide in the dark.

Answers to Correspondents.

F. C. S.—The oxychloride theory for explaining the darkening of chloride of silver on exposure to sunlight was first suggested by Robert Hunt ("Researches on Light," second edition, 1854, p. 80). The hypothesis lay dormant until recently revived by Professor R. Meldola in his lectures on the "Chemistry of Photography." See his book, pp. 53-57.

TYRO.—Eikonogen development. We have not tried the preliminary bath of hypo and mercury, but Mr. A. Cowan, who has done so, reports adversely, and it seems difficult to imagine that it should answer any useful purpose. There is probably a misprint in the paper of instructions:—For "15 grains hypo in $2\frac{3}{4}$ pints of water" may really mean 1 gramme per litre, or 15 grains in *one and three-quarters* of a pint of water. The use of so much caustic potash as one part in thirty (*i.e.*, 5 grms. in 150 c.c.) is another great disadvantage, for it is very liable to attack the film.

F. WELLS (two letters).—A general summary of the history of photography by the late Robert Hunt, with mention of all the known processes up to the introduction of collodion in 1850, will be found in the *Journal of the Photographic Society*, Vol. I., pp. 29-31. It will be easy to supplement this list by searching through the later journals or the YEAR-BOOKS. Consult also Hardwich's *Photographic Chemistry* for the earlier dates. 2. H. Fox Talbot's *Pencil of Nature* was the first issue of calotype prints.

EXHIBITOR.—1. We can only call to mind the Richmond Photographic Exhibition (Mr. Albert Chancellor, Hon. Sec., 1, King Street), which was open during the end of December last. 2. The remedy is in your own hands, although two years have elapsed since the infringement of your copyright.

A. F. (Dublin).—Answered by post. Let us know if we can be of any further service to you in this matter.

W. M.—Since our last conversation we have been unable to gain any authoritative information as to the tracing paper. For waxing paper negatives, try the use of melted paraffin, instead of white wax.

VERNIS.—The amber in chloroform varnish could doubtless even now be procured from Messrs. R. W. Thomas and Co., Limited. Dr. Diamond's proportions were one ounce of amber to four ounces of chloroform; but if this should prove too strong, it is easy to wash the residues on the filter with a little more chloroform, and use these washings for diluting the main bulk of the varnish.

C. F. B. (Lynton).—Messrs. Marion and Co. have sent us a list to show that they are agents for the sale of the original Sœhnée varnish, about which you were enquiring a month ago.

G. P.—The developing formulæ were tabulated by Messrs. Lyonel Clark and E. Ferrero, for the Camera Club, in October, 1887. See the NEWS, No. 1519, page 650. They took account only of pyrogallol; since that time other developing agents have come into general use, for which a like service remains to be performed.

F. R. M. S.—There were only four wet days in November, and the total rainfall for London, less than an inch, records considerably below the average, 2·31 inches. This diminished amount compensates for the surplus quantity collected in the previous month, and contrasts most remarkably with the weather experienced in November, 1888, when 4·31 inches of rain fell.

W. W. (Hamley).—The crystals enclosed in your letter are iodo-nitrate of silver, and indicate a super-saturated condition of the bath, which may be cured by adding fresh solution of pure silver nitrate (about one-eighth bulk) to the filtered bath. Cold weather favours the precipitation, and the prints sent also show evidence of the crystals. They give off violet fumes of iodine upon heating with oil of vitriol.

RESIDUES.—Stoneware receptacles. You will find suitable vessels figured in Messrs. H. Doulton and Co.'s catalogue. The glazed red earthenware is very soon destroyed by hypo.

ST. LEONARD'S.—Tinting lantern transparencies. Many of the colours in your list are insoluble in alcohol and varnishes; but you might try roseine, methyl-violet, malachite green, aurine, and methyl-blue.

F. GOW.—Received your registered letter and enclosures. We shall have pleasure in making enquiries for you, and will answer next week.

W. SANTER.—Answered by post.

Other correspondents in our next.

THE PHOTOGRAPHIC NEWS.

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THE ROYAL INSTITUTION.

No. II.

THE preliminary steps for founding the Institution having been taken as narrated in these pages last week, it was incorporated by Royal Charter in January, 1800, in the reign of George III., and forthwith began its honourable career. In the Charter it is described as "a public institution for diffusing the knowledge, and facilitating the general introduction of useful mechanical inventions and improvements, and for teaching by courses of philosophical lectures and experiments, the application of science to the purposes of life." At the end of the Charter it is stated that "if any abuse or difference shall hereafter happen in or concerning the government or affairs of the said Institution," the Lord Chancellor, the Lord High Treasurer, the Lord President of the Privy Council, and other high functionaries of the State, whose titles are given, shall come forward "to reform every such abuse, and to settle and adjust every such difference." The managers of the Royal Institution are too well-bred to quarrel, otherwise one might have some curiosity to see a few of the chief officers of the Crown stepping from their spheres to quell differences of opinion, and make everybody happy.

The first public lecture on photography ever given to the world was delivered by Thomas Wedgwood at the Royal Institution about March, 1802, and is published in the "Journals" of the Royal Institution, London, 1802, page 170. The present being the Jubilee year of photography, or at all events being called such, the original lecture of Wedgwood is now appended in full, exactly as originally published. In the memoir Wedgwood is spoken of in the third person, and the whole article seems by us to have been written by Sir Humphry Davy. Doubtless Wedgwood went to him in order that his discovery might be brought under the notice of the Royal Institution, and Davy, then a young scientific chemist employed on the premises, tried some experiments with the process, and wrote the memoir. At that time he was giving lengthy abstracts of his own lectures in the Journals. Robert Hunt, in the various editions of his "Manual of Photography," gave lengthy extracts from the record of this first public lecture on photography; but the whole of it, so far as we know, has never been given in the English modern book literature of photography; therefore the following complete copy is given, with the most scrupulous exactitude, even to the punctuation, from the original published in 1802:—

An Account of a Method of copying Paintings upon Glass, and of Making Profiles, by the agency of Light upon Nitrate of Silver, Invented by T. WEDGWOOD, *Esq. With Observations by* H. DAVY.

White paper, or white leather, moistened with solution of nitrate of silver, undergoes no change when kept in a dark place, but, on being exposed to the day light, it speedily changes colour, and after passing through different shades of grey and brown, becomes at length nearly black.

The alterations of colour take place more speedily in proportion as the light is more intense. In the direct beam of the sun, two or three minutes are sufficient to produce the full effect. In the shade several hours are required, and light transmitted through different coloured glasses, acts upon it with different degrees of intensity. Thus, it is found, that red rays, or the common sunbeams, passed through red glass, have very little action upon it; yellow and green are more efficacious; but blue and violet light produce the most decided and powerful effects.*

* The facts above mentioned are analagous to those observed long ago by Scheele, and confirmed by Senebier. Scheele found, that in the prismatic spectrum, the effect produced by the red rays upon muriate of silver was very faint, and scarcely to be perceived; whilst it was speedily blackened by the violet rays. Senebier states, that the time required to darken muriate of silver by the red rays, is 20 minutes, by the orange 12, by the yellow 5 minutes and 30 seconds, by the green 37 seconds, by the blue 29 seconds, and by the violet only 15 seconds. *Senebier sur la Lumière*, vol. iii, p. 199.

Some new experiments have been lately made in relation to this subject, in consequence of the discoveries of Dr. Herschel concerning the invisible heat-making rays existing in the solar beams, by Messrs. Ritter and Böckmann in Germany, and Dr. Wollaston in England.

It has been ascertained, by experiments upon the prismatic spectrum, that no effects are produced upon the muriate of silver by the invisible heat-making rays which exist on the red side, and which are less refrangible, though it is powerfully and distinctly affected in a space beyond the violet rays out of the visible boundary. See Annalen der Physik, siebenter Band, 527.D.

The consideration of these facts enables us readily to understand the method by which the outlines and shades of paintings on glass may be copied, or profiles of figures procured, by the agency of light. When a white surface, covered with solution of nitrate of silver, is placed behind a painting on glass exposed to solar light: the rays transmitted through the differently painted surfaces produce distinct tints of brown or black, sensibly differing in intensity according to the shades of the picture, and where the light is unaltered the colour of the nitrate becomes deepest.

When the shadow of any figure is thrown upon the prepared surface, the part concealed by it remains white, and the other parts speedily become dark.

For copying paintings on glass, the solution should be applied on leather; and, in this case, it is more readily acted upon than when paper is used.

After the colour has been once fixed on the leather or paper, it cannot be removed by the application of water, or water and soap, and it is in a high degree permanent.

The copy of a painting, or the profile, immediately after being taken, must be kept in an obscure place; it may, indeed, be examined in the shade, but, in this case, the exposure should be only for a few minutes; by the light of candles or lamps, as commonly employed, it is not sensibly affected.

No attempts that have been made to prevent the uncoloured parts of the copy or profile, from being acted upon by light have as yet been successful. They have been covered by a thin coating of fine varnish, but this has not destroyed their susceptibility of becoming coloured; and even after repeated washings, sufficient of the active part of the saline matter will adhere to the white parts of the leather or paper, to cause them to become dark when exposed to the rays of the sun.

Besides the applications of this method of copying that have just been mentioned, there are many others. And it will be useful for making delineations of all such objects as are possessed of a texture partly opaque and partly transparent. The woody fibres of leaves, and the wings of insects, may be pretty accurately represented by means of it; and in this case, it is only necessary to cause the direct solar light to pass through them, and to receive the shadows upon prepared leather.

When the solar rays are passed through a print and thrown upon prepared paper, the unshaded parts are slowly copied; but the lights transmitted by the shaded parts, are seldom so definite as to form a distinct resemblance of them by producing different intensities of colour.

The images formed by means of a camera obscura, have been found to be too faint to produce, in any moderate time, an effect upon the nitrate of silver. To copy these images, was the first object of Mr. Wedgwood, in his researches on the subject, and for this purpose he first used the nitrate of silver, which was mentioned to him by a friend, as a substance very sensible to the influence of light; but all his numerous experiments as to their primary end proved unsuccessful.

In following these processes, I have found, that the images of small objects, produced by means of the solar microscope, may be copied without difficulty on prepared paper. This will probably be a useful application of the method; that it may be employed successfully however, it is necessary that the paper be placed at but a small distance from the lens.

With regard to the preparation of the solution, I have found the best proportions those of 1 part of nitrate to about 10 of water. In this case, the quantity of the salt applied to the leather or paper, will be sufficient to enable it to become tinged, without affecting its composition, or injuring its texture.

In comparing the effects produced by light upon muriate of silver, with those produced upon the nitrate, it seemed evident that the muriate was the most susceptible, and both were more readily acted upon when moist than when dry—a fact long ago known. Even in the twilight, the colour of the moist muriate of silver spread upon paper, slowly changed from white to faint violet; though under similar circumstances no immediate alteration was produced upon the nitrate.

The nitrate, however, from its solubility in water, possesses an advantage over the muriate; though leather or paper may, without much difficulty, be impregnated with this last substance, either by diffusing it through water, and applying it in this form, or by immersing paper moistened with the solution of the nitrate in very diluted muriatic acid.

To those persons not acquainted with the properties of the salts containing oxide of silver, it may be useful to state, that they produce a stain of some permanence, even when momentarily applied to the skin, and in employing them for moistening paper or leather, it is necessary to use a pencil of hair, or a brush.

From the impossibility of removing by washing, the colouring matter of the salts from the parts of the surface of the copy, which have not been exposed to light: it is probable, that both in the case of the nitrate and muriate of silver, a portion of the metallic oxide abandons its acid, to enter into union with the animal or vegetable substance, so as to form with it an insoluble compound. And, supposing that this happens, it is not improbable, but that substances may be found capable of destroying this compound, either by simple or complicated affinities. Some experiments on this subject have been imagined, and an account of the results of them may possibly appear in a future number of the Journals. Nothing but a method of preventing the unshaded parts of the delineation from being coloured by exposure to the day is wanting, to render the process as useful as it is elegant.

THE "PHOTOGRAPHIC NEWS" YEAR-BOOK.

EARLY next week the "PHOTOGRAPHIC NEWS" YEAR-BOOK for 1890 will be published. It contains a photogravure portrait of M. Edmond Becquerel, and an essay on his experiments and results in relation to the subject of photography in natural colours. The YEAR-BOOK likewise contains numerous articles by the chief men of science and others connected with photography; a variety of formulæ relating to various developing substances now on their trial, as well as an extensive amount of miscellaneous information.

WEST LONDON PHOTOGRAPHIC SOCIETY.—A conversazione and exhibition of members' work will be held on the 10th and 11th January, 1890, at the Addison Hall. The work sent in for competition will be restricted to the work of members and must be produced from negatives taken during the year 1889. Bronze medals will be awarded for the best exhibit in the divisions respectively of general landscape, architecture, portraiture, enlargements, and transparencies. Further particulars and entry forms may be obtained from the hon. secretary, Mr. Hodges, 87, Chancery Lane.

EXPERIMENTS WITH EIKONOGEN.*

BY LYONEL CLARK.

THE triumphal pæon with which hydroquinone was introduced to photographers' notice has hardly died away, and the developer itself been relegated to its proper position, than our ears are again assailed with a fresh "See the conquering hero comes!" from the shores of Germany. Eikonogen, the invention of Dr. Andresen, of Berlin, is, if we are to believe the vendors, a very acme of developers, and we ought properly to instantly discard all our old chemicals in favour of the new-comer. But, somehow or other, the old photograpers do not always listen very attentively to the voice of the vendor, "charm he never so wisely." There is always a familiar sound in the harmony that recalls deceptions of early youth. But nevertheless, a better developer is undoubtedly a possibility, and it would be absurd to refuse to investigate the merits of a new claimant for public favour simply because disappointment has resulted from earlier trials. The cry of "wolf" becomes a fact one day.

Therefore, as soon as the new developer was a commercial article, I took an early opportunity of obtaining a sample from the English agents.

My predecessor this evening, Mr. Elder, will have most ably described the new developer from a chemical point, and I can pass over its etymology and ancestry, and plunge into its practical behaviour.

It is my invariable custom, on obtaining any new photographic agent, to most implicitly follow the vendors' directions at first, and then, from the experience gained thereby, modify my further experiments as suits my pleasure.

It will, therefore, be understood that my first trials were carried out strictly in accordance with the vendors' directions.

The following solutions were made up:—

1st.—A. Sulphite of soda, 5½ drams; water, pure rain, 10 fluid ounces; to this was added eikonogen, 1½ dram.

B. Carbonate of soda (recrystallized), 1½ ounce; water, 10 ounces.

This is the developer recommended for ordinary work.

2nd.—Sulphite of soda, ¾ ounce; potash caustic (Kal. Hyd. dep. in sticks), ½ ounce; water, 10 fluid ounces; to which was added ½ of an ounce of eikonogen. This is a concentrated solution for instantaneous work.

I may here remark that, with the exception of the caustic potash, all the other chemicals were obtained from the vendors of the eikonogen. The water used was rain water, obtained from a glass roof and allowed to settle in a demijohn, and then decanted.

On opening the tin box that contained the new developer, I found that, instead of the white crystalline powder I was led to expect from the prospectus, it was of a browny-madder colour, not unlike road sweepings, or the crumblings from red sandstone. I am not aware whether this is the normal colour and state of this substance, or whether it had altered in colour through keeping. Whilst in my care, a few days only before being opened, it was stored in a drawer in a dry cupboard, and not in the dark room, as it is stated that the fumes of ammonia are injurious to it.

On mixing the solutions with cold water, I found that the whole of the eikonogen was not taken up, but some sediment remained in the bottom of the bottle. In the concentrated solution with caustic potash, however, the whole was completely dissolved. The colour of the solutions in both cases was of an apple-green, exceedingly like good protosulphate of iron. These solutions were made in the afternoon. The next morning I found that the mixed solution had already commenced to decompose, some two-thirds of the upper part of the liquid having turned of a reddish-brown colour. This, it must be remembered, was before it had been used. The next day the whole of it had turned colour, and in a week was of a browny-treacly consistence. It was evident, therefore, that this solution so made up was not capable of being kept, when in contact with the air, even a moderate time.

The solution with the sulphite of soda alone, however, presented no change; and I carried out a few experiments. As these, however, have all been repeated with greater care, I will not again allude to them, except to say that they gave results identical with the more systematic experiments.

The sulphite of soda and eikongen stock solution was put away, and in about a week or ten days' time used to develop two negatives. Contrary to what I had expected from my first experiment, I failed to get even intensifying density.

On examining the solution some few days later, the bottle being than half empty, I found that it, like the combined mixture, had completely altered its character, and had become also a thick treacly liquid, with which it would have been impossible to develop any plate.

As the vendors state that the stock solution will keep for weeks, I was somewhat surprised at this, and shall be glad to learn if this is the universal or only an isolated experience.

As I am not altogether an advocate of introducing any preservative into a developer, but much prefer to use simple dry pyro, when fairly pure water is obtainable, I thought I would try to make up a similar solution with eikonogen. In this, however, I totally failed. The mixture formed turns at once of a deep claret colour, and in a very short time becomes thick and muddy. I attempted, however, to develop a plate, in spite of the utter unsuitability of the compound, but found that it required an immense quantity of the salt to produce any effect. One good point should be noticed, however; and that is, the compound has no staining power on gelatine films.

This rapid oxidation of the developer was, in my eyes, a very good sign of powerful reducing powers. The *rationale* of every developer is its power of becoming oxidized at the expense of the haloid salt, and it would be too much to expect a developer to only undertake this oxidation just when ordered.

The actual experiments on the new developer that I have made may be divided under two heads—a comparison of the standard developers, as given by the vendors, with a developer composed of pyro and ammonia, first, as regards their intensity, that is to say, their power of making the smallest possible amount of exposure visible; and secondly, their power of giving density. A fresh set of experiments was made to determine the variation in the density curve obtainable by different alterations in the component parts of the developer; that is to say, the power of compensating for over-exposure, or reducing the brilliancy of under-exposure.

In these experiments I naturally employed a sensito-

* Read at the Camera Club.

meter for comparison tests. The difficulty and care required to obtain correct deductions from ordinary negatives prohibit their use for anything but mere indications of one particular class of work.

The sensitometer I use is one made according to Spurge's method. It really consists of a collection of twenty small cameras placed side by side, each furnished with a pinhole lens. This has a somewhat voluminous sound, but, as a matter of fact, the whole thing is only the size of a quarter-plate, and the cameras are simply holes bored in a piece of wood.

Each of these pinholes is, however, of a different diameter, and therefore, since the quantity of light admitted by any hole varies as the square of the diameter of that hole, it follows that each hole will represent a different amount of exposure on the plate. In my sensitometer these exposures are regulated so that every other hole gives a double exposure, the actual amounts being as follows:—

No. of hole—	1	2	3	4	5	6	7	8	9	10
Exposure—	1	1½	2	3	4	6	8	12	16	24
No. of hole—	11	12	13	14	15	16	17	18	19	20
Exposure—	32	48	64	96	128	192	256	384	512	768

So that the 20th hole receives 768 times the exposure of the first hole; or, as the terms are synonymous, at least within the limits I was working the last hole is exposed to a light 768 times as intense as that which the first hole receives.

The plates to be tested were all exposed in the sensitometer to gas-light turned up to a constant height, a screen of ground-glass and tissue paper being interposed between the light and the sensitometer, to equalise and diffuse the light. The plates were all exposed one after another as rapidly as possible for a period of 1½ minute each. The exposures were made in the day-time, when the gas pressure was likely to be extremely constant. The sensitometer was always replaced in the same position, and every precaution taken to ensure the plates being exposed exactly the same length of time.

I will now proceed to analyse the results obtained.

The negatives developed with the eikonogen and caustic potash combined came up with extreme rapidity, the first appearance of reduction showing within a few seconds, and development being completed within a minute or two. The addition of the accelerating bath given by Messrs. Marion made no appreciable difference in the result, if we except a slight general chemical fog; if anything, the amount of detail produced is less. In order to see whether development was really complete in the two minutes, another plate was left in the developer for ten minutes. No difference will be observed in the result, except that the fog is more pronounced.

In spite of the great rapidity of the development, density is obtained quite low down in the scale; in fact, this developer is a most vigorous one, and works almost too close to the fogging point for practical work, all the examples suffering more or less from this complaint.

Turning now to the pyro-developed negatives, we remarked first that the formula is only normal in quantity of pyro used—two grains per ounce—the ammonia being present in the maximum possible quantities; in fact, the fogging point has been reached, and is more or less pronounced according to the treatment.

One fact cannot, however, fail to be instantly noticed, and that is, that the critical point—that is, the square that has received the least possible exposure that will show under development—has not varied in any of the examples. It is possible that the eikonogen in one plate may be able to claim a very slight advantage; it is a matter for argument whether the lowest square is really apparent in it, or whether it is only fog; at any rate, the difference is so slight as to be easily ascribable to natural errors of exposure, and so on.

On the whole, I think these results—and in this they perfectly agree with others I have carried out—show very plainly that eikonogen has not the slighest power of producing any more detail than the ordinary pyro and ammonia developer has, and in this respect is in no way superior to the ordinary developers in use.

I must confess that I myself am not at all surprised at this result. I have now made comparative tests of a large number of developers, and the present results only tend to strengthen my belief in a theory that I have frequently advanced before, and that is, that the action of light is absolute; that is to say, a certain quantity will effect a change in the haloid salts, and any substance capable of developing will, in a greater or less time, make this change apparent. If the power of the light fall below this point, no developer in the world, however theoretically powerful, can make its action apparent.

I can compare this theory best to the phenomena in metals known as the elongation, and permanent elongation, of bars. When an iron bar is tested, it is elongated by any strain that may be put on it; on removing this strain the bar resumes its original length. However small the power may be, there is still the corresponding elongation. When we, however, arrive at a certain strain, we find that the bar no longer returns again to its original length, but retains a certain amount of permanent elongation, even after the whole of the strain has been completely removed.

So it is with the silver salts; light may fall on them and only produce this transitory elongation, till it arrives at such a strength that at last the salt can no longer return to its original form. Permanent elongation has commenced, and the developer can make its effects apparent.

Returning now to my experiments:—

When we come to examine into the density-giving powers of eikonogen in combination with the caustic alkali, we find that it has a slight advantage over the pyro; that is to say, a maximum density is obtained for a less amount of exposure than was when pyro was used. It is interesting here to analyse the composition of the two developers. With pyro we have—pyro, two grains to the ounce of water. In the combined eikonogen and potash, we have a no less amount than sixteen grains of eikonogen per ounce of developer. It is not, therefore, surprising that a developer which, according to the vendors, possesses "far greater developing powers than other developers," when in a solution eight times more concentrated, should give slightly more density.

As I have noticed that the presence of sulphite tends somewhat to reduce the density-giving powers of pyrogallol, I made some further negatives developed with dry pyro and ammonia, without the addition of a preservative. These results, although superior in density to those obtained with sulpho-pyrogallol, are still inferior to those obtained with eikonogen.

When we come to compare the carbonate developer with the normal pyro and sulphite one, we find slightly different results, that is to say, although the amount of detail brought out is the same, density is now obtained low

down in the scale with pyro than with eikonogen. If we again analyse these developers we find that the eikonogen has now only six grains to the ounce, the pyro developer being of the original strength. A developer more similar to the pyro one, that is, one containing two grains of eikonogen to the ounce, was then made up; its results, although exactly the same as regards intensity, fall still more below the pyro in density. It is very evident, therefore, that, weight for weight, eikonogen possesses less powerful reducing power than pyro. The time of development both of the pyro and eikonogen negatives was about ten minutes. I fixed the duration of development at ten minutes, because I found that with these strong developers, after the first five minutes hardly any further action was apparent.

I will now proceed to the experiments made by varying the strength of the eikonogen itself. There appears to be a very salient difference between pyro and eikonogen, and that is, whereas the former will not practically develop a plate without the addition of an alkali, eikonogen seems to carry, so to speak, its own alkali with it, and is capable of developing a plate very satisfactorily without any other addition. A plate was developed with a developer of the standard strength with sulphite alone, and another with the normal carbonate developer. It will at once be noticed that the same amount of detail has been obtained in both cases, but the addition of the carbonate has caused greater intensity in the high lights. Curiously enough, the time of development was in both cases nearly the same, the carbonate being a little, some one minute, shorter, the actual times being nine and ten minutes.

Other plates were exposed in order to ascertain the influence of bromide on the standard carbonate developer, two grains to the ounce of bromide of potassium being the quantity used. Bromide has not destroyed any detail, but it has lowered the density of the lower squares, showing that it would be useful for cases of over-exposure, but not to such a degree as I had expected.

Other plates were made to show the effect of increasing the bromide up to four and twelve grains respectively. Its effect then is the same as when used with pyro, the whole scale being moved upwards several squares.

The effect of diluting the developer, or adding water in equal parts to the normal developer, was tried. A slight general loss of intensity is the only effect, showing that this is useless in cases of over-exposure.

I have also tried the effect of altering the amount of the soda solution in the developer, making up a developer of one part eikonogen stock solution, and three parts soda stock solution. The effect of this is to decrease density all along the scale, leaving intensity unaltered. In this respect eikonogen behaves somewhat like a pyro developer, where decreasing the quantity of pyro lowers the density only.

This modification also approaches in the appearance of its results more nearly to the plate developed with no alkali. I am, therefore, almost inclined to ascribe its appearance not to any influence of the alkali, but to a weakening of the quantity of eikonogen present, which here was, of course, only two grains to the ounce.

It is to be regretted that the eikonogen salt is so insoluble in water. Even the stock solution, when made with hot water, did not dissolve the whole of it. It is therefore impossible to really try the effects of powerful developers unless we use the caustic alkali, which appears to have the power of causing a further dissolution of the eikonogen.

On the whole, I am somewhat inclined to think that it is the quantity of eikonogen present that is the cause of all the variation. In the concentrated developer the density given is very great. It contains sixteen grains of eikonogen to the ounce. With the ordinary developer, of six grains to the ounce, density is much less; and, as we decrease this amount, by adding water, or even alkali, density still further falls off. We can, however, get very satisfactory results in cases where the natural lighting of the object is very pronounced; that is to say, where the high lights are very bright, and the shadows very dark. In such a case, by using a diluted developer, we can bring out the ultimate detail without allowing the lights to gather any density.

In fact, when it is remembered that my photometer top square represents a light 768 times as bright as the lowest square does—that is to say, a very brilliant sunlight scene indeed—I am inclined to think, that for ordinary negatives difficulty would be found in obtaining sufficient printing density in the high lights with an ordinary carbonate developer. In portraits, where the difference is naturally much smaller, I have found this to be the case in practice.

As it is often claimed that eikonogen will develop several negatives successively, I tried the experiment of developing six similarly exposed negatives, one after another in the same normal developer. The time of development was in all cases the same, viz., five minutes; the slight falling off in density in each case is pretty visible, otherwise the negatives are equally well brought out, and, if such a thing as six negatives requiring similar treatment should fall into a photographer's hand, this developer would be really useful for the purpose.

I have further tried using a developer one day old, and find that in this time it has not sensibly oxidised, and is quite capable of developing a plate, although the time of development is somewhat lengthened.

In order to strengthen some of my deductions, I have made a few further experiments with the view of ascertaining the action of an alkali on the developer. In order not to weaken the developer in strength of eikonogen, I replaced the 7 per cent. carbonate solution with a saturated one, which we may assume to be about 20 per cent. The result of this experiment goes to show that the increasing strength of the alkali does not alter the developing action, thus confirming my original deductions.

I regret that I had none of the potash carbonate with me; this, being more soluble in water than the sodium salt, would have permitted the use of more concentrated solutions.

Generally speaking, I may state that eikonogen appears absolutely free from any staining propensities whatever. In no single case, although some plates were left in the bath twenty or thirty minutes, is there the slightest colour stain visible.

To resume now the advantages and disadvantages of eikonogen *versus* alkaline pyro. The new developer must be divided under two heads—first, when used with the caustic alkalies; secondly, when used with the fixed alkalis.

The caustic alkalis have, of course, the grave disadvantage that they are most unpleasant to use, the strength being amply sufficient to commence to disintegrate the skin, converting the fatty acids of this into soap, the un-

pleasant slimy feel of which must be well known. Secondly, it is impossible to keep such a developer made up, even for a reasonable time, if in contact with the air: possibly it might be kept in small, tightly-corked bottles, each containing exactly the amount required, the corks being well luted with wax or paraffin. Thirdly, eikonogen is not soluble enough to permit our adding it to the sulphite solution just as required—following, in fact, the method employed when using dry pyro. Fourthly, the quantity required to develop is very great, not less than 16 grains to the ounce, thus comparing very unfavourably with pyro, where three or four grains would be a maximum.

Its advantages are that greater density is obtained lower down in the scale than with pyro, but no further detail can be brought out. This practically means that in cases of great under-exposure, such as instantaneous views, where no part, not even the high lights, have received a proper exposure, it would be advantageously used. In ordinary cases of under-exposure, where the high lights have been fully exposed, and only the shadows under-done, its use would be deleterious, as great hardness would result.

Coming to the second division, that is, eikonogen, in conjunction with fixed alkalies—here we find it distinctly inferior to pyro in every respect. Its solutions do not keep beyond a few days; it is too insoluble to allow it to be easily made up as desired; and it fails in giving density even to brilliantly-lighted objects. In order to convince myself of this fact, I have this morning exposed two plans on the same subject for the same time. The subject was a sun-lighted, white mill, with dark shadows. The eikonogen was made up according to the ordinary prospectus formula. The pyro developer consisted of two grains of pyro, half a grain of bromide of potassium, and two minims of strong ammonia.

The advantage in favour of the pyro was most evident. The time of development was the same in both cases, and the first signs of reduction appeared simultaneously. The eikonogen one gathered density first, and before fixing appeared of good printing density, but fell off terribly in the hypo (1 to 5) bath. I have noticed the fact repeatedly, the eikonogen developed negatives appear in the developer to promise excellent density, but they fade out terribly, and the slaty-blue colour of the deposit offers but little resistance to the light rays in printing.

I do not consider that eikonogen is as under control as pyro; it is extremely difficult to alter the gradation in any way except in the respect of loss of density. Therefore in extremely brilliant snow-scenes, with extra heavy shadows, in interiors where the high lights have had terrific over-exposure, and the dark shadows hardly been exposed at all, it would come in useful. But, at the same time, it must be remembered that pyro is equally capable of being modified to give the same result.

The only admissible advantage over pyro appears to be that it does not stain the negatives or fingers.

It has certainly also the advantage of being able to develop several negatives in succession, providing they require similar treatment.

Amongst other advantages claimed for eikonogen is that of cheapness. I am at a loss to discover how the claim is made out. In the first case, the cost of eikonogen and pyro is very nearly the same, but we require about eight times as much of it as of the latter to obtain the same results; or even using the ordinary developer, which, in my hands, fails to give good results, three times as much is required.

If many negatives are developed with the same solution, the cost would naturally be lowered, but I do not think that many amateurs would care to develop each negative with the same developer, except, perhaps, in the case of small detective camera shots.

It is further stated that a fifty or hundred per cent. over-exposure can be remedied. This is of course a fact, for I doubt if the most practised hand could appreciate this difference; it amounts really to the difference between any two squares on my sensitometer tablets.

Lastly, it is stated that eikonogen is free from poison. I am perfectly willing to grant this without experimenting on it myself; at the same time, I notice that in a paper read on this subject before the British Associatiation the writer ascribed its non-poisonous qualities to the fact of its great insolubility. It will, however, I think, be a matter of indifference to photographers whether it is a poison or not. Lovers will, I believe, kiss the portraits of their mistresses, but I have not heard as yet that their devotion has urged them to drink the solution the negatives were developed in.

There is one other point in connection with eikongen that I should like to ask further experience about. I noticed in one negative developed with this salt, that there was a curious eating away of the film in parts; the top layer only appeared to have been destroyed, and was as if eaten or gnawed away. The appearance is quite new to me, and I should like to hear whether other workers with eikonogen have met with the same phenomenon, or whether it is ascribable to other causes..

Summing up the whole of my results, it must first be remembered that they are made with one sample of eikonogen, and therefore must require further confirmation from other workers before they can be received as absolute; but, assuming them to be correct, I must confess that I am not at all disposed to admit eikongen to the place of honour on my dark-room shelves hitherto occupied by pyrogallol.

I have not as yet experimented with it as a developer for positives, but doubtless its feedom from stain, and the pleasant colour of its deposit, may cause it to be very useful for such a purpose.

THE fifth of the series of "One Man" Photographic Exhibitions at the Camera Club will be open on and after Tuesday, December 17th, to visitors on presentation of their cards. The exhibition will consist of pictures by the late Mr. O. G. Rejlander, and a selection from over 200 of his famous figure and genre studies will be shown. The pictures will be on view for about six weeks.

NEW GERMAN GLASS.—We find in the *Moniteur de la Photographie*, of Paris, a description of the new red glass which has been recently invented in Germany, and appears to be attracting a good deal of attention. Besides its use for the manufacture of bottles, goblets, and vases of various kinds, it will be found applicable in photography, and in the chemist's and optician's laboratories. This glass is produced by melting in an open crucible the following ingredients:—Fine sand, 2,000 parts; red oxide of lead (minium) 400; carbonate of potash, 600; lime, 100; phosphate of lime, 20; cream of tartar, 20; borax, 20; red oxide of copper (protoxide), 9; and bioxide of tin, 13 parts. By *a single melting* a transparent red glass is thus obtained of a very fine quality, of which various objects can be manufactured directly, without it being necessary to submit the glass to a second heating with the view of intensifying the colour.—*Monthly Magazine of Pharmacy.*

EIKONOGEN.*

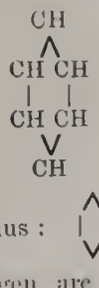
BY H. M. ELDER, M.A.

WHEN I was asked by your Secretary to open the discussion this evening, I had never even seen eikonogen, so I hope that any shortcomings in the notes I have to bring before you will be excused. I was told, however, at the same time, that the discussion would be taken up by far abler hands than mine, so I have decided to confine myself chiefly to a few remarks on the chemistry of this very interesting body, and to try and compare it more from a chemical than a photographic point of view with the other developers that we are accustomed to use.

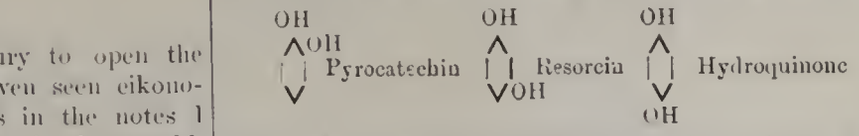
The first thing to do when any substance is to be examined is to procure a sample, and I at once obtained a quarter kilo. tin from Messrs. Marion, together with a paper of instructions, in which I was pleased to see that the proportions recommended for use were given in the metrical system, a system that I hope all photographers will soon learn to use. On the tin I found two statements—(1) that eikonogen was discovered by Dr. Andresen, of Berlin; (2) that it was patent. The first is certainly untrue, for, granting that it is the substance that it is declared to be on first-rate authority—and I shall presently show you reasons for believing it to be this—it was fully described by Professor R. Meldola in the *Chem. Soc. Jour.*, xxxix. p. 17, in 1881; though, as he did not suggest its use as a developer, the credit for this must be given to Dr. Andresen.

With regard to the second, I cannot say that the use of eikonogen as a developer is not patented; but I have searched at the Patent Office, and failed to find any specification. Neither do I think it is possible to patent the substance, since it was fully described by Professor Meldola. Of course it is possible that I missed the specification; but, as I say, in one fairly careful search I failed to find it.

Our ordinary organic developers are derivatives of the well-known hydrocarbon benzene. The chemical formula of this body is C_6H_6, and chemists have a method of representing this, that is a considerable aid to them in studying, and even in predicting the reactions of its derivatives. As has been well said by the late Professor Clifford, the benzene molecule is a "game of round the mulberry bush played by six carbon and six hydrogen atoms." And this is represented by writing the formula thus:—

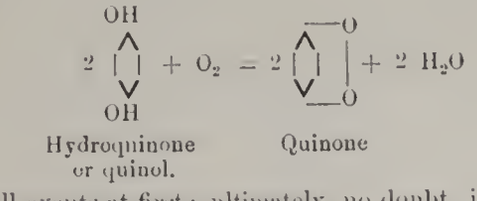


Or, for shortness, thus:  where the symbols for carbon and hydrogen are understood. If, now, one of the atoms is removed, and replaced by a hydroxyl molecule  thus, we get the well-known phenol, or carbolic acid. Now, there are five other hydrogen atoms that may be replaced, and you will see that, according to the formula, it should be possible to form no less than three derivatives, in which two hydrogen atoms are replaced by hydroxyl; *i.e.*, three dihydroxyl-benzenes. Accordingly, we find that three of these are well-known.



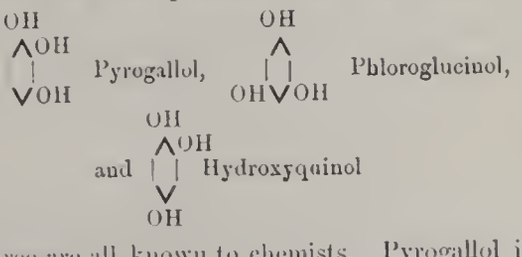
These are distinguished respectively by the prefixes ortho-, meta-, and para-.

The first of these is said to be a powerful developer. The second is also said to act, but I have been unable to make it do so. The third is well-known, and it appears to act by becoming oxidized to a body called quinone, thus:—



At all events at first: ultimately, no doubt, it breaks up into a number of complicated brown humus-like bodies that stain the plate.

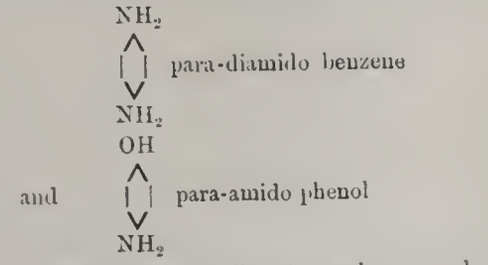
There are also three possible trihydroxy-benzenes:—



These three are all known to chemists. Pyrogallol is, of course, our old friend; and I have very little doubt that the other two, or at all events the latter, would also act.

Pyrogallol, as we all know, is very easily oxidized when in solution, especially in alkaline solutions, and gives acetic and carbonic acids, and a plentiful crop of brown, plate-staining, humus-like products. The reaction, however, is far too uncertain to theorise about.

Dr. Andresen, of Berlin, appears to have considered that para-benzene derivatives—that is, bodies built on the type of hydroquinone—were peculiarly suited for photographic developers, and he tried several, notably



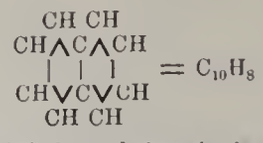
no doubt because the amido bodies themselves may be considered reducing agents, as is seen by their reaction with nitrous acid.

He also tried the sulphonic acids of some of these bodies, probably led to it by the fact that these acids and their salts in general have substantially the same properties as the bodies from which they are derived, but are, as a rule, more soluble in water.

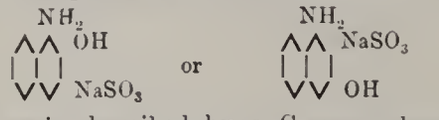
Ultimately he was led to try a body of a different class, which rejoices in the name of amido β naphthol β sulphonate of soda, and finding that this seemed very suitable, it has been introduced into the market under the name of eikonogen. As I said above, this body was first described

* Read at the Camera Club.

by Professor Meldola in 1881, who obtained it by reducing nitroso β naphthol β sulphonic acid with tin and hydrochloric acid. It is a derivation of napthalene, a hydrocarbon which may be looked an as two benzene rings, linked thus:—

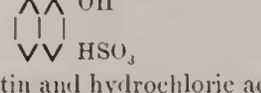


Professor Meldola* showed that the formula of our developer may be represented thus:—



It was again described by a German chemist named Witt, who obtained it in much larger quantity as follows:—

He took β naphthol treated it with strong sulphuric acid at a particular temperature, and so obtained β naphthol β sulphonic acid  and then by treating this with the substance known as diazo-benzene chloride, obtained an orange dye known as Schaeffer's orange or tropocolin O O O O,



This, treated with tin and hydrochloric acid, broke up, giving the body we are discussing, and probably anilin.

This body is a powerful reducing agent, and in solution in the air darkens more rapidly than either pyro or hydroquinone; in fact, the presence of sulphite is necessary if the solution is to keep at all. It probably breaks up, at all events initially, into phthalic acid, ammonia, and carbon dioxide, though, in the absence of any proof, I should not like to hazard any equation representing it.

I may say that in the samples I obtained from Messrs. Marion I have verified the existence of sodium, sulphur, the amido group, and the naphthaline group, as I thought it might be interesting to the members to have some first-hand evidence of the identity of eikonogen with amido β naphthol β sulphonate of soda.

As a developer, I will only say that while eikonogen gives bright, clean pictures, it seems to have a disintegrating action on the gelatine, so that, with Eastman strippers it is almost impossible to manipulate the stripping so as not tear the film. I have used it a good deal for lantern slides, but find that though it gives a beautifully bright picture, it is generally necessary to intensify in consequence of the difficulty of obtaining sufficient density.

WORCESTERSHIRE CAMERA CLUB.—The following critics will act as judges at the forthcoming Photographic Exhibition to be held in Kidderminster in March, 1890:—Messrs. Charles W. Hastings, W. Jerome Harrison, and Major J. Fortuné Nott. The arrangements for the exhibition are progressing favourably. Any information required by intending exhibitors should be addressed to the Hon. Secretary, Mr. W. Ray, Science School, Kidderminster.

* Professor Meldola has since told me that he has thrown doubt on the position of the sulpho group in his amido *B* naphthol sulphonic acid, for when acted on by an oxidizing agent he has succeeded in obtaining sulphophthalic acid instead of phthalic acid, as described in the *Chem. Soc. Jour.* This would indicate that the sulpho group is attached to a different benzene nucleus to the hydroxyl and amido groups.

TONING READY SENSITISED PAPER.

BY S. W. ROUCH.

WE occasionally find in our business that users of ready sensitised paper make a difficulty over the toning, where, if the proper measures are taken, there is no more mystery or trouble than in dealing with ordinary albumenised papers. For the latter there are several good toning baths equally applicable, and to be chosen according to the class of tone preferred. The best of these for general purposes is undoubtedly the acetate; but with ready sensitised paper the tungstate bath appears to possess special features which recommend it in preference to all others. Here lies the chief secret, and if those who complain of slowness and difficulty of toning such papers will bear this fact in mind, and give up old methods, valuable for other purposes but unsuitable for this, their trouble will disappear.

The bath consists simply of one grain of gold chloride and twenty grains of sodium tungstate in each five ounces of water, mixed a short time before use and employed warm. In making the bath the following plan, however, gives the best results. Dissolve the requisite quantity of tungstate, allowing twenty grains to each sheet of paper, in a small quantity, say one ounce, of boiling water, and when dissolved add the corresponding quantity of gold. This is conveniently kept in solution containing one grain to the drachm. Let this stand at least an hour, and just before use make up to the full quantity by the addition of hot water, and use it at once. It acts quickly and evenly, and without any sign of mealiness.

When a number of prints have to be treated, only a few can be toned at once, and if the full quantity of gold be diluted down in one operation, the solution will have become cold, as well as weaker, long before the whole of the prints are toned, and slowness in action and unsatisfactory results will be obtained at the finish; besides which, there will be a considerable difference or want of uniformity in the first and last prints passed through the bath. To obviate this, a small quantity only of the concentrated solution of gold and tungstate should be diluted to start with, and as this begins to act slowly from the combined action of cooling and exhaustion, a few drops more of the strong solution and a small quantity of *boiling* water may be added at intervals, by which means the strength and temperature of the bath are kept tolerably constant, and the toning proceeds evenly and rapidly to the last, while uniformity of colour prevails throughout the batch.

With a little practice any variety of tone from warm-brown to black can be obtained with tungstate with far greater ease and certainty than with any other bath, if indeed such is possible with any other combination.

In washing the prints, before toning, do not remove quite the whole of the silver; three changes of water, each sufficient to fully accommodate the number of prints, will suffice. There is no necessity for any alkaline wash unless very purple tones are desired, when such may be employed. Avoid using too strong a fixing bath, which leads to blisters and degradation of tone.

BATH PHOTOGRAPHIC SOCIETY.—A meeting will be held at the Royal Literary and Scientific Institution on Wednesday, 18th inst., when Mr. W. Pumphrey, the president, will give a lantern exhibition of photographic transparencies from his own negatives, illustrative of cities of Italy in 1887. The chair to be taken at 8 o'clock p.m.

REMEDYING CERTAIN DEFECTS IN PORTRAITS.

BY ELLERSLIE WALLACE.

A very clever definition of photography that we once met with in the course of our reading, made our art "the art of delineating aspects scientifically." This covers the ground very well; in fact we have never seen anything better.

If we take the word "scientifically" in a free and liberal sense here, we might make it refer not only to true and faithful reproductions of objects, but to such scientific delineations of those objects as would tend either to the exaggeration of their beautiful qualities, or to the suppression of their ugly ones.

It is not our purpose to repeat in this connection any of the unctuous art-jargon concerning "truth in art," which occupies by far too much space in the columns of our photographic literature, but rather to ask our readers to consider the merits of the following curious process, which at first might be regarded in the light of a caricature only.

Transformism, the process alluded to, is defined by M. Ducos du Hauron rather diffusely as follows:—"An image, characterized by a change in the relative proportions of the objects represented, is formed if a ray of light be introduced into a dark chamber, not through a simple orifice, but through two slits cut in places which are differently directed, and separated by a proper distance." He then proceeds to give some examples which are startling, to say the least. It seems that when the first of the two slits is vertical, and the second—the one nearest the image—horizontal, the image, when compared with the original, will be found to be amplified or stretched vertically. Again, if one of the two slits, instead of being rectilinear, be curved more or less, the image will show curves or undulations laterally or vertically according to the direction of the slit. The examples therewith given are at least as strange and uncanny as the former ones. All the examples given are portraits, and here is the point that is so surprising—the natural likeness is well preserved in spite of the extreme distortion. The distortion of countenance seen in a convex mirror in some measure approaches to it, but it is not the same.

The method of working adopted by M. du Hauron is quite simple, and we will here give a condensed account of it, premising that for certain unfortunate individuals possessing great facial deformities this process may prove valuable, the photographer having it in his power to greatly exaggerate certain features, and to suppress others. It is this point to which we desire to direct our readers' attention, that the process, called "transformism" for want of any better name, puts into their hands the possibility of altering the features of the sitter, and yet of preserving the likeness while doing so. A sitter with a head so flat and wide as to be unsightly would be a good subject for trial with the first slit vertical and the second horizontal, as we mentioned above. Other examples will suggest themselves. M. du Hauron gives the following directions:—"The best means of experimenting with photographic transformism is to provide a dark box so fitted up that twelve or more proofs may be made at one operation. Two partitions or septa are set into a deep frame, opposite to each other and to the sensitive surface at the bottom of the frame, the model being at the other end of the box, and well lighted. Each of these two septa is pierced with twelve or more slits, which are brought opposite to each other and disposed in symmetrical rows. Two slits of any given form are then so placed that the desired deformation or distortion may be produced. The model will then be represented by as many different 'transformisms' as there are pairs of slits. In the production of these images the slight distance separating the slits from the sensitive surface will greatly influence the action of the light, so that the exposure will remain within the limits absolutely practicable for portraiture. The proofs obtained will thus all differ the one from the other. A variety may be made by reversing the position of either one or both of the two septa above-mentioned, such as turning them upside down. If a camera furnished with a battery of lenses of any desirable number were at hand, a plate of instantaneous proof-types might be made, with the same distances between as between the slits in the septa. The plate could then be set in place before the slitted septa in the dark box, and thus a series of instantaneous portrait transformisms obtained."

It is evident from the above description that the transformism is made from a ready-made portrait or picture; not done direct from the sitter. There are certain points in the process analogous to the pin-hole or diffraction principle of making views. Fun and recreation can be had from the above in plenty; but it is rather as an important means by which defects may be remedied in portraiture that we recommend it to all of our readers who are willing to experiment out of the beaten track.

In concluding, let us add that the making of the slits requires care; they should not be broader than one-third of a millmetre. They should be drawn on white paper with india ink, rather large in size, and with clean edges and borders; then reduced to the desired measure by means of the camera. The negative, of course, must be on glass, and acts as the transforming screen.—*American Journal of Photography.*

The Photographic News, we are informed by a correspondent, has the largest circulation in St. Petersburg of any photographic publication in the English language.

Sun-spots in High Southern Latitudes.—The Rev. S. J. Perry read a paper under this title at the meeting of the Royal Astronomical Society, on November 8th, in which he drew attention to some remarkable instances which have recently occurred of the appearance of sun-spots at a great distance from the equator. These took place on June 5th, June 30th, October 8th, and October 10th respectively; that of June 30th being especially interesting, as the spot seen on that occasion attained a latitude of 40°, a circumstance for which there are only a very few recorded precedents. Besides these spots mentioned by Father Perry, some much larger groups have also been seen at a less but still considerable distance from the equator. Thus, on July 26th and 27th a group was noticed in latitude 24° S., while another and more important group in nearly the same latitude was observed during three successive rotations in August, September, and October. Bearing in mind that the mean distance from the equator of all spots in 1888 was scarcely more than 7°, and in the first five months of 1889 but little more than 5°, these outbreaks in high latitudes become very significant; and taken with the marked increase in number and size of spots during the months of June, July, August, and September, as compared with the earlier part of the year, point to the minimum being definitely passed. If this be so, the period of quiescence has been decidedly shorter, the run down from maximum swifter, and the turn towards recovery sharper than in the preceding cycle. Judging from the form of the spot curve on previous occasions, when a short period of minimum has followed a maximum of low intensity, as was that of 1883, we may expect that the revival will be rapid, and the next maximum a strongly marked one.—*Nature.*

Notes.

A well-known judge, whose caustic remarks make him very welcome to the reporter, has a horror of photography—photography, that is to say, when applied to himself. He is not alone in this aversion, for other judges, notably the Lord Chief Justice, are also sensitive on the point. But none of them carry their prejudice so far as the individual whom we have in our mind. It is an absolute fact that he went to a certain photographic dealer who does a good trade in photographs of legal luminaries, purchased every photograph of himself there was in the shop, and tore them up! Whether this was due to the fact that of late years he has grown a beard, and that the photographs represented him before he had this adornment, we are unable to say.

The Birmingham Photographic Society has set a good example in considering the question of a photographic survey of Warwickshire. It is not the first in the field, as the subject was mooted in another society a year or more ago, and commented upon at the time in these columns. Old land-marks, old buildings, old historical architectural "bits"—if the expression may be used—have in the country a knack of disappearing and of making no sign. Of old London it would be scarcely an exaggeration to say every brick, every stone is known, and it would be difficult to remove anything without a paragraph creeping into one of the newspapers. But in the country matters are altogether different. How many picturesque specimens illustrating the domestic architecture of the Queen Anne, the Stuart, the Tudor, and possibly earlier periods, have vanished during even the last quarter of a century, and of which not a drawing remains, it would be impossible to say. A photographic survey of all that is interesting in a county should be hailed by the antiquarian with delight.

The much-advertised story "Dead" has essentially a photographic plot, but we cannot say that it realises the promise held out by the initial idea which went the round of the papers a few weeks ago. So far as technical details are concerned, the authoress is fairly correct, but this was to be expected, as no doubt she had the photographer to refer to. But the writing is very poor, and the plot childish. Photography deserved a better setting than it gets in "Dead."

Sun spots occupied the attention of the Royal Astronomical Society at their last meeting. The particular sun spots were those photographed in southern latitudes, and some interesting comparisons were made by Mr. Maunder between photographs of the sun taken at Greenwich and those taken at Dehra on the same day. In the Greenwich photograph a faint spot was discovered, but as a similar spot was not formed on the one taken in India, it was assumed that the spot in question was a photographic defect. Father Perry, however, observed the same spot in a photograph taken on the same day at Stoneyhurst, and the truth of the Greenwich photograph was confirmed.

It was discovered afterwards that the Indian photograph was taken something like seven hours earlier than the Greenwich photograph, Father Perry making his photograph within three hours of the time when the photograph was taken at Greenwich. The spot, therefore, had not begun to form at India when the sun was photographed, had reached its climax when photographed at Stoneyhurst, and was passing away on the Greenwich photographers going to work. Thus, as Mr. Maunder said, this spot had a life-history of only a few hours. This is a very interesting contribution to what may be called the romance of photography, and shows decisively the value of simultaneous photographic work in different parts of the world.

It is some time since the old dodge of getting money from people by pretending to take portraits of themselves, or of their premises, was practised, but a charge brought against a man last week at Paisley shows that this very ready method of fraud is not forgotten. There are so many amateurs now-a-days that probably to offer to take the photograph of a house would not find many responses, but a bogus portrait club can still be worked. In the former case, the favourite trick was either to get the money in advance, and promise to send the print, which never came; or to actually take a negative, and print a proof, which, however, was submitted fresh from the printing-frame, and never toned or fixed. In the case of the bogus club, subscriptions are collected as often as the victim chooses to part without suspecting he is being "done," after which the "photographer" disappears. It is sad to see that the swindler in this case was a sculptor. Clearly he had learned to turn his "chiselling" to some purpose.

It is satisfactory to know that the Meteorological Department at Kew has wisely made itself independent of the gas strike, should the movement extend to the Richmond gas works, whence it derives its supply. Mr. Whipple, in his interesting, if somewhat lengthy, paper read at the Photographic Society this week, said that one of the instruments used at Kew for recording photographically meteorological observations could be employed either with a gas jet, or with the light from a paraffin lamp. At the present juncture, he remarked, this double resource might prove of value, although, the Richmond gas workers having recently struck and obtained the advance they wanted, it was not likely that the consumers would be inconvenienced.

The Camera Club has discovered upwards of three hundred of Rejlander's pictures in private hands, so has a large number to select from for its exhibition, which will be opened next Monday night.

PHOTOGRAPHY IN RUSSIA.

BY C. T. CHESTERMAN.

THE jubilee year of photography was celebrated with great pomp in both the old and new capitals of the Empire. The St. Petersburg Exhibition, organized under the auspices of the V section of the I. R. T. S., must, however, be especially remembered by Englishmen, as it was the only one in Europe, as far as I have been able to ascertain, which was inaugurated in commemoration of the discoveries of Daguerre and Talbot. The object of the organizers of the exhibition was to represent as far as possible the present development of photography in all its vastness, with its varied applications to science, art, industry, and public and private life; not to act so much as a stimulus among its participators, as to assist in diffusing a true knowledge of photography, and to give prominence to those workers who have been instrumental in its development, as well as those to whom it owes its origin. Her Britannic Majesty's ambassador to the court of Russia was present at the opening, and expressed his thanks to the president for the honour shown to his countryman. General Timascheff, president of the executive committee, delivered an address to the following effect:—

"Half a century ago, Daguerre in France, and in England Fox Talbot, almost simultaneously, but by different means, discovered the possibility of reproducing the visible world encompassing us in a true and exact drawing, through the combination of physical and chemical agencies. This invention, which fulfilled the dreams of previous years, was regarded as a wonder by contemporaries, and since that time has not lost favour with its adepts. Photography is one of the most important inventions of our time in the sphere of applied sciences; it has not only influenced the development of science and art but has opened out new branches of industry. Several had previously noticed the effect of light upon different substances, but it was the fortune of Daguerre and Fox Talbot to be able to give processes sufficiently matured to produce images which were applicable to the uses of every-day life as well as to science.

"Nearly every invention combines the joint labours of predecessors, and a large share of the honour in the invention of photography ought, with justice, belong to Niépce, the co-operator of Daguerre and inventor of helio-engraving. There is no doubt, however, that the discovery of the latent image and its development—that is to say, that process which makes rapid exposures a possibility—belongs to the genius of the Frenchman Daguerre, and then to the Englishman Fox Talbot; the former developed with the vapours of mercury an iodised silver plate, the latter with gallic acid paper saturated with iodide of silver; 1839 was that epoch in the history of photography in which the results of a series of intellectual efforts were gathered into one channel, which gave mankind a new weapon for aiding the mind and for diffusing knowledge. The names of Niépce, Daguerre, and Fox Talbot ought to be inscribed on the tablets of history as men whose invention, as far as regards its signification, might be equalled to that of printing. In fifty years the applications of photography have reached most extensive limits, and its development this last decennial has advanced hand-in-hand with scientific progress. Photography, as a means for taking views of nature, has had a most popular reception; in fact, a photographic outfit has become almost as much a necessity to the scientist as his pen, pencil, and field-glasses. Very few, however, of those who make use of photography have a comprehensive idea of the manifold phases which it embraces in its several processes and applications."

A life-sized portrait of Fox Talbot, together with those of Daguerre and Niépce (enlargements by Mr. Thiele) formed the chief decoration in the central hall. This spacious building, which was erected especially for exhibition purposes by the I.R.T.S., together with the annexe used upon previous occasions for machinery, teemed with every conceivable variety of photographs, specimens of photo-mechanical reproductions, and apparatus. Of the latter a remarkably bulky specimen was suspended from the roof of the chief building; without it, however, the exhibition would not have been complete; it was nothing less than the gondola of a balloon, fully equipped for reconnoitering purposes by the aid of photography. It was exhibited, together with a series of very vigorous prints from balloon negatives, upon aristo-paper, which is peculiarly adapted for very thin negatives by the Aërial Navigation Corps, such as those taken from balloons.

Various foreign gentlemen and firms who are noted for some specialty were invited to contribute some of their productions for exhibition. Besides diplomas of honour, the council of the Imp. Russ. Tech. Society voted especial thanks to those who were kind enough to respond to the invitation. The following is an alphabetical list of those foreign exhibitors:—J. Albert, Munich; Ottomar Anschutz; Autotype Co., London—the exhibits of the Company were received some time after the opening of the exhibition, so that the hanging committee had a difficulty in finding space for them; a portrait of H. M. Queen Victoria was much noticed by the visitors: Autotype Co. (Meisenbach & Schmaedel), Munich; Braun, Henri frères, Herany, Dr. Just, Prof. Janssen, Löwy, A. Londe, Marey, Nadar, Payne-Jennings, Pickering, H. P. Robinson, H. W. Vogel, and O. Volkmar.

The *Photographic Vestnick* published a series of articles upon the invention of photography, and especial emphasis was laid upon the fact that, although Daguerre's discovery was very great, still it was only a positive process, and it is to Fox Talbot that we are indebted for the process that has caused such extended uses of photography.

Although the majority of members consist of amateurs, the vote was carried to make no distinction between them and professionals at the prize adjudication; thus constituting a precedent, I believe, as at all previous exhibitions amateurs have only been able to compete in special classes.

The present season of the V section of the Imp. Russ. Tech. Soc. commenced under a new president. Mr. L. Levitsky, who had held that position since the decease of the Society's first president, General Birkin, has been obliged through impaired health to relinquish that post.

The officers of the section for the ensuing year are as follows:—*President*—Gen.-Adjt. A. E. Timasheff; *Vice-President*—His Excellency M. Deshevoff, Inst. of Mines; *Council*—Messrs. B. Gratcheff, N. Ludontny, B. Kourdiumoff, L. Levitsky, Junr., A. Smirnoff, V. Srezneffsky, Ph.D., and G. Schulz; *Hon. Secretary*—P. Olkhin.

A HECTOGRAPH mass, prepared from 1 ounce of isinglass, 4 ounces of water, and 6 ounces of glycerine, according to *Industrie Blätter*, is preferable to that from gelatine, in that the aniline ink adheres only to the surface, and is thus more easily removed by washing.

A COLLODIO-CHLORIDE PROCESS.*

BY JAMES INGLIS.

No. 1.—Alcohol	... ...	12 ounces
Gun-cotton	... ...	1 ounce
Ether	... ...	20 ounces
No. 2.—Chloride of strontium	... ...	80 grains
,, lithium	... ...	80 ,,
Citric acid	... ...	300 ,,

Dissolve all of these in a mortar in as much alcohol as will make six ounces in all.

No. 3.—Nitrate of silver	... ...	137 grains
Water	... ...	7 drams

Dissolve and add slowly as much alcohol as will make five ounces in all.

To Make the Emulsion.

Take six ounces of No. 1, add to it six drams No. 2, then 10 drams of No. 3. This must be poured through a funnel slowly, while a second person shakes the bottle well all the time.

A.—Castor oil	... ...	2 ounces
Ether	... ...	8 ,,
B.—Glycerine	... ...	4 ounces
Alcohol	... ...	8 ,,

Add to the emulsion half ounce of each A and B, and shake.

To colour the emulsion, make a mixture of aniline dyes, violet and magenta, to suit the taste. They are first dissolved separately in water. Then a mixture of the two to any desired strength and tint is made up with equal parts of alcohol and ether; very little is used, but this can only be judged by the eye.

The emulsion should be about 10 ounces when completed. Should it lack anything, make it up by adding ether.

Should the prints ever appear rusty in the shadows, add a little more of No. 3, as the emulsion must then be too weak in silver.

When the prismatic rays show on the paper when dried, the emulsion is too thin and should have a little cotton added to it.

When the negatives are very thin, a better emulsion for such is made by using only four drams of No. 2 instead of six drams.

For negatives that are dense, more of No. 2 must be used; also an increased proportion of No. 3.

After coating each sheet of paper, add one dram of ether to the emulsion. This will break all air-bells formed by its being run back into the bottle, and also make up for any evaporation.

The amount of emulsion required to coat a sheet of paper 20 by 24 is ½ ounce. Should more be left upon the paper, the emulsion is thicker than necessary, and may be thinned with ether to be of such a consistency as will only impart this quantity.

Toning Bath.

Water, 40 ounces; hypo. 8 ounces; dissolve 15 grains chloride gold in 2 ounces of water, and add to hypo solution, then 75 grains nitrate lead (dry).

Tone the prints without previous washing. When they tone too fast the fixing will not be complete; they should then be put into an ordinary fixing solution for a few minutes. When they are in the toning bath for ten minutes or over, they will be fully fixed, and need only be washed.

*Read at the Chicago Camera Club.

Toning Bath to Produce an India Tint in the Half Tones.

Water	... ...	20 ounces
Hypo	... ...	3 ,,
Sulpho-cyanide of ammonia	... ...	½ ,,
Saturated solution of alum	... ...	½ ,,
Salt	... ...	50 grains
Gold solution	... ...	2 ounces

Gold Solution.

Gold	... ...	15 grains
Water	... ...	10 ounces

The prints may be washed or not before toning. When prints tone too slowly, add one or two drops of solution of sulphuric acid; one dram to water 15 ounces. This must be used very sparingly, as too much will bleach the prints and make them too yellow in the half tones. Adding a little hypo solution to the bath will correct it again.

BLISTERS.

BY W. H. DUNWICK.

I HAVE had my share of them, and lost a good many prints. Ammonia is good in hypo as a preventative, but if a little too much is used it softens the albumen. I get rid of them entirely by using luke-warm water for first washings, and tone in a warm bath; after toning place them in half a gallon of lukewarm water and one ounce saturated solution bicarbonate of soda, a little salt in the water, hypo mixed with warm water and added, one ounce of the bicarbonate of soda, and a small handful of salt. I have tried this for some time with unfailing results. I silver on a 60-grain bath; found 45 to 60 grains made no difference as far as blistering was concerned. I use fresh fixing bath 1 to 20, that is, four ounces of a saturated solution of hypo to 15 ounces of water; fix twenty minutes. I find that we make a mistake in making saturated solutions by placing the chemical in a vessel and adding water; no matter how much it is shaken, it is an uncertain and oftentimes a deceiving solution. I purchased a five-gallon, new, clean butter firkin, and had a board fitted in it about six inches from the top, and bored full of small holes. About two inches from the bottom have a good wooden faucet fitted. Fill it with water above the perforated board, and add hypo until the water is saturated. By adding water and hypo occasionally, you are sure of having a saturated solution that is reliable for prints and negatives; in fact, you have a dissolving jar such as chemists use in the laboratory, in which the chemical dissolves and mingles with the water, owing to its weight being greater than water. I use wooden dishes for all work except toning; if properly made of inch pine, and put together with white lead (ground), and plenty of screws used, say one to every two inches, and coated inside and out with equal parts of paraffin, bees-wax, and rosin, they are fine. I have silvered paper in a dish of this kind for the past ten years. Dishes of this kind usually leak, because they are made too light. I have a novel skylight which works fine. It is simply a double light, one directly over the other. It is warmer, and less liable to leak, and is clear from frost.—*Wilson's Photographic Magazine.*

LEWES PHOTOGRAPHIC SOCIETY.—At the meeting held on the 3rd inst., the President in the chair, Mr. A. R. Dresser read a paper on "Hand Cameras," and he brought several for inspection, including the one he used himself. On the walls was exhibited a collection of enlargements from hand camera negatives by Mr. Dresser, and, at the conclusion of the paper, he passed about 100 slides through the lantern.

PHOTOGRAPHY IN FRANCE.

BY LEON VIDAL.

Photographic Society of France—International Photographic Congress—Terminology Adopted—Manufacturers and Dealers in Photographic Apparatus—Yellow Fog—Experiments with Eikonogen—Jubilee Banquet—Society of Etudes Photographiques.

Photographic Society of France.—The meeting of the French Photographic Society on December 6th was not of much interest; the communications, usually numerous, were on this occasion few, and relatively of minor importance. The Society has been enriched by a portrait of Daguerre, painted by his friend, M. Carpentier, and presented by M. Rolland, to whom the Society was previously indebted for the model of the bust of Daguerre. These are precious gifts, because of their unquestionable authenticity.

International Congress.—The official documents relating to the International Congress are already in the hands of the printers; so says M. Pector, secretary to the said Congress. The President spoke highly of the zeal and activity displayed at the Congress by Colonel Sébert, who did a vast amount of work thereat, and the general editing of the resolutions of the Congress. M. Pector also merits the thanks of photographers for his punctuality and close attention to his duties.

Photographic Terminology.—Some of the recommendations of the Congress have already been introduced into practice; thus, M. Fabre in his *Traité Encyclopédique de Photographie*, of which the sixth number has already been received at the office of the Society, makes use of the nomenclature proposed by Colonel Sébert and adopted. Thus, the cliché or "negative" is called a "phototype," or type obtained by photography. We know that this designation, though accepted by the majority, had its opponents. It has been argued that in other languages this word means a "typographic cliché," and that there seemed to be no advantage in adopting a terminology likely to cause confusion. The President approved this designation, and thought the word "photocopy" a good one to denote positives; so that in future we may hear such expressions as "You have had a fine photocopy made of your portrait." Harmony seems rather disturbed by this choice of new words.

Manufacturers and Dealers in Apparatus.—The President announced the appearance of a new photographic organ, namely, that of the new Syndical Chamber of Photographic Manufacturers and Dealers. He remarked that in the statistics published by this organ was a singular error, to the effect that photographers at the Exhibition have had three times as many awards as the manufacturers and dealers. The circumstance really was not so strange, considering three times as many photographers exhibited. It is easy to see that the complaint is the outcome of discontent; a certain number of dealers have found themselves insufficiently recompensed, and they have banded together in the hope of creating, for the future, a situation so strong that their importance cannot be overlooked. The thing in itself is without importantance, but it is sad to see these divisions in industrial corporations, which are already weak enough, and which should unite more firmly. It is to be hoped that after having sufficiently censured their judges, they will resume their bonds of union.

Yellow Fog.—M. Balagny made a communication about the yellow fog of certain negatives developed with hydroquinone; he advocated as a remedy washing the plate with water containing citric acid, before putting in the hypo bath. He believed the too alkaline condition of the film to be the cause of the fog, which he thought to consist chiefly of sulphide of silver.

Experiments with Eikonogen.—M. Léon Vidal communicated the result of his experiments on eikonogen. He had tried various formulæ, notably one given by M. Audra at the previous meeting, also one which was published in the Photographic News of Nov. 22nd. The last formed a developer of great energy, and he called it the intensity-yielding bath, as compared with that of M. Audra, which contained less eikonogen. His method was to begin with the weak bath, and afterwards, if necessary, to remove the plate to the strong one. Vidal concluded from his experiments that *white crystalline* eikonogen forms a first-class developer. He exhibited negatives which he had produced by the aid of various developers in comparing their action with eikonogen; he even exhibited some developed with a saturated solution of eikonogen, and nothing else. Washing seemed to him to be of great importance when it was desired to avoid yellow fog, and above all when carbonate of potash was used as the alkali, also when the development was long-continued. M. Davanne, in concert with M. Audra, has also made experiments with which he is well satisfied. He desires to increase the simplicity of formulæ, and suggests that 100 parts of water should always be the point of departure; this would facilitate the comparison of formulæ with each other.

Jubilee Banquet.—The Syndical Chamber of Photography has initiated a new banquet to celebrate the jubilee of photography, and it will come off on the 16th of this month. It is to supplement the first banquet, at which time many members were absent from Paris.

Society of Etudes Photographiques.—The Society of Photographic Studies has elected M. Balagny as its president, and it is a happy selection.

Of all the work relating to the International Exhibition of 1889, no more remains to be executed than the report. It has been confided to us, and we desire the English exhibitors who wish to have their exhibits described therein with the greatest possible precision, to address their documents to us. The English exhibition has been a good one, and we can but speak of it in the highest terms.

The subject at the Camera Club on Thursday, December 19, will be "Salting and Exciting Ordinary Drawing Papers."

In his paper read before the Society of Arts last Wednesday night, Mr. Trueman Wood said: "In photography we more than held our own, except in the important class of photogravure."

Royal Institution.—The following are the lecture arrangements before Easter:—Professor A. W. Rücker, six Christmas lectures (for juveniles) on Electricity; Professor G. J. Romanes, ten lectures on The Post-Darwinian Period; Mr. E. Roscoe Mullins, three lectures on Sculpture in relation to the Age; the Rev. Canon Ainger, three lectures on the Three Stages of Shakspeare's Art; Mr. Frederick Niecks, four lectures on the Early Developments of the Forms of Instrumental Music (with musical illustrations); Professor Flower, three lectures on the Natural History of the Horse, and of its Extinct and Existing Allies; the Right Hon. Lord Rayleigh, seven lectures on Electricity and Magnetism. The Friday evening meetings will begin on January 24th, when a discourse will be given by Professor Dewar on the scientific work of Joule; succeeding discourses will probably be given by Sir Frederick Abel, Mr. Henry B. Wheatley, Professor J. A. Fleming, Mr. Shelford Bidwell, Professor C. Hubert H. Parry, Mr. Francis Gotch, Professor T. E. Thorpe, Professor G. F. Fitzgerald, Lord Rayleigh, and others.

ANSCHUTZ'S INSTANTANEOUS PICTURES.

IN Herr Herman E. Gunther's article on "Photography in Germany," published in our columns on November 29, the writer alluded to the successful work that had been



done in the field of instantaneous photography by Herr Ottomar Anschutz, of Lissa. Some illustrations of



his work have just been received by us from Herr Anschutz, and are given herewith.

A general defect, hitherto, of the roller-blind shutter has



been the absence of means of readily varying the aperture of the slit without introducing disadvantages. Mr.



Wellington has devoted some time to the solving of this problem; Herr Anschutz has done the same.

THE BRITISH FINE ART SECTION OF THE PARIS EXHIBITION.*

BY H. TRUEMAN WOOD, M.A.,

Secretary to the Society of Arts, and to the Mansion House Committee of the Paris Exhibition.

IT was at first a great difficulty to know what amounts the Mansion House Committee would really have to deal with, and what expense might therefore with justice be incurred for such items as decoration, a head on which large sums might easily be expended, and the preparation for which had to be put in hand at an early stage of the proceedings. The committee were obliged to begin modestly, and to enlarge their plans as funds came in, a system admirably calculated to check profuse expenditure, but by no means tending to simplify the work of the decorator. In this respect the skilful dispositions of Mr. Donaldson, a member of the committee, who took on himself, as a labour of love, the duty of superintending the whole of the decorative work, were of the greatest service. Probably nobody but a volunteer would have undertaken such a task hampered by such conditions.

There was certainly one advantage in the way the funds came in. For some time before the opening the committee had actually in hand almost the whole of the funds. We were thus enabled to calculate our expenditure exactly, and suit it to the amount of our resources. With any great uncertainty as to our receipts, we could hardly have brought the two sides of the account so near a balance.

In this manner of financing the affairs of a section there is one considerable difficulty. Industrial exhibits can, it has been shown, be made to pay for themselves, but there are important classes of exhibits which cannot. Chief of these is the Fine Art Section. It has been urged, with sufficient lack of generosity, that painters and sculptors, like potters and weavers, should pay the cost of showing their wares. The questions are easily to be argued, were it worth while, but it may be enough to say here that, even granting it not to be unreasonable to ask the painter to bear the cost of exhibiting the picture he wants to sell, it seems hardly fair to expect him to pay costs and charges for a picture he has already sold, and which he must go and borrow from the owner. Now the pictures it is desirable to show are the painter's best, those which have certainly passed out of his possession, not the unsold canvases remaining in his studio. But argument or no argument, the fact remains that without funds for insurance and transport, a fine art section in an exhibition is impossible if it is to be representative.

The committee recognised this fact, and, considering the attractiveness of a picture gallery, the credit it would bring to the section, and the discredit of its absence, they thought themselves justified in allotting a sum of £1,500 from their general funds to the purposes of the Fine Art Section. This was supplemented by contributions to an equal amount, and with this £3,000 the expenses of the Picture Gallery so universally and so justly admired at Paris were met.

NOTTS AMATEUR PHOTOGRAPHIC ASSOCIATION.—A meeting was held on the 9th inst. at Cavendish Chambers, Market Street. Mr. F. G. Pierpoint, of the Leicester Photographic Society, gave a lecture entitled "A Trip up the Thames, from Oxford to London," which was illustrated by slides taken by him on a pleasure trip. The negatives were 12 by 10, and the slides were reductions from these negatives.

* A portion of a paper read last Wednesday night before the Society of Arts. Sir Frederick Abel, F.R.S., occupied the chair.

PATENT OFFICE LIBRARY

Patent Intelligence.

Specifications Published.

13,523. "Solutions for Developing or Fixing Photographic Latent Images." A communication from abroad by CHARLES SPIRO, of New York, Gentleman. WILLIAM PHILLIPS THOMPSON, F.C.S., M.I.M.E. of the Agency for Foreign Patent Solicitors, 6, Lord Street, Liverpool, and 6, Bank Street, Manchester, and 323, High Holborn, London, Civil Engineer.

This invention relates partly to means for developing the latent images of photographic plates or sheets without a dark room, and has partly for its object to provide a developing mixture whereby a complete isolation of actinic rays of light from the developing photographic plate or sheet will be secured, while a clear view of the developing image may be obtained.

In developing a photographic plate or sheet in a dark room, as heretofore, in which the only light was the dim light admitted through ruby or orange-coloured glass used to exclude the actinic rays, it was possible for the operator to watch the progress of and control the development only by removing the plate or sheet from the developing bath from time to time, and holding it up to the light for inspection, which process was wearisome and, in many instances, destructive to the plate, owing to the incomplete exclusion of the actinic rays, and the perhaps extreme sensitiveness of the plate.

To avoid these inconveniences and attain the objects of the invention, a mixture is provided consisting of any of the ordinary and well-known developers, such as pyrogallic acid and soda, or hydroquinone, in combination with a non-actinic transparent colouring matter, preferably orange aniline, or a mixture of the same and carmine aniline, where the plate or sheet to be developed is very sensitive.

In preparing this non-actinic developing mixture, at present, the inventor takes, preferably, hydroquinone for the developer, and to one pint thereof adds a solution composed of equal parts of alcohol and water (to energise the solution) to make one ounce, and two parts of orange aniline and one part of carmine to make half an ounce, thoroughly mixed so as to form a completely saturated and dark orange-coloured solution of diluted alcohol.

This solution is first well strained to remove all extraneous matter, and then combined with the developer, as before stated.

This mixture is poured into a developing tray, and the photographic plate or sheet to be developed transferred from the plate-holder into the non-actinic bath thus prepared, either in the dark-room, afterwards admitting the light thereinto, or removing the bath with the contained plate into the light, or by any well-known or approved means for effecting this transfer in the light without exposing the plate or sheet thereto.

The non-actinic bath will completely exclude the actinic rays from the immersed plate or sheet, and, the developing mixture being perfectly clear, the development will proceed in full view of the operator, who may thus easily note the progress of the development.

When the image is found to be fully developed, the plate or sheet may be transferred in the light to a bath of any of the usual fixing agents, such as hyposulphite of soda, and the bath quickly covered with a dark cloth; or the fixing bath may be likewise rendered non-actinic by the addition thereto of the same non-actinic colouring matter.

The transfer of the developed plate or sheet from the non-actinic developing bath into the fixing bath in the light may be thus effected without clouding the image, insomuch as the aniline colouring matter forms a perfect solution and fills the pores of the gelatine film, so as to form a perfectly non-actinic envelope over the film, lasting until the plate is immersed in the fixing bath. The fixing action then immediately commencing, light has no further effect on the film.

The proportions of the developer and coloured solution above given will yield a safe and efficient developer, if the tray is no larger than necessary to be half filled by the mixture. But the circumstances of the case and the experience of the operator will determine the depth of colour in the mixture.

The inventor claims:—

1. The combination, with a photographic developer, of a non-actinic transparent colouring matter, substantially as and for the purpose specified.

2. The combination, with a photographic developer, of a non-actinic solution of aniline colouring matter, substantially as and for the purpose specified.

3. The combination, with a photographic developer, of orange aniline, substantially as and for the purpose specified.

15,935.—*November 3rd*, 1888. "The Production of Oxygen and Hydrogen in Large Quantities." DMITRI LATCHINOFF, 9, Great Konionsheuneya Street, St. Petersburg, Counsellor of State.

The inventor says that up to the present time it has been thought impossible to obtain hydrogen for ballooning by the electrolysis of water. This impossibility was explained by the following simple calculation. One ampere yields, as is well known, seven cubic centimetres of hydrogen per minute; hence it follows that a current of 100 amperes would furnish 42 litres in the hour, or a cubic metre in 24 hours. Now a military balloon of average dimensions requires 640 cubic metres of hydrogen. Thus it seems evident that electrolysis is not applicable to this end.

My invention consists in a combination of apparatus which renders the productions of hydrogen and oxygen in large quantities not only possible, but very advantageous.

A continuous current dynamo machine of ordinary construction serves as the source of electricity, but to explain my idea more clearly by means of figures, let us suppose that a Thury machine producing a current of 600 amperes, and an electro motive force—difference of potential—of 100 volts, and driven by a motor of 100 horse power, is employed.

The current of this machine is passed through several ranges of reservoirs or electric baths, of which the construction will be explained further on, and I produce a decomposition of water in them. As for the decomposition of water one and a half volts are required, it will be seen that in disposing of 110 volts 73 electrolytic baths connected in series may be employed; but taking into consideration the increase of polarization with powerful currents, and the resistance of the liquid itself, it is more practical to allow the current to pass through 44 baths only, allowing 2½ volts for each. Experiments which I have made show that the decomposition of water can be easily effected by means of a current having a density of 14 amperes to each square decimetre of the electrode. Thus, with the electrodes of three decimetres wide and five decimetres long a current of 200 amperes can be passed through the liquid, and as the machine yields 600 amperes, it is evident that it is necessary to pass the current through three parallel ranges of the said baths, containing 44 each, that is to say, 132 vessels. In this case a current of 200 amperes will pass by each range, and the total quantity of gas liberated in twenty-four hours will be hydrogen $132 \times 2 = 264$ cubic metres, oxygen 132 cubic metres. Consequently, to obtain 640 cubic metres of hydrogen for a balloon, 2½ days or 60 hours will be required.

The complete up-keep of a steam engine amounts in St. Petersburg to about 5 copecks per hour per horse power, and consequently, to obtain 640 cubic metres of hydrogen and 320 cubic metres of oxygen, it is necessary to expend 290 roubles for the mechanical work. Assuming the other expenses of working, that is to say, the overlooking of the electrical plant, the interest and the sinking of capital, at 1,200 roubles per month, there is a total expense of 390 roubles. Now the maintenance of a balloon plant by ordinary processes costs about 700 roubles, and besides, no oxygen is obtained.

It follows that the electrolytic process is superior as respects economy.

The hydrogen obtained is led first into the gasometer; then it is compressed into safety cylinders. As to the oxygen, it will be observed that its value at the present price (35·33 roubles to the cubic metre) represents the enormous sum of 9,600 roubles. But admitting that the price of oxygen may go down to

1·75 copecks per cubic metre, the quantity obtained would still represent a value of 480 roubles, which is more than sufficient to cover the cost of production of the hydrogen, which thus is obtained gratuitously.

The inventor then by the aid of engravings describes his apparatus, and finally claims :—

1. The construction of the baths or electrolytic reservoirs, consisting of oblong vessels with electrodes either flat, corrugated, or reticulated, and of iron, carbon, or lead, divided by partitions of asbestos, and with caps to collect the gas.

2. The construction of the compression baths to obtain the gas under pressure, consisting of steel reservoirs hermetically closed and furnished with two pipes for the exit of the gases, which are closed by means of floating valves, so as to prevent inequality of pressure in the two compartments of the bath.

3. The construction of the simplified electrolytic battery, consisting of a case divided by electrodes into compartments, with non-conducting partitions furnished with pipes serving for the exit of the gas from each compartment, and of a common cover hermetically closing the entire battery.

4. The construction of the drier, having the form of a pipe or of a circular or quadrangular case, divided into two parts by a longitudinal partition, and filled with material which absorbs moisture with the object indicated.

5. The general arrangement of the apparatus above described, which renders it possible to easily and cheaply obtain hydrogen and oxygen in very large quantities, as, for example, to fill balloons by means of electrolysis of water, which, at the present time, has been regarded as absolutely impractible.

2,908. *February 19th*, 1889. "Regulating the Supply of Gases." WILLIAM GORDON, 2, Church Terrace, Seacombe, Cheshire, Engineer.

This invention relates to that kind of gas governing device in which the pressure of the gas passing through the device is employed and acts in such a manner as to regulate the volume admitted to it.

In apparatus embodying the invention, gas is admitted by valves controlled by a spindle on or in connection with which a floater is employed. The floater is arranged in a vessel or chamber containing glycerine, mercury, or other suitable liquid, and outside or near this chamber is another vessel or chamber containing fluid, both chambers being in communication with each other. The chamber last specified is in communication with the surface of the gas passage or chamber on the outlet or low pressure side of the apparatus, and thus the pressure of the low pressure gas acts upon the surface of the liquid in that chamber, and causes the liquid in both vessels or chambers to rise and fall respectively, or to stand at certain heights ; and as the liquid falls or rises in the floater chamber, so the float rises or falls, and by its movement the valve or valves controlling the gas inlet to the apparatus is moved, and opens or closes the gas inlet passage to the apparatus.

A convenient and simple arrangement of these liquid vessels is a concentric one, and they may be placed above the valve, and the chamber in which it works.

The valve which controls the gas inlet apertures may be of double equilibrum type, and it may be conveniently connected to the floater aforesaid directly by a spindle, which spindle may rise to the top of the floater through a tube. The arragement of liquid vessels above described causes the gas to be kept out of contact with the floater or liquid in the floater vessel, and the pressure of the gas is caused to act indirectly upon the liquid in the floater vessel or chamber.

The gas may enter the apparatus by the side or bottom, or at any convenient point, and it may also leave the apparatus at any convenient spot.

If the apparatus be made of metal, such as iron or brass or its equivalent, the inside or other surfaces may be provided with enamel of any suitable kind, such as that used on various sorts of metal goods now in use ; this is especially useful in connection with those surfaces which come into contact with liquid. Or these parts may be made of earthenware, ebonite, or other not easily corroded material. The apparatus may also be provided with a glazed part or parts, or some of the parts may be of glass, by which more or less of the interior and its operation may be observed from outside. And it may also be provided with a moveable cap or lid adapted to be locked or screwed down in its normal position.

7,675. *May 8th*, 1889. "Holders or Lifters for Photographic Plates, Films, and Papers." THOMAS STANWAY, 24, Cauldon Road, Hanley, Staffordshire, Decorator.

This invention relates to holders or lifters for photographic plates, films, and papers ; and has for its object a method of constructing the same, whereby the said plates, films, and papers may be easily manipulated without risk of injuring them.

The invention consists in making the holders in the form of loops, which fit on the ends of the plates. Each loop is made with a suitable handle or finger-hole to lift it with, and also with one or more stops to keep the said holders at the ends of the plate being manipulated.

In using holders constructed according to this invention, one is held in each hand and slipped on the ends of the plate. The holders are then slightly pressed towards each other to prevent them slipping off the plate. The plate is then manipulated in the ordinary manner. When they are used for papers and films, the said papers and films are first damped and laid upon a sheet of glass, and manipulated as before.

The inventor claims :—

A holder or lifter for photographic plates, films, and papers, constructed in the form of a loop provided with a suitable handle or finger hole to lift it by, and one or more stops to keep it in position.

9012.—*30th May*, 1889. "Improvements in Colour Photography." ANTOINE HIPPOLYTE CROS, of 5bis Rue du Cirque, Paris, Physician.

The present invention has for its object the carrying into effect by means of new processes the principles discovered and made known by Mr. Charles Cros in his studies on colour photography.

These processes consist essentially in the arrangement of an apparatus capable of taking at one time three superposable pictures, and permitting, with the modifications hereafter mentioned, the reconstruction of the complete picture of the objects reproduced with their natural colours by the conveyance of the three separate elementary pictures upon a common surface.

The inventor gives drawings representing the apparatus for accomplishing this object.

The inventor produces three elementary pictures, which are brought to register upon one horizontal transparent glass that is slidden in grooves above three oblique mirrors. Thus three colourless pictures taken, one with orange light, another with red light, and a third with green light, are seen in rapid succession by the observer looking into the instrument through the lens ; consequently the pictures appear superposed, and as each picture is seen through its appropriately tinted glass, the combined picture appears in approximately its natural colours. This "trimonoscope" offers great advantages, he says, over the apparatus of the same kind heretofore proposed.

He avoids entering into the details relating to the different treatments usual in photographic operations which are indispensable to complete the above-described invention, these operations being already known and carried out in a more or less satisfactory manner, and may be adapted to the described process.

He claims :—

1. The means and apparatus described and illustrated to be used for and in connection with the production of coloured photographic pictures.

2. The use in colour photography of a rotating reflector, to obtain simultaneously three or other number of images, and receiving such images on sensitive surfaces under conditions such that each surface may be affected by rays of a different colour.

HACKNEY PHOTOGRAPHIC SOCIETY.—On Thursday, Dec. 23rd, at Morley Hall, a flash-light demonstration will be given by Mr. F. W. Hart.

PATENT OFFICE LIBRARY.

Correspondence.

FLASH-LIGHT PHOTOGRAPHY.

DEAR SIR,—Just a caution to those about to use the above. In using a pneumatic arrangement, be careful to have plenty of tube. I have lately escaped a bad accident through not taking proper care. I had arranged to fire three lamps to photograph a stage group, and, not having enough tube, the first lamp was too near. Without thinking, I was almost over it when firing, and had part of my eyebrows singed off, a scorched nose, &c. Otherwise my experience was successful, and I think the flash-light capable of very good results. FRED. DOWNER.

110, *High Street, Watford, Dec. 18th.*

THE OXY-CHLORIDE THEORY.

SIR,—In your Answers to Correspondents this week you say the oxy-chloride theory was revived by Professor Meldola in his lectures. I beg to inform you that I published in the PHOTOGRAPHIC NEWS, some time before Professor Meldola's lectures, some analyses of exposed silver chloride. In ignorance of Hunt's work I suggested the composition Ag_4OCl_2 as likely for the exposed salt, in a conversation with Captain Abney, and the suggestion occurred to me after an experiment in which I had heated exposed chloride in a vacuum and obtained distinct quantities of oxygen gas. The exposed chloride was previously dried for some days in a vacuum over sulphuric acid. Subsequently I obtained from exposed chloride, after treatment with cold saturated lithium chloride, nearly the theoretical quantity of oxygen for the above formula. This was three or four years ago, whilst I was at Kensington. At that time Capt. Abney did not quite concur, as he had obtained a substance from the exposure of dry chloride and dry benzene. I do not know what the result of the analysis of this product was. I should not be at all surprised at a silver haloid compound of benzene being formed; it would not shake my belief in the oxy-haloid body. I have very little time or convenience for work now, but since leaving Kensington I have made a considerable number of experiments and analyses, which, for the most part, confirm the idea of oxy-haloid salts.

W. R. HODGKINSON.

Royal Artillery College, Woolwich, December 6th.

PHOTOGRAPHIC CLUB.—The annual dinner will be held on Wednesday, the 18th inst., at Anderton's Hotel. On this occasion a testimonial will be presented to Mr. E. Dunmore, the retiring hon. sec. and treasurer.

TO FIX PENCIL DRAWINGS.—First pass the drawing through clear water; go carefully over with skimmed milk, using a camel's-hair pencil; dip in a weak solution of alum and let it dry flat. Allow a thin solution of isinglass to run over the drawing on a perfectly level surface.

PHOTOGRAPHY is sure to play an important part in the book-production of the future. The ninth edition of the "Encyclopædia Britannica" was photographed by the Henry Allen Company, of New York, who sold copies in Kansas City by subscription. Several of the subscribers refused to take the books on the ground that they were not receiving what they expected. The Allen Company brought actions to compel these subscribers to take the books. The matter was decided against the plaintiffs, the judge dismissing all the cases, eleven in number.—*Sales and Wants Advertiser.*

MR. C. T. CHESTERMAN informs us that photographers in St. Petersburg are nearly at a standstill, owing to the bad weather. "Magnesium illumination is," he says, "nearly a necessity. The latest development of magnesium lamps is Professor Kourduemoff's, which can be made to give an almost continuous light, so that it can be used for copying purposes instead of the costly electric light. Mr. Levitsky, the court photographer, was obliged to dispose of his plant for electric lighting some two years ago, as the the neighbours complained of the noise of the machinery in the cellar; now he uses flash-light illumination. I think it is a modification of Gaedicke and Miethe's."

Proceedings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

December 10th.—5A, Pall Mall East, London; Mr. JAMES GLAISHER, F.R.S., President, in the chair.

The following new members were elected:—Messrs. G. W. Allen, W. T. Armitage, L. Ashburner, H. Baker, W. J. Beasley, H. W. Bennett, W. H. Bois, S. Tinfan Chang, of the Chinese Legation, W. L. Colls, Lieut. J. J. Galloway, R.E., Miss Florence Harvey, Messrs. E. A. Perkins, T. Protheroe, W. S. Stuart, J. H. Taylor, M.A., Lieut. C. B. Vandeleur, H. Van der Weyde, A. H. Hinton, J. S. Hodson, C. J. Gunn, and Lieut. F. L. Lloyd, R.E.

Mr. G. M. WHIPPLE, B.Sc., F.R.A.S., Superintendent of Kew Observatory, read a paper on "Photography in Relation to Meteorological Work," and said that the prosecution of the study of weather and its changes entails frequent and numerous observations of the various natural phenomena which in the aggregate go to make up what we term weather; popularly these may be described as changes of the various properties of the aerial ocean which surrounds us, and at the bottom of which we live and move and have our being. These phenomena are its temperature, its humidity or extent of dryness—*i.e.*, the amount of aqueous vapour it hold sin suspension—its motions, its density, as well as its electrical condition. Variations in its chemical constitutions and in the amount or nature of the objects accidentally floating in it, such as dust, organic or inorganic, under which he would include germs and seeds, although of great interest to the naturalist and sanitarian, are scarcely to be considered as falling within the scope of the science of meteorology as spoken of at the present time. It is to be hoped, however, that as we obtain a fuller knowledge of many of the phenomena first mentioned, those later named will come in for more extended notice. In the extreme south-west of England there has existed for fifty-six years a comparatively small scientific and artistic society—the Royal Cornwall Polytechnic Society—founded by some young ladies in 1833, and publishing annually a small volume of Proceedings. In 1838 its Secretary, Mr. T. B. Jordan, who was also a mathematical and philosophical instrument maker in the county, described an instrument for recording by photography the variations in the height of the barometer by passing light through the torricellian vacuum and allowing the top of the mercurial column to arrest the luminous rays in their passage to the sensitized paper. Mr. Jordan also devised a recording declination magnetograph, and a sunshine recorder, all of which instruments, with illustrations, are described in the Sixth Annual Report of the Society. The next application of photography in the order of time was by Sir Francis Ronalds, at that time Honorary Superintendent of the Kew Observatory, who when hard at work in 1840 on atmospheric electricity, constructed an apparatus which he called an electrograph, which was described in our report this year of the Photographic Convention excursion to Kew Observatary. The speaker said that we next come to the simultaneous labours of Brooke and Ronalds, described in the "Philosophical Transactions," 1846, and the principal parts of the original apparatus after working for many years, the one at the Royal Observatory, Greenwich, the other at the Kew Observatory, are now in honourable retirement side by side in the loan collection of scientific apparatus at South Kensington Museum. Since the time of Brooke and Ronalds their magnetographs and meteorographs have undergone many modifications in detail, but not in principle. The speaker next described the thermograph and pluviograph, both derived from the barograph; the earth current and Thomson electrograph, both adaptations of the Gauss's mirror method, as used by Brooke in the Greenwich magnetograph; Campbell-Stokes and Jordan sunshine recorders, descendants of T. B. Jordan's heliograph of 1838, in which the methods of producing records are characterised by extreme simplicity; whilst finally he mentioned the Roscoe recording actinometer, and Abney's cloud cameras. By the aid of the lantern he exhibited upon the screen pictures of various meteorological instruments. Lastly, he dealt with the photographic pro-

cesses employed in connection with the above instruments, and many of the particulars will be found in our report of the Convention excursion already mentioned. In speaking of sunshine recorders he said that the Campbell instrument, consisting of a solid glass sphere placed concentrically in a bowl turned out of a block of mahogany equal in radius to the focal length of the sphere, registers the duration of bright sunshine by the amount of wood burnt or carbonised by the heat of the solar rays, which is concentrated in the focus of the globe. This instrument, originally in operation at the office of the Local Government Board, Whitehall, London, has since 1875 been fixed on the roof of the Kew Observatory, and the charred bowls are renewed every six months as the sun passes through the summer and winter solstices. A long time ago, Prof. Sir Henry Roscoe and the late Dr. Balfour Stewart had a long series of these charred bowls at Manchester. They weighed each of them separately, then filled them with melted wax; afterwards they turned them in the lathe to remove the wax, except where it had sunk into the scars; then they weighed the bowls again, and discovered the weight of wax taken up. In this way they obtained a rough measurement of the sun's heating power at different periods, and he thought that they found it to agree in some way with the decennial period of sun-spots. In 1879 Professor Stokes improved the instrument by substituting a grooved brass bowl for the wooden one, so enabling one table card to be so placed that the sun's image should traverse it daily from end to end, burning a blackened path on the card which showed accurately the periods of the sun's shining and obscuration, hour by hour, or minute by minute. There is, however, some uncertainty attached to these records, because the presence of ever so small an amount of hazy or cirrus cloud in the sky suffices to prevent the charring action of the sun on the paper, and no trace of sunshine is recorded unless the sun should be shining with its full glare. Mr. T. B. Jordan's sunshine recorder, which is purely a photographic instrument, obviates this by recording varying intensities of sunshine by a varying amount of discolouration produced in a paper sensitised by the ferrocyanide process. A strip of prepared paper is put into a brass box, and the sun's light allowed to pass through a small slit in the side of the box, and fall upon the paper; after exposure the paper is fixed in clear water, and we have then upon the surface a blue trace, the intensity of which roughly measures the amount of solar influence upon the earth. As now constructed, a pair of semi-cylindrical boxes are fixed back to back upon a frame, which can be placed parallel to the equator of the station.

Mr. SLINGSBY exhibited some flash-light photographs, after which the proceedings closed.

CAMERA CLUB.

December 5th.—Bedford Street, Strand, London; Major J. F. NOTT in the chair.

Mr. G. DAVIDSON, Hon. Sec., exhibited a reading desk with shaded lamp for use during lantern exhibitions, with electrical means of actuating a low-sounding bell near the lantern, so that the operator shall know when to show a fresh slide; the instrument had been designed and presented to the Club by one of the members. He also exhibited the new appliance for vignetting made by Messrs. Marion and Co.

Mr. A. H. HINTON read a paper displaying considerable thought and literary ability, and which we hope to publish hereafter. He set forth that the word "art," in the sense in which he should use it, applied to the fine arts or the production of beauty, a kind of art which helped to make life brighter and men better, and which deals with that part of our nature which is associated with another life. He held that good art must be the outcome of love, and is beautiful only when it is true. He claimed for photography a place side by side with the sister arts. He remembered a quiet lake and mountain scene, the first glance at which gave an impression of rest, in producing which impression the sharpness of particular parts had little influence. Some parts, however, did most in producing the impression, and those must the photographer get into his picture; at the same time there should not be arbitrary rejection of detail. It would have been well for art, in some cases, had flowers not been classified by the botanist, but left to produce their spiritual effect on the observer. A good orator speaks so as to forcibly impress the one truth he desires to set forth, and which he does not surround with too much detail; so should it be in photographic art.

The CHAIRMAN said that the paper dealt with a subject which agitates photographic workers at the present time, and that Mr. Hinton had succeeded in introducing nothing of a pugilistic nature.

Mr. DAVISON remarked that for the most part he agreed with Mr. Horsley Hinton, but he had made use of the word "soul," and in that he had found it difficult to follow him; and Mr. Hinton had also stated that good artistic work is a clear revelation of what the observer already has within him. He (Mr. Davison) thought that the understanding of art matters is purely intellectual. He would draw a distinction between the creative and critical faculty; a man may be a close critic in art, yet without the power of delineation himself. Mr. Hinton had said that there was only one perfect rendering of a subject, and that seemed to be an abstruse statement which required elucidation; he had also said that photography avoided the introduction of the artist's personality; but he (the speaker) thought that the personality came out very strongly indeed, and would be sorry were it otherwise. Some more practical matters might be brought into the discussion. One man sees some very nice views in a shop window, and buys them merely because he thinks that they make "jolly pictures;" that is the only artistic idea some photographers have. Another man sees the same pictures, and gets some inspiration from the work done by others. Criticism in our photographic literature is too much patting each other on the back in a friendly way, without paying sufficient attention to what will elevate photography as a fine art. He thought that photographic exhibitions do as much harm as good; they raise some, and lower others, especially when medals are given easily. Although some photographers study works of art, they go to nature for their chief inspiration, and improve their results by the study of nature. Would Mr. Lyonel Clark say a few words about the paper?

Mr. CLARK replied that he always avoided speaking on art, because he knew too much about it.

The Rev. A. B. WHATTON was not an artist, so in speaking he felt himself to be rushing in where angels feared to tread. Mr. Hinton had told them that a cursory view gave the best impression of a scene, and that details disturbed that impression—so much so, that the spectator might visit the scene again to see what those details were. His own opinion was, that the more a man studies a beautiful scene in nature, the more does he know of the causes of the pleasing impression, and the more satisfaction does he derive. If art be truth, it can be only one; yet truth is many-sided, like a diamond cut with many facets; therefore there might be two or more representations of truth, and each of them be truthful, for one aspect of the scene might impress one observer, and another aspect another. A given number of vibrations of a stretched string, or a given number of vibrations of a column of air in an organ pipe, will each yield a particular musical note, which note will call forth a sound from an untouched neighbouring stretched string or column of air having the same rate of vibration as the exciting cause. So is it in art. Each man has within him what may be called his own note, and thus the kind of appreciation of any particular scene depends upon the mind of the particular man whose "note" is attuned thereto. He did not think art appreciation to be so widely separated from scientific appreciation as the speaker had implied, for in looking at a beautiful picture that man will derive the greatest pleasure who knows most of the factors contributing to the beauty of the scene in nature. Take, for instance, calves feeding: the more a man knows about the anatomy of calves, the more pleasure will he feel in viewing the scene, for "to him that hath, much is given," is universally true. Those airs in music which have built themselves into the lives of nations do not in all cases yield to the canons of musical composers, and sometimes even violate such canons, yet they play a more powerful part in the national existence than far more

ambitious compositions. They touch that part of our nature which relates to our earthly environments. Only a few men can appreciate that which is above the passions of earth, and above the ordinary facts of life. He thought that in art some absence of detail leaves the mind free to play, and to fill in the detail for itself: and as there is pleasure in working the mind, so is there pleasure in working the muscles of body: both demand exercise. When we feel pleasure in looking at a fire at Christmas time, is it not because the imagination builds castles in the glowing coals?

Mr. Clark thought it was because the weather was so cold. If the exercise of the imagination were so good, why not suspend plain mounts in frames, and leave the imagination to fill in the whole photograph?

Dr. C. S. Patterson remarked that, in gazing at a picture, one must get an idea of distance, and although the gaze may be concentrated on the principal feature, in nature the other things are there also. He thought that there was an artistic position midway between chaos and too much detail.

The Chairman felt that he must make some remarks, simply because he was in the chair, otherwise he should have preferred to keep silence; for although he was a diligent student of art, he considered himself no more than a student. He thought one class of photographers to be trying to imitate the conventionalities of the old masters.

Mr. Davison wished to know where that had been done.

The Chairman replied that they quote old masters, therefore they set them up as the standards of what truth ought to be. The camera gives the details of things as they are, and that is really truth; this new photographic school is trying to give suggestions of truth, and not the truth itself. He was not singular in saying that any part of a picture which is "fuzzy" produced a painful impression upon him, and he maintained that art which gave him a painful impression was bad art, and had nothing to do with soul, though it might have to do with argument. He agreed that detail should not produce too much impression, but the corrective was not the introduction of fuzziness. If they took a photograph with anything out of focus, he maintained that it was a bad photograph, and that bad photography was not good art.

Mr. Hinton, in reply, said that Mr. Davison called him to task for the use of the word "soul," but he held that there is something in the nature of man which is outside the human senses, and that it is that something, which he called soul, which chiefly gives the pleasure derived from the contemplation of nature. He thought artists to be less creators than discoverers, and that they have the greater power the more they can lay bare the truth which they imbibe. He thought a cursory glance at a scene to be better than long study thereof, because after-influences distract the mind from that which first excited admiration. Imperfect music might be pleasant, but was it not educating the people to appreciate something more perfect? Was it not raising them to the state in which they would demand the whole truth? In photography we have, as yet, no standards to guide us, so the great masters who have gone before are at present our only means of reference: we may make use of them until we have better standards of our own, and then, perhaps, surpass the old masters. He did not regard photography as mechanical work, but as a means of reflecting the pleasurable impressions which nature produces, and in achieving the result, the mental impression is of more value than the visual.

East Dulwich and Peckham Photographic Society.

At the meeting on Friday, December 6th, Mr. F. W. Edwards was in the chair.

Mr. Thos. Cadett and Mr. Kirby were elected members.

Mr. Howson read a paper on "Enlargements and Contact Printing on Bromide Paper," developing specimens before the members. In addition he made an enlargement from a quarter-plate negative of the Vice-President, with the aid of an enlarging camera.

Two members having been proposed, the meeting closed in the usual manner.

London and Provincial Photographic Association.

At the meeting on the 5th inst., Mr. G. W. Atkins occupied the chair.

Mr. A. Cowan stated that the addition of carbonate of ammonia to a normal developer, either eikonogen or hydrokinone, caused development to be from four to six times slower. It produced a warmer image, but at the same time, the highlights were liable to be stained. He had not tried other alkalies.

Mr. J. B. B. Wellington said his experience was very similar: a green stain was frequently the result. This, however, could be partially remedied by increasing the bromide, which, of course, meant increasing the exposure.

Mr. J. J. Linsell gave a demonstration with the "spray pencil." The ink or colour is held in a small duct, a fine stream of air impinging on the edges of the duct causing the spray, a fine or coarse grain yielded, depending upon the sizeof the needle used along with the pencil. The air is pumped through a length of india-rubber tubing attached to the pencil; the opposite end of the tubing is connected with a small portable piston, worked by a treadle with the foot. Any of the moist water colours could be used; turpentine might be used as a medium, but not oil, as it clogged. The working of the pencil and its capabilities were shown, several sketches being executed very quickly; also a number of drawings was passed round that had been brought to the meeting as specimens, which were examined with much interest, noticeably a large head, which, it was stated, had been completed in two hours.

Mr. W. Prestwich remarked upon the facility the pencil gave, especially in the retouching of large pictures.

Mr. A. Clarke showed a celluloid film printed-out, which was very much stained: the stain was found to be on the film only, as by detaching a portion of it from the base the celluloid was quite clear.

Mr. J. B. B. Wellington spoke about the yellow stain caused by the soda developer, and passed round two negatives developed with, in one instance, ordinary washing soda, and in the other pure anhydrous soda, using sulphite in each case; the result with the latter was an image quite free from any trace of yellowness.

Sheffield Camera Club.

The monthly meeting was held on Dec. 6th at the Rooms, New Surrey Street, the President, Dr. Morton, in the chair.

An exhibition of lantern slides was given by the members, who, in addition to explainining what the slides were, gave particulars of the plates employed, exposure given, and developer used.

Mr. J. Hawksley was elected a member of the Society.

Coventry and Midlands Photographic Society.

December 4th.—Ordinary meeting. Mr. President Andrews in the chair, and a fair attendance of members.

Mr. Sturmey gave a demonstration of the cold bath platinotype process. Commencing by describing the printing operations, he remarked that he was in some doubt as to the success of his exposition that evening, as the papers on which his prints were prepared had been purchased over six months ago, and some of the prepared prints had been made more than a month; and further, that they had not been stored as directed in a calcium tube, but in that in which the paper is sent out, which had been kept in his dark-room without any special effort to prevent access of damp.

After a full description of the process, development was proceeded with, and all the prints—with one exception, which was over-printed—came up remarkably well.

In the discussion that followed, in reply to a question as to permanence, Mr. Jones stated that he had subjected a print by the process to some tests, such as boiling in dilute hydrochloric acid, without the image being affected, although the paper support suffered total destruction.

Many members expressed it as their opinion that the directions sent out with the papers were such as would deter many from availing themselves of the many advantages of the paper,

but after having seen the process demonstrated they would no longer be afraid to take it up.

Prints developed by the brush method were shown by Mr. Dew, who also detailed some experiences in working.

The PRESIDENT handed round a negative and also a print from an enlarged negative of the same, showing how an original which might be too thin to be of any use, as this one was, could be reproduced in a satisfactory manner.

HUDDERSFIELD PHOTOGRAPHIC SOCIETY.

AT a meeting held 4th December, Mr. W. H. CHARLESWORTH in the chair, Mr. H. M. SMITH, of the Eastman Dry Plate Company, gave a lecture on the "Method of Making Enlargements on Bromide Paper." He remarked that the permanency of a bromide print had many times been questioned, but he was of opinion that if the paper and the gelatine used were of the purest, and the various operations properly carried out, the bromide print would be as unfading as carbon or platinotype. Mr. Smith proceeded to make an enlargement from quarter-plate to 15 by 12, by means of one of Eastman's enlarging lanterns, using paraffin as the illuminant, though he explained that the lime or electric light was preferable, but not so much within the reach of all. Having successfully developed and fixed the print, the new Kodak camera was shown and explained, the principal advantages over the old one being a larger picture, better lens, and improved shutter.

BOLTON PHOTOGRAPHIC SOCIETY.

MONTHLY meeting held at the Baths, Bridgman Street, Thursday, December 5th, Mr. E. N. ASHWORTH presiding.

Mr. CHARLES J. P. FULLER read a paper on the "Attainment of Permanence in Silver Albumenized Prints." He considered that more prints faded from insufficient fixing than from anything else, and advocated the use of two hypo baths, as he found that hypo and silver, in certain proportions, formed an insoluble compound of hyposulphite of silver, which could not be washed out; but which, if it had been placed in a second bath, would have been dissolved.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting was held in the Masonic Hall on Dec. 5th, when a practical demonstration by the Secretary, Mr. E. BECK, on "How to Use the Optical Lantern," with special reference to the oxy-hydrogen limelight, was given.

The Lecturer said that members and the public generally had got a notion that the use of the steel cylinder was highly dangerous and difficult to manage, whereas it was really as safe, if not safer, than the old-fashioned gas-bag, and a deal more portable, and, if anything, easier to manage.

A goodly number of members' slides was passed through the lantern, and fully appreciated by the large number of members present.

RECEIVED.—From Messrs. Marion and Co., the revised and enlarged edition of "Johnson's Retouching," of which we shall give a further notice in a future number.—Mr. John J. Atkinson sends us his catalogue for 1889. The compilation of a catalogue now-a-days demands more consideration than of yore, owing to the many changes taking place in photography, and to this fact Mr. Atkinson attributes the long delay in the publication of this issue for 1889. Its contents, including a large amount of useful information, seem certainly to justify the delay.—MM. Gauthier-Villars et fils forward No. 6 of their admirable "Traité Encyclopedique de Photographie," by Dr. C. Fabre. The present part, like the first, consists of eighty pages, well printed on good paper, and embraces the subject, "Phototype Negatifs." The illustrations already reach the number of 458.—From Messrs. Cassell and Co. we get a souvenir of "The Dead Heart," containing the story, and thirteen illustrations by J. Bernard Partridge, W. Telbin, J. Harker, and Hawes Craven.

Answers to Correspondents.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper & Carter, 5, Furnival Street, London.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

D. O.—Having called once and now written again to the person named, we feel it is impossible to do more to help you in the matter. Let us hope, meanwhile, that our joint representations will be honoured in the way you desire.

A. F.—You cannot do better than take the course indicated in your letter of last week; further inquiries only confirm the advice already given. Why not send off at once two negatives by way of trial?

R. M.—1. Portraits of Daguerre and Fox Talbot were issued respectively with the YEAR-BOOK, 1881, and the NEWS of March 11th, 1881. From the circumstances of the case you can hardly expect to get one also of Joseph Nicephore Niépce. 2. We have heard of a film of dew on the lens suddenly obscuring the definition of a camera image, but never before of a butterfly persistently blocking the line of sight. Did you take him prisoner for wantonly interrupting your proceedings?

PLATINO.—Your hydrochloric acid may have contained free chlorine, and this latter have acted upon the platinum deposit. Only in this way can we account for any notable solvent effect upon the print.

F. GOW.—Collotype in hot climates. Having taken counsel with two of the most eminent authorities, both agree in saying that your chances of success are very slender. Colonel Waterhouse, we are informed, finds it almost impossible to work the collotype in India, and the difficulties would be equally great in South Africa. The temperature of an English summer limits the production to a very few copies from each plate, or even stops the work altogether.

J. B. B.—Gold toning reversed. There is no novelty in your suggestion; the late Mr. T. H. Hennah, of Brighton, described in 1884 such a mode of proceeding. The paper was treated first with the double chloride of gold and sodium, dried in the dark, then floated or washed over with nitrate of silver, and printed. Plain hypo was then used for fixing, no toning being required. The neutral black tints were much admired, but they were produced at the expense of a largely increased amount of gold. Results similar in appearance, and equally permanent, may now be got with platinum at cheaper cost.

INSURANCE.—Some offices will not accept photographers' risks on any terms; you might apply to Mr. Guy Pym, North British and Mercantile Insurance Office, 8, Waterloo Place, S.W., who gave us fair terms six months ago for a correspondent who wished to cover for fire insurance.

B. C.—Received your letter. We shall be happy to make enquiries, and report the results later on.

H. B.—Received with thanks the book of experiments, dated 1844, which contains matter of very great interest. Some of the results appear to be well worth publication, and on this point we will advise you when we have had time to digest the particulars.

ZINCO.—Imitation steel engravings. We see nothing marvellous or novel in the American paragraph, for a machine calculated to "make lines as fine as 125 to the inch" (*square inch* stated in error) is not one of extraordinary delicacy now-a-days. Why use a machine at all, since the lines or reticulations are so easily got by the well-known device commonly used in photography?

S. S.—Prints by development. Try citrate of soda in conjunction with the chloride salt; there is no bromide, for, as you say, the yellow colour would in such case be apparent on sensitising. We wish you success, and hope to be favoured with details of your new direct printing process.

SUBSCRIBER.—The subject is already within the programme of the Photographic Section of the London Chamber of Commerce, and in their hands it had better be left.

A. D. H.—Nothing further occurs to us than the suggestion already given to you by letter this week.

F. P.—The idea is a good one, and we should advise you to move in the matter at once.

G. W. A.—Letter received.

THE PHOTOGRAPHIC NEWS.

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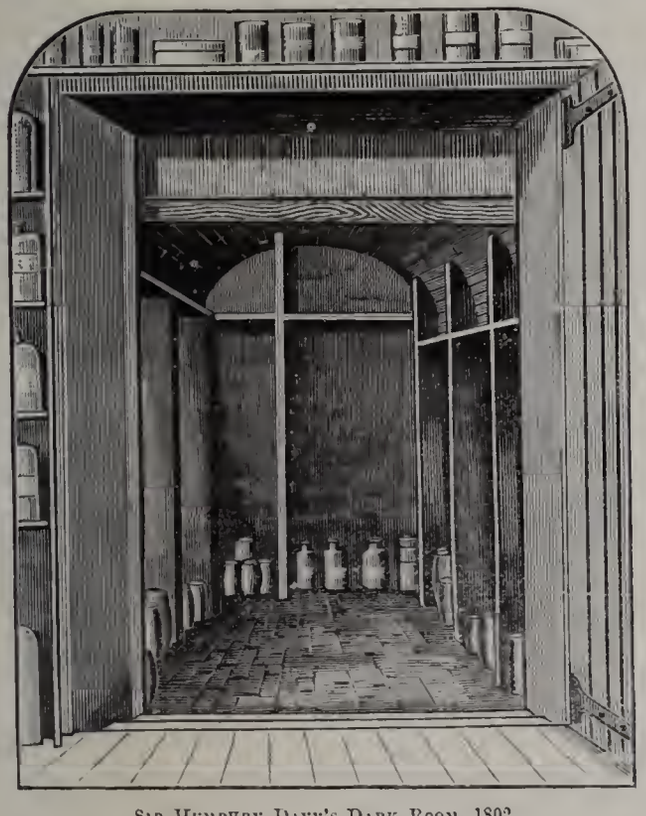
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THE ROYAL INSTITUTION.

III.

In our last, the original paper in relation to Thomas Wedgwood's photographic discoveries published in 1802 was given in full. Whether the published memoir was written by Wedgwood or by Davy is not clearly apparent, for in one part of it Wedgwood is spoken of in the third person, and the title asserts the paper to contain "observations" by Sir Humphry Davy. Robert Hunt assumes part of it to have been written by Wedgwood, and part of it by Davy; indeed, he adds Davy's name to one paragraph in it, but the name is not so added in the original. The probability is that the whole memoir was written by Davy, who was in the habit at that time of writing long abstracts of lectures delivered at the Royal Institution.



SIR HUMPHRY DAVY'S DARK ROOM, 1802.

One thing is clear, and that is, that Davy repeated the experiments of Wedgwood, and made photomicrographic negatives in 1802 by Wedgwood's process. The assumption is reasonable that he tried the experiments in his own laboratory, which is still intact at the Royal Institution; also, that if he wanted a dark-room he had one handy, in the shape of a kind of cellar with its door opening into his laboratory. Hence engravings of this dark-room, and of his laboratory as they are at present, are published in these pages to-day. The tables represented in the picture of the laboratory are those used by Davy; another table now in the laboratory, but of more modern construction, is omitted in the cut on next page.

The larger laboratories at the Royal Institution are of recent date; even Faraday's laboratory was abolished to allow space for the one of which we recently gave a pictorial supplement.

The two pictures accompanying the present article represent in all probability those rooms in which Davy tested Wedgwood's photographic process in 1802.

Beyond what was published in these pages last week, little or nothing is known about Wedgwood's photographs. Miss Eliza Meteyard, in the second volume of her life of Josiah Wedgwood,* makes the following statement about Thomas Wedgwood:—

> His father, as early as 1774, had used the camera obscura in taking views for the Russian service; and Dr. Turner of Liverpool, as it was well known, had either invented or brought to tolerable perfection the art of copying prints upon glass by striking off an impression with a coloured solution of silver, and fixing them on the glass by baking on an iron plate in a heat sufficient to incorporate the solution with the glass. With knowledge thus obtained and observation directed, it amounts to absolute certainty that Thomas Wedgwood, during some of his experiments on the production of light from different bodies by heat and attrition,† made certain discoveries, which led practically to the first principles of photography. He advanced so far as to throw objects on paper prepared with the nitrate of silver, but neither at that date, nor in

* London, Hurst and Blackett, 1866.

† Published in 1791-2. *Phil. Trans.*, vol. lxxxii., pp. 28, 270.

subsequent experiments with Sir Humphry Davy, could a method be discovered to fix them there with any permanence. The impressions were even at the first faint, and lapse of time has almost obliterated them. But enough remains, as in the engraving from a breakfast-table scene from one of these early pictures, to prove the truth of the tradition handed down, that Thomas Wedgwood was amongst the earliest discoverers of photography, or, as it was then called, heliotype. This and another "silver picture" which remains* are wholly different in every respect from the so-called photographs from Soho. The latter were with much probability the product of some of Egginton's water-colour processes; whilst those from Etruria are evidently due much more to scientific or chemical manipulation than to art.

In her book Miss Meteyard gives an engraving of the aforesaid breakfast-table scene, copied from an alleged early photograph; but as the picture is a positive one, there can scarcely be a doubt it was not one of the pictures taken in 1802, which, moreover, were not fixed. In a letter we have just received from Mr. Hensleigh Wedgwood about his Uncle Thomas, he expresses anything but faith in the antiquity of the photographs spoken of by Miss Meteyard. He also says:—"I never knew Thomas Wedgwood, being only two years old when he died in 1805 at the age of 34, after his short manhood of wretched health." Some additional particulars about Thomas Wedgwood will be found in an article by Miss Julia Wedgwood, in another column.



SIR HUMPHRY DAVY'S PHYSICAL LABORATORY, 1802.

The first person who noticed that certain substances change colour when exposed to light cannot be called the first photographer, because, for instance, the phenomenon has always been known to the fair-skinned races who become browned in summer by the action of sunlight. In the Age of Bronze or Stone, if the men were too savage to observe such trifling facts, in the midst of their fierce fight for existence, it may be taken for granted that the women displayed no such negligence, but that the beauty of the tribe took careful note of the circumstance when contemplating her features in Nature's looking-glass, the water-mirror. There is no record to solve the problem to what extent our prehistoric forefathers in these latitudes knew the colour of their own skins, for the chronicles state not to what extent they performed ablutions, or whether, instead thereof, they indulged in an occasional scrape. The person who first noticed that the skin of the face did not darken in sunlight in those parts covered or shaded by a head-dress, came nearer to the discovery of photography, or "delineating by light"; but unless he, by such means, intentionally produced a design of some kind upon the skin, he cannot be said to have been the first discoverer of photography. The man who first intentionally produced a delineation of any diagram, letters, maps, picture, or other design by means of light was the first photographer, and, so far as at present known, that man was Schulze. See the historical facts in another column, made known by Dr. Eder.

* Representing a man playing a bagpipe. Both are very faint, so much so that in making his drawing of the breakfast-table, the artist had to use a lens.—ELIZA METEYARD

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.—Shawbury Hall, Lordship Lane, has been engaged for a members' lantern display this (Friday) evening; and in the same building the first exhibition of the Society will be held on January 3rd, 1890.

PYROCATECHIN.—Pyrocatechin is a feathery substance of light straw colour, and with a strong odour of carbolic acid. It dissolves readily in water, and is said to be fifteen times the strength of hydrochinone—which we doubt, though the writer developed successfully a 6½ by 8½ plate in a solution containing only one grain of pyrocatechin. The normal developer made with carbonate of potash works a trifle slower than a normal pyrogallol developer, and gives less density, but produces negatives of crystal clearness in the shadows, and of fine printing quality.—F. K. MORRILL.

THE PROGRESS OF QUINOL DEVELOPMENT.*

BY ALFRED MASKELL.

I address myself primarily not to the workers of great experience, of whom our body happily numbers not a few, and whose patience and indulgence I have to deprecate, but to those less experienced in the art, to whom the method of development by hydroquinone is more especially valuable. By these I do not mean what are known as the merest tyros, or those whose elementary knowledge is so limited as to cause them to propose the wonderful questions which we find in the query columns of the photographic papers, but rather those members who have reached a certain position of skill, and who find in the method of pyro development difficulties which, with their limited practice, they have not the means easily of overcoming. I do not hold the opinion that photography cannot or should not be taken up unless as the serious purpose of one's lifetime. There are many to whom it is a relaxation and enjoyment now and again, and whose other avocations, and perhaps even want of sufficient ability, prevent them from taking high rank—perhaps they do not desire to do so—in the art. I will go so far as to say that I do not even needlessly sneer at the kodakist who has his films developed and prints made by Eastman—not, indeed, that I have to teach him anything. I think that if there is one person more than another who should be gifted with charity towards his fellow-workers, it is the amateur photographer, and I am happy to say that, as a general rule, he exemplifies that virtue. I have also thought it advisable to exhibit a few specimens of the products used in this method of development; it is possible that they may not be without interest and value to some here present. It is sometimes taken for granted on the reading of papers in this room that every one present is already, to a considerable extent, informed concerning the subject; but taking, for instance, the last two papers read, I know that there was at least one who had no general idea concerning orthochromatic plates, and another last week who had given up photography some five years ago, and to whom films were an unknown quantity. I have seldom heard here a more interesting and practical paper than Major Nott's, but to one at least of his hearers he must have appeared to be indulging in some very clever juggling; sleight-of-hand it undoubtedly was.

Several excellent papers on the subject we are now considering have been read before various societies during the present year, notably by Mr. Swan, before the Photographic Society; by Mr. Cadett, by Mr. Wilson Noble and by Mr. Lyonel Clark, whose incidental remarks in his paper on a comparison of developers, read at our conference in March last, were especially valuable, and I think he will have seen little reason since to alter the opinions he then expressed except his conclusion, for I venture to think that when he considers the valuable aid which can be contributed by hydroquinone in its place among developers, and the special cases in which it is undoubtedly useful, he will no longer in such strong language advocate for it a bag-and-baggage policy, or predict that its reign or residence amongst us will be as short-lived as the restoration of the Stuarts. In the preparation of the remarks which I have now the honour of placing before you, I desire to acknowledge the valuable assistance which I have had the pleasure of receiving from several gentlemen, amongst them Messrs R. H. Robinson, Wilson Noble, Andrew Pringle, Dresser, Corbould, Willis, and Rogers, who, in the kindest manner—some of them under serious stress of other business—found time to write lengthy replies to the questions I had put to them. To some of their remarks I shall refer in their places as occasion arises. Mr. Davison's obliging assistance, it is hardly necessary for me to state, has been freely given to my great advantage. I must also gratefully acknowledge the very kind manner in which Messrs. Mawson and Swan placed at my disposal the products on the table, and the collection of illustrative negatives which I shall later on endeavour to assist you in examining. I will now proceed to address myself more particularly to the matter in hand.

Historically considered, to state briefly the most important points, I find hydroquinone mentioned under that appellation in Miller's "Elements of Organic Chemistry," edition of 1862, where its various qualities are described and noticed. It has been used medicinally, and it may interest you to know that it is a powerful antiseptic, and produces stupor in frogs; also that, in large doses, in man it causes symptoms of intoxication. It has been employed locally in diphtheria, also in cholera. Captain Abney, president of this club, first brought this product under the notice of the Society of Arts in a paper read before that body in the year 1882. As a developing agent, hydroquinone took a fresh departure in France at the end of last year or the beginning of this, and the early accounts heralded with a flourish of trumpets this, to that country, new re-agent as possessing in an increased degree all the distinctive qualities of pyro or iron development, and none of their defects, together with other astounding qualities and claims which, too hastily advanced, soon proved chimerical, and were destined to be speedily exhausted. The first notice which I find of the use in France is in the *Amateur Photographe* of January 18th, 1888, which gives an account of a *seance* of the Société Française de la Photographie. At that *séance* M. Balagny proposed his formula, which I shall presently again refer to, as it appears to me to be practically identical with the one now used and approved by the Photographic Club of Paris. Shortly afterwards it is said that it was impossible to purchase a grain of quinol in Paris at any price. The remarkable success which this developer still continues to retain in France and throughout the Continent is very striking: it has been attributed to its having supplanted in those countries the less effective iron developer which previously had been in vogue rather than pyro. But I would venture to suggest whether the make of plates may not have something to do with the question, and whether in the experiments made in this country, and conclusions consequently arrived at, this element has been sufficiently taken into consideration. Be that as it may, it is not the only question in which we maintain our attitude of difference with the rest of the world, and, so far as experiment in our own country gives us data to form an opinion, we have in this case sufficient reason. The early trials in England aroused very soon a considerable amount of antagonism; pyro was not to be allowed to be so easily dethroned. The new developer was, in fact, treated with a certain amount of contempt and disdain. It was spoken of as a feeding-bottle developer, and with other derisive epithets; very unreasonably, I think, the reason probably being that in the easy task of demolishing the pretentious claims which had been put forward with such an air of charlatanism, the many valuable qualities of the new re-agent were not treated with the deference they deserved,

* Read at a meeting of the Camera Club.

I think that even now it is possible that sufficient justice has not been done to it by experimentalists of repute. At any rate, it has not had the continued study of years which has placed pyro in the position which it occupies. Hydroquinone, as many of you are aware, may be distilled from quinic acid, which is obtained from quinine bark. It is nearly akin to pyrogallic acid, the symbol of the one being $C_6H_6O_2$ and the other $C_6H_6O_3$, differing, therefore, by having one equivalent less of oxygen. The name is somewhat long, but it has another, which is still more of a mouthful, this being paradi-hydroxy-benzene. I do not like either of these. I prefer quinol, certainly in writing, but somehow or other, in conversation, I find myself always using the term hydroquinone. The term quinol is one upon which chemists split hairs concerning its accuracy, but it has come to be accepted, and will, I fancy, remain so. I exhibit specimens of the various qualities supplied in commerce. All come from Germany—that is in the order of things to-day—except one, which is manufactured by Messrs. Hopkin and Williams, and is of a very pure quality. So far, however, as my experience goes, the question of extra purity is not of great consequence. The quinol used in the preparation which I prefer is not of great purity, I believe. In its chemical aspect, I refer those who are interested to the papers on the value of hydroquinone in the *British Journal of Photography*, by Mr. Levy and others; probably, however, those who are likely to be interested are already sufficiently acquainted with the matter. The alkalies used are the carbonates of soda, potash, and ammonia, and the hydrates of potash and soda, with sulphite of soda as a preservative, or potassium metabisulphite, and potassium bromide sometimes as a restrainer. The purity of the carbonate and sulphite of soda is a matter of great importance. Ammonia was at one time used as the alkali, but it is not successful, and a good deal of the unpopularity of this developer may perhaps be traced to this and to the impurity of the components subsequently used.

The formulæ employed for the developing bath show a very remarkable discrepancy, varying from half a grain to as much as six or more of quinol per ounce of developer, and the alkalies from two to twenty or more grains per grain of quinol. I shall not weary you with accounts of a large number of these. You will find in *Anthony's Bulletin* a tabulated statement of a sufficient number to stagger you, an accident which it is not worth while risking for the result to be obtained. I shall, however, presently mention some five or six, in which, to take the quinol for instance, the quantity varies from 40 to 360 grains per twenty ounces of developer. Mr. Clark mentioned—he was referring to bromide paper—that it is almost impossible to get more than a shadow when less than one grain of quinol is used.

Before proceeding to re-examine with the light, I hope, of nearly a year's experience before us, the advantages and disadvantages claimed for and urged against this developer, I will, so far as I am personally concerned, lay it down as an axiom that, in the hands of an experienced operator, better results—especially in difficult cases—are to be produced in the development of a negative by pyro development than can be produced by quinol development. By negative I mean one from which to print for ordinary pictorial purposes. Throughout the remarks, therefore, which I have still to make, I wish this axiom to be always borne in mind as a reservation.

I am now prepared to make the assertion that, admitting the superiority of results, that superiority is very small, and that except in the hands of the most experienced workers, when we consider the requirements of those less experienced, it is counterbalanced by the greater ease of working, and by other advantages which I shall presently proceed to notice. But I wish to be distinctly understood: all methods of development are good to those who can produce the best results from them, and it is only to those who fail often with pyro, and will always continue to fail often—and they are the vast majority of amateur photographers—to whom I say, try hydroquinone. You ought never to have any disastrous failures. The method of success I shall also endeavour to show.

(To be continued).

EIKONOGEN PORTRAIT DEVELOPER.

BY D. BACHRACH, JUN.

WHILE I have never been in a hurry to rush into new things on their first much-heralded excellence by interested manufacturers or hasty enthusiasts, I invariably give them a trial, and, if promising, would give them a practical test in every-day work in the studio. It was after such a test that I discountenanced the use of hydrochinone (in preference to pyro) as a developer for portrait negatives, while I recommended it for out-door work or any purposes where contrast and strength were desirable.

My judgment has been confirmed by the majority of workers, despite the hasty snap judgments of the inexperienced few—and I even received several columns of abuse from a very hasty, though well-meaning young man—and the result has been that very few, indeed, abandoned their old friend pyro.

But, after similar careful tests of the new agent "Eikonogen," I can cordially recommend it as possessing several advantages over pyro for portrait negatives. And for the very same reasons that give it that advantage for portrait work, it is not quite so well adapted for landscape work, except where great delicacy is desired at a sacrifice of strength, and, of course, it has still less advantages for copies or process work.

For the latter purposes, however, its property of maintaining clear glass shadows in the blacks, when well restrained with bromide salts, may bring it into practical use, provided that strength can be secured without sacrificing this property.

But it is of its advantages as a portrait developer that I wish to speak in this article. The published directions given with the boxes are generally correct, except that for normal exposures, no additions of hyposulphite of soda, &c., are necessary. In fact, even for extremely short exposures such measures are of doubtful utility, and it introduces elements into the developer that are anything but beneficial.

Simple formulæ should be adhered to whenever possible. I would also caution workers that it is extremely difficult to get sufficient intensity with carbonate of soda, while carbonate of potassium gives plenty of printing strength. My practical success is entirely with the latter salt.

But to me the greatest advantage I find to be in the delicacy of detail that it enables me to retain in the highlights of a negative, along with good printing depth. This quality is absolutely wanting with hydrochinone, except in rare conditions, and is only partially present in the negatives developed with pyro. This advantage is parti-

ally due, I think, to the colour of the deposit, which is closer to that of the collodion wet plate than any developer yet introduced.

And another advantage—and that not a small one—is, that by using a freshly combined developer, with a suitable amount of bromide as a restrainer, negatives for solar printing closely resembling those obtained on wet collodion plates can be easily produced. This has heretofore been all but impossible, and it will rejoice many of those who do not make large direct negatives, and yet have no favour for the bromide enlargements of doubtful permanence, generally disagreeable tone, and difficulty in thorough finishing, on account of the hard gelatine surface. For these, such a developer has been a desideratum for a long time. Most of the negatives developed with eikonogen will make good platinotype enlargements, unless they have been much over-exposed or carried too far in development.

These views are the result of practically working the developer for some time, and are not hastily formed.

Some old developer should always be used to mix with the fresh for the day's work, or else a good addition of bromide salts, when the former is absent. At present I have no modifications to suggest to the published formulæ.

I must here explain that my successful results were with "Seed" plates 23 and 26 sens., "Eagle" 40 sens., and Carbutt's "Special" 25 sens. (as marked by the manufacturers). At the same time (on two occasions) I used Cramer plates 30 sens., but did not get a good result on them, the images being flat-looking, over-exposed. Now it does not follow from this that the eikonogen developer is unsuitable for them, although I cannot imagine that Cramer's 30 sens. plates are much more sensitive than Seed 26, or Eagle 40; but it may be that *much less* alkali or *more restrainer* is wanted for those plates to give brilliancy. This developer will, no doubt, give an impetus to a gradually growing sentiment that plates of extreme sensitiveness are unsuited to general work, particularly as it gives more delicacy in the high-lights, a thing heretofore lacking when a slow plate has been less than very fully exposed, and yet retains the brilliancy and clear shadows usual with such plates.

And here I must again give vent to my feelings of vexation and contempt for our dry plate manufacturers who persist in marking the sensitiveness of their plates by such entirely different methods, thus confusing the workers by their endeavours to show such great sensitiveness, on paper, for their plates.

Do they not know that nearly all intelligent photographers already see through such methods? Why not adopt the well-known "Warnerke" scale as a uniform measure of sensitiveness for *all?* It would save us all much vexation and annoyance, and I can assure them it would not cost one of them the sale of a single plate.—*Wilson's Photographic Magazine.*

Newcastle and Northern Counties' Photographic Association.—The ordinary monthly meeting was held on the 10th inst., when a series of over one hundred slides was shown by means of the lime-light lantern. A committee of eight gentlemen was formed to carry out arrangements for an exhibition of photographs, to be held in Newcastle next spring, when it is the intention of the Association to offer a number of medals for competition in various classes.

THOMAS WEDGWOOD.

BY JULIA WEDGWOOD.

If the opinions formed by contemporaries eminent in the most various departments of life be any guide to what is remarkable in character, Thomas Wedgwood must assuredly be described as a remarkable man. Although ill health ended his school life at the age of seven, and narrowed the compass of his active life into a space considerably less even than the thirty-four years (1771-1805) which he passed in this world, he yet left an impression which might have commemorated a long career of genial activity. I give a few quotations to justify this assertion.

"In the year 1793," writes Mrs. Shelley, "Godwin cemented his acquaintance with one of the most generous, the most amiable of men, Thomas Wedgwood, of Etruria, a name dear to all who reverence truth and goodness." "Your opinions," Sir Humphry Davy tells him in 1803, "have been to me as a secret treasure, and have often enabled me to think rightly when otherwise I should have perhaps thought wrongly." The poet Campbell thus describes him to Dr. Currie:—"You may have heard of Thomas Wedgwood, son of the potter, a strange and wonderful being, full of goodness, benevolence, with a mind stored with ideas, with metaphysics the most exquisitely fine I ever heard delivered; a man of wonderful talent; a man of taste, acute beyond description, with good nature and mild manners." Another poet writes of him in a strain which conveys more of personal feeling:—"When your brother entered the room," wrote Wordsworth to Wedgwood's brother Josiah, "I was quite heart-stricken; he was deplorably changed, which was most painful to see, but his calm and dignified manner, united to his tall person and beautiful face, produced in me an impression of sublimity beyond what I ever experienced from the appearance of any other human being."

I will close this list of tributes with a recollection of my own. In the year 1849 I was taken within the classic precinct of Rydal Mount, and after the visit to Mr. and Mrs. Wordsworth, as we left the house, a bath-chair drew up containing the frail and bowed figure of the poet's sister. I remember well the glance of her "wild eyes," and the sudden awakening of interest at the sound of my name, though she had then passed into that phase of mental decay which closed her life. I knew then so little of Thomas Wedgwood, who is my great-uncle, that I did not at the moment fully take in the reason of her interest in me, and the few words she said of him have escaped my memory; but the sudden distinctness, almost as of a spirit returning from some far off region, with which she asked, "From whom are you sprung?" remains in my mind as not the least impressive tribute to him; though he is thus commemorated by some illustrious contemporaries. His friendship with Coleridge is well known, and if the poet be believed, the pecuniary benefit which he derived from that friendship was only a part of his debt. It is impossible to justify the impression thus chronicled, but it is in itself a fact worthy of record.

The only writing of Thomas Wedgwood ever known to the printer—we cannot say the public—is preserved in the "Philosophical Transactions" for 1792. It consists of two papers read by Sir Joseph Banks to the Royal Society of the preceding year "On the Reproduction of Light from Different Bodies by Heat and Attrition." The chief interest of the little tract now lies in the testimony it gives of the value of an alliance of science with

the arts. The manufactory of the Wedgwoods was to the speculative mind of Thomas less a source of wealth than a laboratory where chemical experiments went on before the eyes of busy workers, and were forced on the attention of interested spectators. But this, his only printed work, has also a biographical interest. There is something pathetic in the spectacle of one for whom the struggle with disease was to be almost the only occupation, hurrying, as it were, into the world of thought at an age when the routine of instruction is generally still unfinished, and hastening to fling his little contribution into the treasury, as if aware of the foe that dogged his footsteps, and was soon to occupy his whole energies. His interest in chemistry must have been remarked at a very early age, for in the papers from which these remarks are compiled there is a letter from Erasmus Darwin, author of the "Botanic Garden" (whose son afterwards married Thomas's sister) giving a set of directions for some family picture which, apparently, never was painted, and announcing that "little Tom is to be jumping up and clapping his hands at the sight of some chemical experiments." Chemistry was at that period—the last quarter of the eighteenth century—entering upon that productive and fascinating stage when, disengaging itself from the admixture of spurious metaphysics which is apt to render turbid the earlier course of a science, it emanates in its first sparkling clearness; and the occupation of the elder Josiah provided the new study with illustrations of the most practical and interesting nature. It was to his chemical assistant in the pottery, a Mr. Alexander Chisholm, that his son Thomas seems to have felt himself most largely an intellectual debtor, and it was doubtless the taste thus acquired which led the youth, at the age of sixteen, to beg that he might be sent to Edinburgh University, then enriched by the teaching of Professor Black, who has been called by a countryman (Sir James Mackintosh) the father of modern chemistry. The most important fact in his Scotch sojourn was the friendship to which it gave rise with his instructor in mathematics, Mr., afterwards Sir John, Leslie, and the dedication of his treatise on Heat to Thomas Wedgwood conveys so much information about him that, as the book is not read now, it seems worth copying here:—"In presenting this volume to my best friend, I feel the satisfaction of having at least in part discharged an obligation which springs from the sense of duty. To you principally it owes its birth. By your counsels and generous encouragement I have obeyed an early impulse, resolved to cherish the spirit of independence, and devote my life to the attractive pursuits of philosophy. I prize it as the highest distinction to have so long shared your affectionate esteem. Ever shall I deplore the cruel interruption of your eager career. You have had to maintain a continued struggle with that languid state of health which is but too often the companion of genius and exquisite sensibility. Happily your mind, superior to the oppression of pain, still preserves its native lustre; you take the same interest in all the various concerns of humanity, and anxiously seek to promote whatever may eventually contribute to the improvement of our species. . . . . If this work shall obtain your approbation, I may dismiss all solicitude for its reception with a discerning public." If the eulogy cannot be called quite disinterested (for Leslie was Wedgwood's pensioner), it was unquestionably sincere, and the feeling thus expressed was mutual to a considerable extent. The tutor was only five years the senior of his pupil, and from the tone of the letters which remain—Wedgwood's share in the correspondence being unfortunately lost—we should imagine the difference of age the other way. Their studies were pursued beyond the two years which Wedgwood spent at Edinburgh; Leslie followed him to Etruria in 1790, accompanied him in a tour in Germany and Switzerland in 1796, and remained his friend through life.

The friendship had to pass through an ordeal which it is a tribute to both parties to have endured. On the death of the elder Josiah, the two brothers, united in every desire throughout their joint life, begged Leslie to undertake their father's biography. He spent two years in the attempt, and the result was a production which the brothers could not use, and about which they could not say one word of commendation. It must have been a poignant mortification to Leslie. That it occasioned no coolness between the friends was due to the delicate considerateness of Thomas, whose respectful sympathy softened the cruel blow. He took this opportunity of presenting to his friend a valuable collection of mathematical books, as though anxious to compensate him for the wasted time spent on this unfortunate endeavour, and it is evident from Leslie's letters that he succeeded in soothing his wounded feelings and avoiding the alienation which, with a less gracious nature, would have been inevitable.

The accident of Leslie's letters having been all preserved makes him almost the chief referee for any facts in a life so short and eventless, and ended so long ago. Thomas Wedgwood was never married, and the strongest feeling of his life seems to have been his affection for his brother, with whom he lived for the most part on their estate in Somersetshire, so far as his miserable health permitted him to have a settled home; his connection with the works, after his father's death, being merely nominal. The latter part of his life was a series of journeys in a vain search of health, and other devices to escape the miseries of some mysterious disease which, to judge from the record in his own letters, seems to have oppressed the mind as much as the body. "I have had many painful conflicts of mind," he wrote in 1802, "from imagining that I had only to forget that I was an invalid to be like other people, and get well." "Sickness" he elsewhere quotes Dr. Johnson as saying "makes scoundrels of us all;" and adds his own mournful corroboration, "it impairs and destroys sympathy. But feebleness of constitution and spirits is not the only obstacle; I have to contend with a timidity of disposition which has long harassed me, and which in a thousand ways is obstructive to the growth of an entire intimacy." This feeling seems to have been entirely confined to himself; perhaps the very sense of his own danger of self-occupation precluded its triumph. At any rate, there is no sign in any papers that remain of any friend of his having felt a moment's chill. Few men can have been more loved and mourned. None who have done so little ever can have left a more vivid impression of a striking personality on men who knew all that was most striking in their own time.

A Police Studio.—The *Photo. Zeitung* gives an account of a police photographic studio in Hamburg, which has been in operation about a year. It is situated in the town hall, and has its own corps of operators and a full set of apparatus. A Voigtländer lens which permits exposures of about two seconds is used. Business seems to be brisk, inasmuch as 210 exposures are sometimes made in a week, and the results are said to be very useful.

PHOTOGRAPHY IN GERMANY.

BY HERMANN E. GUNTHER.

Magnesium Lamp—Photo-lithographic Transfer Paper—Local Intensifying and Reducing—Eikonogen Developer—Keeping Water Colour Paintings—Reproduction of Negatives.

A New Magnesium Lamp.—At the last meeting of the Verein zur Förderung der Photographie, at Berlin, Dr. Miethe presented a new magnesium flash lamp constructed by himself, with which no explosive mixture, but pure magnesium powder is used. The lamp consists of a single Bunsen burner, into the flame of which the magnesium powder is blown upwards by the aid of a pneumatic ball. At some distance over the opening of the Bunsen burner a circular disk of sheet-copper is fastened, which is inclined forwards at an angle of 45°; when the pneumatic ball is pressed, the magnesium powder is driven against this circular disk, by which it is dispersed in all directions, and so complete combustion is effected. For portraiture two lamps are combined by means of a bent tube, and each of them is provided with the requisite charge of magnesium powder; the two flash lamps are then lighted by a single pneumatic ball. Dr. Miethe declares that he now gives up his and Gädicke's previous principle of the explosive magnesium mixtures, for the reason that with the latter, the surface only of the flame is active, which is itself very opaque. Consequently the magnesium burning in the interior of the large explosion-flame will be lost for the effect of the light, whilst with the pure magnesium flash light almost the whole charge is utilised. With the latter a much smaller quantity of magnesium is therefore required.

New Photolithographic Transfer Paper.—We are informed that a new photo-lithographic transfer paper will be shortly introduced by Prof. Husnik, which he calls "Husnik's Reproduction Enamel Paper." The new paper is provided with a strongly hardened gelatine film, which consequently swells but very slightly, and therefore gives only a very flat relief in the copies, this being of great advantage in developing. All photo-lithographic transfer paper is subjected to the inconvenience that the copies, if damped before development, show a high relief, the lines of the image being deepened, the ground relieved. In developing, the sponge cannot enter into the depths of the smallest points, and for this reason the latter appeared always comparatively larger than in the negatives; consequently in the case of fine photo-typogravures, produced by the aid of a grained or stippled screen, where the lines are placed very closely together, the lights as a rule were too dark and impure, lacking half-tones and gradations. It has been found that this is caused entirely by the fact of the relief of the transfer paper being too high. The new hardened gelatine paper, giving only a slight relief, entirely obviates the defect mentioned, and is said to gives besides better results than the so-called chrome-albumen process, the development rendering every point, even the finest one, according to the character of the negative. Professor Eder, who has tried the new transfer paper, asserts that it is, with regard to the fineness of the lines, very well suited for the production of photo-lithographic transfers, and that it gives off the colour in transferring without any difficulty.

A New Method of Local Intensifying and Reducing the Negative.—The following original process of local reduction of a negative is recommended by Herr Anton Einsle in the last number of the *Photographische Correspondenz*. After development, the negative is allowed to drain for about five minutes, when it is placed in clean water for five minutes, then removed, and the superfluous water taken off with blotting-paper. The plate is then placed in a dark-slide, and the whole arranged horizontally above a looking-glass, or any other source of light. Now, the too dense parts are by means of a brush touched upon with a solution of hypo (1 : 4), and sufficient of the solution is added to cover these parts with the solution about $\frac{1}{16}$th of an inch high. Now, by the aid of a pipette, a cold saturated solution of potassium ferricyanide is dropped on, which at once spreads over the whole portion, and reduces it very rapidly and uniformly. If sufficiently reduced, the plate is placed in a dish of water and thoroughly washed. In case of local intensifying being required, the negative is, as described above, placed horizontally, and the portion to be intensified is touched upon with a cold saturated solution of bichloride of mercury (about 4 : 100); sufficient of the solution is added to stand about $\frac{1}{16}$th of an inch high, and it is allowed to remain until the portion has turned white. The plate is then at once rinsed, and treated with sodium sulphite or ammonia.

Eikonogen Developer.—Herr A. Petry recommends in the *Archiv* a very simple and reliable method of preparing the eikonogen developer. In a sufficiently large vessel in 200 c.c. of rain-water at first 12 grammes of sodium sulphite, then 4 grammes of eikonogen, and finally 5 grammes of chemically pure potash are dissolved. The eikonogen, which should be added in small portions, is dissolved with difficulty; the large crystals should therefore be pounded by means of a glass rod on the bottom of the vessel. In this form the developer is excellent for instantaneous exposures and dimly-lighted interiors; for landscapes, twice the quantity of water may be added to it, and even then the time of exposure may be materially shortened, or the lens stopped down. In the case of over-exposure, potassium bromide or tartaric acid is to be added in the usual manner. This developer proves also very efficient in recovering old hydroquinone solutions, a very small quantity of it being sufficient to impart to the hydroquinone developer its former strength. Besides, the eikonogen solution transfers to the hydroquinone developer its best properties, namely, its energy in developing, and its freedom from fog.

New Mode of Keeping Water-Colour Paintings.—The following hint, which will be interesting also from a photographic point of view, has been given by Herr E. R. Liesegang, of Düsseldorf. As is well known, water-colour paintings fade so quickly that after some ten years the original colour-tone may be hardly discerned. If, however, the light, before it touches the painting, has to pass a fluorescent substance, a chemical action—or, in other words, a fading of the colour—no longer takes place. A suitable substance of this kind is a solution of sulphate of quinine, it being, however, injurious to the colour if applied to them directly; it is more practical to cover with this solution the windows of the rooms in which the paintings are kept. The solution is quite colourless by transmitted light, and therefore invisible from the interior of the room. This sulphate of quinine solution might, perhaps, also advantageously be applied in factories where sensitive paper, gelatino-chloride paper, or sensitised albumen paper, for instance, is prepared. For the sake of safety the window panes might be coated on both sides with the solution; but we have exposed to strong light a

piece of sensitised albumen paper below a glass plate, covered on one side with the quinine solution, and it remained almost colourless for about two days. It would certainly be a great convenience to be able to work in these factories in full daylight.

Reproduction of Negatives.—In the *Photographisches Archiv* the manipulations of reproducing negatives, according to M. Balagny, are described as follows:—1. A bath of potassium bichromate, 3 per cent. A gelatino-bromide plate is bathed in it for five minutes. Preferable to glass plates are flexible films, because these lie more smoothly in the printing frame. 2. By the aid of an india-rubber squeegee the film side is freed from the adhering liquid, the back being cleaned with a moistened sponge. 3. The film is allowed to dry in the dark. 4. It is placed in the printing frame on to the negative, like albumen paper. 5. Exposure, five minutes in the sun, one half to one hour in dull weather. 6. The plate is removed from the printing frame by red light, placed in water, and the latter changed until all the chrome salt has been washed out. 7. The plate is taken out of the water, and, film side up, placed in a glass dish. 8. It is for about one half minute exposed to the light of a gas flame at a distance of about twelve inches. 9. The picture is developed with old ferrous-oxalate or hydroquinone developer, and must be finished in ten minutes. 10. It is rinsed with water, then bathed in a 2 per cent. solution of citric acid for two minutes. 11. The citric acid is removed by well washing the plate. 12. Fixing is done with cyanide of potassium, 5 per cent., or hyposulphite of soda, 20 per cent. (fresh solution). Then the plate is washed and dried.

PYROCATECHIN DEVELOPMENT.

BY CLEMENT SANS.

The formula below gives remarkable negatives, greatly superior to those obtained with hydroquinone; they possess more clearness, more details in the shadows, no fogging, good modelling in the whites, which, remaining slightly transparent, produce all the details. They are strong, and finally, the exposnre is shorter and the violet blue-black tone is superb.

Rain water	60 c.c.
Solution of sulphite of soda at 40 per cent....	10 ,,
Solution of pyrocatechin at 1 per cent. ...	2 ,,
Solution of carbonate of soda, *and not of potash*, at 20 per cent.	3 ,,
Solution of caustic potash at 7 per. cent. ...	2 ,,

The image appears after a contact of about thirty seconds, and gradually becomes deeper in colour; it is finished at the end of from ten to fifteen minutes. If, owing to too weak light in instantaneous work, more time is necessary for developing, the plate may be allowed to remain in the bath for thirty minutes, and even longer. It will not fog. In case, or on account of this long sojourn, yellow spots, which appear metallic by reflection, should show themselves on the edges: these spots may be made to disappear almost instantaneously by passing over them a cotton tuft charged with a weak solution of perchloride of iron; after having slightly washed before and after, again fix. A greater quantity of the alkaline solution is useless. It might prove dangerous with some plates should the temperature of the developer exceed 15° Centigrade, because the gelatine film might become detached. With carbonate of soda *alone*, even using two or three times the quantity, the development is exasperatingly slow; it requires several hours, and the image is deficient in harmony; it is hard, and lacks details. The caustic potash causes the rapid appearance of the print with all the qualities mentioned above. The sulphite of soda, preventing the colouration of the bath, maintains the clearness. Two negatives may be developed, one after the other, in the same bath: a third would lack vigour. Although I have not tried old baths, I believe that kept in well-stoppered bottles they would do very well for portraits and time landscapes, as this developer has but little colour. My experiments were made with the plates marked "Phœnix" and "Lumière" *blue* label. These plates bear admirably the intensifier indicated below, when it appears necessary:—

No. 1.—Rain water	200	c.c.
Gallic acid	1	gramme
Sulphuric acid	2	drops
Tartaric acid	0·1	decigramme
Nitrate of lead	0·3	,,
No. 2.—Rain water	100	c.c.
Nitrate of silver	3	grammes
No. 3.—Rain water	30	c.c.
Sulphate of iron	2	grammes
Tartaric acid	0·4	decigramme
Acetate of lime	0·1	,,

For 100 c.c. of No. 1., take 2 c.c. of No. 2, and from 8 to 10 drops of No. 3. This strengthener acquires a slight bluish tone, and the intensification is perfect. I send with this communication a print made with a hand apparatus, the opening of the diaphragm of the *plain* objective 11 millimetres, focus 18 centimetres. so as to enable you to judge of the prints that it is possible to obtain with this developer. This print represents a man threshing wheat with a flail, and the motion was so rapid that it was hardly perceptible to the eye. In this print the impression is very sharp. I do not understand how it was possible to catch it. The image appeared in about ten minutes, and has not been strengthened. In the last number of the *Bulletin de la Société Française de Photographie*, Dr. Eder gives the following formula of a pyrocatechin developer in which enters a considerable quantity of this product and of potash:—

A.—Pyrocatechin	1	part
Sulphite of soda	4	parts
Water	40	,,
B.—Carbonate of potash	4	parts
Water	40	,,

To develop, take 1 part of A, and 2 parts of B.

I do not understand the mode of operation of Dr. Eder, but I do not think that his formula will be adopted by amateurs: first, because it costs too much; next because I believe that the gelatine film could not offer resistance, without becoming detached, to so great a quantity of potash. My formula is very economical, and *acts with certainty*, and I believe that, in view of its qualities, it will be adopted by many operators.

I have forgotten to state that after developing I thoroughly wash the print, and give it a chrome alum bath of from five to six per cent. I again wash, and fix in hyposulphite of soda of 20 per cent.—*Progrès Photographique.*

Photographers' Benevolent Association.—On 13th inst. the committee of this Association had under consideration two applications for assistance. The particulars having been fully stated, the committee made grants in both cases.

PHOTOGRAPHY MADE EASY.

BY C. BRANGWIN BARNES.

The craze for ease or simplicity in working in the photographic art has been growing for a long time amongst a certain section, composed both of amateurs and professionals, but mainly of persons who like to be able to appear as clever photographers in the eyes of their friends or the public at the expense of the least possible modicum of trouble or genuine work on their own part. For such as these the introduction of ready sensitised paper, followed by that of ready prepared plates, and a developer that will not stain the fingers, came as a boon and a blessing, but still they keep craving for increased ease and increased simplicity. The great want of the present day seems to be an automatic dark room in which the plates shall develop of their own accord with a natural developer that will require no mixing, and perhaps the addition of an automatic printer and toner to complete the work might be deemed an improvement.

Seriously speaking, it seems as though some such demand will be the outcome of the present rage for one-solution developers and other simple aids to comfort, if not to art. A one-solution developer can be readily manufactured and readily used, but those who crave for it should remember that with a standard, or, so to speak, absolute developer, standard or absolute plates coupled with standard or absolute exposures must be a *sine qua non*, to say nothing of other conditions. The operator who can produce equally good results from a plate exposed in bright, clear weather, and another on a misty, dull winter's day, with a one-solution developer, must be a clever man, be he either amateur or professional. The era of simplicity and ease which has recently dawned upon the photographic art is far from being an unmixed blessing for those who follow the art professionally, as it has brought into the ranks numerous and almost numberless amateurs, who have been attracted thereto by this very ease and simplicity. These amateurs, be it remarked, are of a far different calibre to the amateur of the early and palmy days of photography. The amateur then was mostly a man with scientific abilities, who did not object to work, and would as soon think of making an exposure and leaving the rest of the work to a professional, as he would of showing such work when completed, and claiming it as his own.

It has been remarked that photography has not made such rapid strides during the past year or so as it had been doing before, and I cannot help thinking that it is this very introduction of easy methods of working that should bear the blame.

Man was made to work, and unfortunately, when work is made easy for him, he is apt to lapse into an easy-going and indolent method of action which is far from being conducive to the production of good results. Instead of experimenting with a view to the production of better work, experiments of late seem to have been made with a view to increased ease, with the result that a man who has the wherewithal to purchase a cheap set, with a book of instructions, and a couple of lessons thrown in, finds himself able to take a photograph (*sic*), and at once places himself in a sort of opposition to the professional who has gone through all the wear and tear of the business as it was. It must not be imagined that I intend to imply that this cheap setter rushes at once to the front as a *successful* photographer, or that his work is worthy of comparison with that of others, either amateur or professional, who have studied the art science for years; but with some folks a photograph is still a photograph, whether it be good, bad, or indifferent; and although it has been over and over again stated that "No man is a prophet in his own country," it is nevertheless a fact that many a worker with a cheap set and easy formulæ is looked upon as a very great prophet indeed among the section of society in which he moves; in fact, he becomes a very particular star in his own firmament. The object of the present article is not, however, to condemn the "amateur-professional," but the system which has created him, the system of easy processes, and I do not condemn that system so much for the creation of this hybrid, as for its having caused deterioration in the true photographer.

If the genuine lovers of photography, both amateur and professional, would only combine their forces, dropping petty jealousies, and experiment and consult together more freely than they seem disposed to do at present, there is little doubt that the art would go on improving day by day and month by month, so that when we next visit the Pall Mall Rooms we should see something better than ever before, which was certainly not the case as regards the last exhibition. It may be urged that an experimentalist wishes to have the whole of the credit which accrues from any discoveries he may make; but against this we may set the fact that many an experiment has failed to produce any satisfactory results until a second person has taken it up, and by some trifling alteration in detail has converted a failure into a success.

I should like the readers of the Photographic News to band themselves together in spirit, each and every one of them determining that in the coming year he will not content himself with merely taking photographs, moving in the same old rut, and accepting any improvements that others may make, but will himself attempt to do something *for* the art he loves, independently of what others are doing; if he finds himself nearly succeeding, let him appeal to some friend, some brother photographer, to help him, and not rest satisfied until he has added his quota towards the improvement and perfection of that art. There are many ways of doing this, for there is no portion of apparatus and no chemical combination that may not be improved upon, and if we take "Excelsior!" as our motto, and act up to it, success must and will attend us. The very fact of photography being easier to work now than it ever was before ought to give additional time in which to pursue experimental work. If we all work as suggested, who knows but that the coming year may, when it has passed, be looked back upon as the one in which some startling discoveries and improvements were made, and who knows but that he may be himself the discoverer?

Forethought.—A civil engineer in charge of important work now-a-days must be something of a diplomat and lawyer, as well as a master of his own calling, and must, to use a cant phrase, have eyes in the back of his head. One instance showing the forethought required may be cited from the work upon the Southwark subway or tunnel under the Thames. Recently, after the tunnel had passed, some householders in buildings overhead discovered cracks in their walls, for which they promptly demanded damages. When the case came to be heard, the engineer produced photographs of the walls in question, taken before the tunnel workings reached them, and showed that the cracks complained of were old ones. It seemed that the engineer, as a measure of precaution, had carefully photographed every wall and building likely to be affected by the excavations for the tunnel.—*American Mechanical News.*

Notes.

Papers which go in for portraits have a grievance against the London Stereoscopic Company which it might be well if the Company could see their way to remove. It is only fair that when a photographer happens to have the photograph of a celebrity who is wanted, that he should be paid for granting the right to copy and publish. But when, afterwards, an electro of the original block is wanted for another paper, it becomes a question whether an inflexible rule to make a charge for the "permission of the photographer" is a wise one. There is now an enormous trade in electros, and the back volumes of the *Illustrated London News* are constantly being drawn upon by trade and other papers, who find frequently they can get the portraits they want in the pages of our two leading illustrated journals. There is no difficulty in getting, as a rule, the consent of the photographer upon whose photograph the block was based; the advertisement contained in the usual acknowledgment being considered an adequate *quid pro quo*. But in the case of the London Stereoscopic Company, a uniform fee of ten shillings is demanded, whether the portrait be of a celebrity or not. Sometimes the fee exceeds the cost of the electro itself, and newspaper proprietors not unnaturally hesitate. We know of some instances in which the charge has prohibited the use of the block. Of course the Company knows its own business best, but we should have thought that some graduated scale of charge was possible.

The complaint we made some time ago as to the want of literature on the subject of drawing for reproduction by photography, has to some extent been answered by Mr. J. Pennell in his newly-published book, "Pen Drawing and Pen Draughtsmen." Mr. Pennell is enthusiastic over pen drawings, and looks upon reproductions from such as superior to etchings and to wood engravings. To photography is, of course, due the possibility of reproducing every line exactly as the artist draws it—a matter impossible with wood when the engraver intervenes. At present there is a certain solidity about a wood engraving, which is absent from most photographic reproductions; but, as the *Pall Mall Gazette* remarks, given artists willing to work with a view to process—just as there are artists who work with a view to woodcut—then careful photo-engraving and "photogravure" will yield results not a whit less artistic, and far more accurate, than woodcut.

In this point we think the whole matter concentrates. Artists have had to build up a certain style suitable for reproduction, and it is by no means certain that the right thing has yet been arrived at. The old "wood men" were most at sea when they attempted drawings on card for reproduction, because they introduced "cross hatching," which, however suitable it may be for wood, does not "come out" well in photography. All this had to be unlearned, and thus the thing may at the present moment be looked upon as in a transition state. Mr. Pennell's book, while it will do good service by drawing attention to the subject, fails in giving what the students would naturally expect. Its practical details are meagre. As the evening paper already mentioned points out, the book does not say a word on speedy drawing and reproduction for daily journals, and, what is stranger still, is silent on the subject of drawing on transfer paper. A perfect manual which shall cover all the ground is still needed; but, while awaiting it, we can strongly recommend Mr. Pennell's book.

An amateur photographer is nothing if not thorough. He thinks little of dangers and hair-breadth escapes, so long as he can secure such a picture as no one else ever had. In this keenness he much resembles the sportsman, and when the amateur photographer is also a sportsman there is no limit to his daring. A case in point may be cited in the story which has just come to hand from India, of a terrific combat between Mr. J. D. Inverarity, a well-known Bombay barrister, and a lioness. Mr. Inverarity, having persistently stalked the unhappy beast, and lodged half a dozen bullets in her, could not have been greatly surprised when the lioness, seizing her opportunity, turned upon him, and most assuredly she would have had her revenge but for the timely assistance of a couple of natives. As it was, he had sixteen wounds more or less severe, but notwithstanding his injuries, the enthusiastic amateur produced his camera, and took a picture of his prostrate foe. The act, we take it, was a signification of triumph, but we cannot help speculating if Mr. Inverarity had started with the camera instead of with the rifle, whether the lioness would have not have turned tail, and the amateur consequently escaped without a scratch. No animal can stand the camera and the head of the photographer hidden by the focussing cloth.

Some of our English ministers do eccentric things, but they have not yet shown the vanity of Dr. Talmage, the American sensational preacher. This person is now visiting Europe with a party of friends, and, while in Athens, went to the Mars Hill, made memorable by the fact that it was there that St. Paul preached to the Gentiles. Reverence, however, does not appear to be the strong point of Americans, and it seemed to Dr. Talmage to be a right and proper thing to place himself beside St. Paul and preach also from the Mars Hill. But, not contented with this, he must seek a sort of factitious immortality by having himself photographed! In fact, the whole thing had been carefully prepared, for the photographer had been employed beforehand, the picture being intended to illustrate Dr. Talmage's coming book "The Life of Christ."

PHOTOGRAPHIC SURVEY OF WARWICKSHIRE.*

BY W. JEROME HARRISON, F.G.S.

No. 1.

My subject may be considered as an extension of a paper which I read before the Birmingham Photographic Society in June, 1885, on "The Work of a Local Photographic Society."† Permit me to quote two paragraphs from that paper:—

"Within the last few years photography has made a new departure. The introduction of gelatine dry plates and films has made the process so clear and, by comparison, so easy, that photographers have multiplied a hundred fold. Oh! that we could bring back Daguerre with his costly silver plates, which required such tremendous polishing; Fox Talbot with his calotypes, and Scott Archer with his wet collodion plates, silver bath, and travelling tent, which made the landscape photographer's life a burden to him, and show them our light and complete equipment, with which a man may travel round the world, and leave, if he pleases, his pictures to be developed by his grandchildren, with every assurance that, if preserved with reasonable care, they will turn out all right, even after the lapse of years."

. . . . . .

"Much useful local work may be done by a photographic society. By securing accurate representations of old buildings, we can furnish a record for posterity whose accuracy cannot be disputed, and whose interest in the future will be great. But I would not only photograph the old buildings—I would secure on rapid plates impressions of the daily appearance of our streets, of the principal lines of thoroughfare, and of the busy crowds by which they are traversed. Even in the half century which has elapsed since the discovery of photography, if such pictures could have been secured of Birmingham at intervals of every five or ten years, what an interest they would have for us to-day! We exclaim at the pleasure it would give us if we could see photographs of Stratford-on-Avon as it was when Shakespeare lived there; but there will come a time when a similar desire will be expressed to see England as it was in 1885; and, fortunately, by the aid of photography, it will be possible for such a desire to be gratified."

Since the paper from which the above quotations are made was written, I have more than once spoken at meetings of the Birmingham Photographic Society, urging that it was the duty of the Society to undertake local work, such as a photographic survey of the district surrounding its headquarters; and during the present year I have urged that this district should be the county of Warwickshire.

A few weeks ago a deputation from this Society went to Sutton Coldfield, there to address the local scientific society known as the Vesey Club. There again I ventured to air my idea; and it was very warmly taken up by the meeting, and especially by the vice-president of the club, Mr. J. B. Stone, J.P., F.L.S., F.G.S., who has since become the president of the Birmingham Photographic Society. Encouraged by his support, the following memorial was presented to the Council of the Society:—

"That the Council be requested to call a special general meeting to consider the feasibility of a photographic survey of Warwickshire, the object being to secure an accurate and unbiassed record of the scenery, monuments, life, natural history, facts, &c., of our county as they now exist."

This was signed by a large number of members, and was laid before the Council of the Society; and it is for its consideration that this meeting has been called. Invitations have been issued to all the photographic, literary, artistic, and scientific societies in the county, and we are much pleased to see their representatives here to-night.

Within the last two years the idea of a local photographic survey has been carried out to some extent by the Boston Camera Club, in America, and by the Birkenhead Photographic Association in England. The Boston Society has secured a number of negatives of what they call "Old Boston;" and from these negatives lantern-slides have been prepared, one set of which has just been going the round of the English photographic societies. The Birkenhead Society took up* the archæological survey of the "Hundred of Wirral," a division of Cheshire; and we shall, I believe, see some of their results, in the form of lantern slides, after Christmas.

Other societies—non-photographic—have seen the need and value of photographic records, and have taken steps to secure them. Ever since 1870 the Archæological Section of the Birmingham and Midland Institute has been endeavouring to secure photographs of all local objects which were likely to suffer change, as the old streets of Birmingham, so many of which have been swept away under the Improvement Act—Dr. Priestley's house, Francis Eginton's house (both since pulled down), and many other places of interest. In their excursions they have also utilised the services of their official photographer, our good friend Mr. Harold Baker, and as a result they have now a valuable and most interesting collection of local photographic negatives.

At the Conference of Photographers held in London in 1888 under the auspices of the Camera Club, I advocated the appointment by Government of a "State photographer, who should be specially charged with the task of obtaining authentic portraits of our great men, and securing pictorial records of historical places and events. The time must come when the present era will be history, and authentic photographic records will then be invaluable."† In closing the Conference, the President of the Camera Club, Capt. Abney, F.R.S., said: "He thought Mr. Harrison's idea of a State photographer a most excellent one."

At the recent meeting of the British Association at Newcastle-on-Tyne (September, 1889), a committee was formed for the collection, preservation, and systematic registration of photographs of geological interest in the United Kingdom; Mr. O. W. Jeffs, 12, Queen's Road, Rock Ferry, Cheshire, was appointed secretary. This committee has just issued a circular asking for the "names of local societies or persons who may be willing to further the objects of the committee in their own districts." As the author of the first book on geology,‡ which was, so far as I know, illustrated by photographs, I feel an especial interest in this scheme, and it is clear that it would be a part of any complete local photographic survey.

* Read before the Birmingham Photographic Society.

† PHOTOGRAPHIC NEWS for July 3rd, 1885.

* See PHOTOGRAPHIC NEWS for May 18th, 1888.

† *Journal of the Camera Club* for March, 1888.

‡ The Geology of Leicestershire and Rutland; illustrated by twelve photographs (from whole-plates). Leicester: J. and T. Spencer, 1877.

A Photographic Survey.

It is proposed to consider the subject of a photographic survey mainly under two heads:—

I.—Have we, in our neighbourhood, a natural region or district which contains material for the work contemplated under the head of a "Photographic Survey?"

II.—Supposing this to be the case, how should such a survey be organized and conducted?

It may be taken for granted that a photographic society, such as our own, will be doing a good and useful work if it endeavour to secure a pictorial record of local objects and events. The question then arises, what is the best area or region to select as the unit of work? I think there can be no question but that—for England, at all events—this unit should be the county; or divisions of a county, as the hundreds. Every Englishman knows his county well; he is familiar with its extent, its boundaries, towns, and industries. Men from the same county have a clannish feeling; and when two Englishmen meet abroad, if they are both from the same county, they feel almost like brothers. This fact has lately been recognised by Government in assigning territorial designations to all the regiments of our army, so that we speak of the "North Warwickshire Regiment," the "South Essex," and so on.

Some have suggested that we should take a certain radius—say twenty miles—from our town, as the area to be studied. This would give us a circle, and would include portions of half-a-dozen counties. But who cares for "the country round Birmingham?" while Warwickshire is a name to conjure with!

Again, we hope that this scheme will be taken up by the hundred photographic societies which now exist in Great Britain. If the unit of work be a circle, then great gaps will be left between the circles; but everyone who has played with a "puzzle map" knows that when the counties are fitted together they make up the entire country.

The County of Warwick.

Let me first endeavour, then, to give you a brief description of the proposed subject of our photographic survey, in order that you may see how worthy it is of your best energies, your utmost exertions. As Wordsworth writes:—

> Come forth into the light of things,
> Let Nature be your teacher.

"Woody Warwickshire"—"that shire which we the heart of England well may call."*—lies truly in the very centre of the land; for lines drawn from Berwick-on-Tweed to the Isle of Wight, from Dover to the Isle of Anglesey, and from the Severn to the Humber, all intersect in this central county. And Warwickshire forms the watershed as well as the centre of England. Its southern stream—"the soft-flowing Avon"—passes to the south-east to join the Severn at Tewkesbury; while its northern stream, the Tame, with its tributaries the Rea, Cole, Blythe, &c., runs north-east into the Trent, and so ultimately mingles its waters with those of the German Ocean. In places, the banks of these streams are beautifully wooded—the Cole, for example—affording the most delicious "peeps" as the river meanders; while they are often crossed by old-fashioned bridges, and lined by gnarled willows and osier-beds.

Nowhere does the surface of Warwickshire attain to any great elevation. In the north-east of the county the Hartshill range, which extends from Atherstone to Nuneaton, does not exceed 600 feet in height, while the Edge Hill range in the south-east barely attains 800 feet.

The area of Warwickshire is 897 square miles, and its population about three-quarters of a million. Panoramic views, embracing large areas, should be taken from all the principal elevations, and from church-towers. In such work the lighting must be carefully studied; and the use of orthochromatic plates, aided by a yellow screen, will sometimes be found an advantage, doing away with the misty or hazy effect which, in this climate, almost invariably envelops distant objects. Such "haze effects" are often invaluable to the photographer in giving the idea of distance; but when the object is to get a panoramic map, it is well to be able to remove the hazy appearance at will.

The most marked feature of the county of Warwick at the present day is the prevalence of woods and forests. Fine parks containing much magnificent timber abound, and include about fourteen deer-parks. The hedge-rows everywhere contain well-grown trees, while the hedges of the country lanes are of remarkable height and thickness. The fact is, that all Warwickshire north of the Avon formed part of that mighty "Forest of Arden," which once stretched northwards to the Trent, and included large parts of Worcestershire, Staffordshire, and Leicestershire. The picturesque small town of Henley-in-Arden, and the village of Hampton-in-Arden, still preserve this title, which was the Celtic name for a forest.

Prehistoric Warwickshire.—The name "Arden" thus at once takes us back to a period before the Roman invasion. This part of England was then a dense forest, scantily peopled by the "Ancient British" tribes called the Cornavii and the Wiccii. They were probably herdsmen, grazing their flocks of sheep and herds of cattle or swine in the clearings and glades of the forest which they knew so well. What remains of them to us? Very little, indeed, that is certain. Some of the mounds or tumuli may be the burying places of their chiefs; others, surrounded by oval or circular entrenchments, and occupying hill tops, are remains of their fortresses or camps.

The name of the county and that of its central town, Warwick, may be derived from the Celtic *Gaur*, a fortified place, and *Wiccii*, the tribe by which that high mound which at Warwick overlooks the Avon, was raised and defended.

Roman Warwickshire.—As Julius Cæsar (B.C. 55) did not advance north of the Thames, his famous "Commentaries" tell us nothing directly of central England. But a later Roman leader, Ostorius Scapula, established a line of forts along the Severn in A.D. 50; and he and his successors during the next four centuries made those famous "Roman roads" which were indispensable to the conquest of the country. Three famous Roman roads run through Warwickshire. The most important is the Watling Street, which extended from Richborough, in Kent, to Chester. It enters Warwickshire near Rugby, and from thence to Atherstone it separates the county from Leicestershire. At High Cross, about half way between the two towns, the Watling Street is crossed by another Roman road called "The Fosse-Way," which extends thence to Stretton-under-Fosse, in the south-west of Warwickshire, a distance of forty miles. It runs in a nearly straight line, up hill and down dale, with deep cuttings and many picturesque views; a true "old-world" road, and but little frequented now. Who will walk its length with

* Michael Drayton, in the "Polyolbion," xiii.

a camera, and resuscitate the Roman? I knew this "old Fosse Road" well when I lived in Leicester, and antiquaries have traced it all the way from Cornwall to Lincoln.

But the Roman road best known to dwellers in Birmingham is the Icknield Street, or Ryknield Street, as it is sometimes called to distinguish it from another road of the same name. It enters the county in the south at Bidford, and runs nearly due north through Birmingham—where one long street still bears the name—to meet the Watling Street at Wall—the Roman station of Etocetum—near Lichfield. For three miles in Sutton Park, on the north of Birmingham, the line of this fine old road is quite distinct as to direction, width, and level, although it is, of course, grass-covered. Beyond Warwickshire, this Ryknield Street extended to Gloucester and St. Davids in the one direction, and to the Humber and thence to the Tyne in the other.

Besides the Roman roads, practically the only certain traces left of the Romans in Warwickshire are the Roman rectangular camps or fortified stations at Manduessedum (close to Mancetter), and at Oldbury, in the same district; with another at Chesterton, on the Fosse-Way, six miles south-east of Warwick. These camps are well-defined grassy mounds or "walls" of earth, enclosing a large central area. They will not be easy to photograph, and the best time for securing their outlines will probably be either early or late in the day, when shadows will accentuate their outlines.

Other important Roman stations are believed to have existed at Præsidium (Warwick), Tripontium (Cave's Inn, near Rugby), Alauna (Alcester), Bennones or Vennones (High Cross or Cloudesley Bush).

Roman remains, coins, and pottery have also been dug up at Brinklow, Monk's Kirby, and Wibtoft. These latter relics appear to have been dispersed, and are probably now lost to us. They could all have been preserved and collected for purposes of study by their reproduction by photography. In the Warwick Museum there is a Roman tomb or sarcophagus, found near Alcester.

Saxon Warwickshire.—The Romans were little more than visitors to Warwickshire, and they probably seldom, if ever, penetrated the recesses of Arden. After their departure in 449 A.D., they were succeeded by the Saxons, who "came to stay." And yet the Saxons cannot be said, in the ordinary sense of the term, to have "conquered" the Midlands. The tribes of Angles (from North Germany), who landed on our eastern coasts, very slowly advanced inland, and only by slow degrees gained power over, and amalgamated with, rather than subdued, the Celtic inhabitants of Arden.

Warwickshire formed a part of the Saxon Kingdom of Mercia, which flourished under Cridda, Ethelbald, and Offa from the sixth to the ninth centuries; after which the eight Saxon sub-kingdoms (the Heptarchy) united to form the Anglo-Saxon Kingdom (827-1066).

Many of the tumuli or mounds of earth—sometimes so large as to be actually small hills—which stud the surface of Warwickshire, contain the remains of Saxon chiefs; but without actual exploration we cannot distinguish the Saxon from the Celtic tumuli. At Walton, near Wellesbourne, a Saxon grave, which was opened in 1774, contained "three skulls lying in a row, with two Saxon jewels set in gold, one with an opal and two rubies, and the other adorned on both sides with a cross, between two rude human figures, with a sword or lance at the outer hand of each." Iron swords and the iron bosses of shields are also commonly found in Saxon interments: while stone implements often accompany the bones of the Celts.

It is probable that during the next few years many of the as yet undisturbed tumuli will be explored; and it is earnestly to be hoped that photographs will be taken, recording each stage of the operations, and especially as showing the positions of the interred skeletons, whether lying on the side or back, and with legs drawn up or extended, as each of these points appears to have characterised different times and different nations.

(To be continued.)

CONCURRENT DEVELOPMENT AND FIXATION.*

BY W. D. RICHMOND.

You will remember that at our last meeting Mr. Davis stated that a friend of his had witnessed the development and fixation of a bromide of silver gelatine plate in one single solution. There seemed to be no one present who had any knowledge of this matter, and to be left as a question needing investigation.

I have no doubt that most of us then present were of the opinion that if such concurrent development and fixation were possible, that it would possess very little practical value, and to that opinion I still hold, though I have subsequently proved that it may easily be done.

Last Friday evening I was thinking over the problem, and it occurred to me that I had the means at hand by which it could be accomplished. It was our friend Mr. Wellington's redeveloper that seemed to promise to be the very solution to answer the purpose, for it contains two fixing agents and a pyro developer.

I have already spoken here of a slight modification of mine of this method of intensification, which somewhat simplifies the operation. I take first a solution of nitrate of silver, 100 grains to five ounces of water; second, 240 grains of ammonium sulphocyanide to five ounces of water; and third, 240 grains of hyposulphite of soda to five ounces of water. These can be kept separately any length of time, so far as my experience during the present year allows me to judge. To redevelop an already developed and fixed plate, either gelatine or collodion, take a drachm of each solution and place into one measure in the above order, and add thereto twenty minims of a ten per cent. solution of pyro (say sulpho-pyrogallol), and twenty minims of a twenty per cent. solution of ammonia. This may be poured on and off the plate as in old days, a little glycerine making the adhesion to the plate more complete.

Now, in regard to the concurrent developing and fixing, I thought I should attain the object more certainly if I added a larger proportion of ammonia pyro in the first instance, so as to start the development before the fixing agents could have time to act, so as to reduce the part which had received the image. I therefore took a drachm of each of the five solutions, and added enough water to make it cover a quarter-plate. Taking the first negative which came to hand, a weak one as you may judge by the positive, I exposed it thirty seconds, and put it into the solution. It did not develop as rapidly as usual, and the fixation was somewhat prolonged on account of the weakness of the fixing portion of the solution. There was an appearance of fog, which was due in some measure to the

* A communication to the Photographic Club.

thinness of the negative, and a considerable amount of non-adherent silver was thrown down on the plate and the dish, which I sponged away. To test if the image were really fixed, the plate was partially immersed for some time in hypo, which had no farther effect. This plate is marked No. 1.

The next experiment was to see if the development would take place when the pyro ammonia was added to the fixing agents without the presence of the silver nitrate. The silver was omitted, and the plate soon became quite clear glass without the trace of an image. It thus seems that this method of development demands silver in the developer, in a manner analogous to that known to all collodion workers in all processes where the alkaline system was not used. It will be seen also that by the dissolution of the bromide of silver by the fixing agents, the solution becomes somewhat like Mr. Howard Farmer's intensifier, and development goes on after the fixation has been effected, as, indeed, might have been anticipated from the known use of the solution as a re-developer.

The second example was treated in the same manner as the first, except that it was exposed half the time, and was not developed so long, and is therefore thinner, though it is probable that a longer immersion would have given greater density.

I regard this as simply a photographic curiosity, for I cannot detect anything in the process that promises improvement upon previous methods; indeed, it seems to point the other way, for the time of developing is considerably increased, and I should say that the separate solutions would do the work in a shorter time. Those who have time and taste for experimenting will doubtless find the matter interesting, and we may yet hear more of it.

At the Camera Club, Thursday, January 2nd, will be a lantern evening; Monday, January 6th, 8.30 p.m., smoking concert.

Some writers state that pyrocatechin solution can only be used once, but Dr. Nicol has disproved this by developing twelve plates in the same solution in the course of two weeks.

Drs. Frankel and Pfeiffer announce the appearance of a work on the photo-micrography of bacteria. This work was composed under the direction of Dr. Koch, the celebrated bacteriologist.

To Silver Ivory.—Soak the ivory in a weak solution of nitrate of silver; the ivory gradually acquires a yellow colour. Then withdraw it, and plunge in very pure water; expose to the sun, by whose action it will become black in a few hours; by rubbing it becomes very bright.

Panoramic Cameras.—A book recently published by Gauthier-Villars, of Paris, gives a description of a very ingenious but simple apparatus for making panoramic views by photography. It is called the Cylindrograph, and is the invention of M. Moessard, a professor of typography at St. Cyr. As far back as 1865, Johnson of England constructed a camera for this purpose, in which clock-work was employed, but the device of M. Moessard is simplicity itself, being entirely without mechanism so-called. It differs from all others in having the sensitive surface stationary, while the lens is made to move. The impression is received upon a flexible film bent to a curve, the radius of which is equal to the focus of the lens. The lens can be moved backward and forward between the extreme limits of the view, so that the panorama is made, as it were, piecemeal, a stop in front of the lens cutting off all but a very small portion of the view. These separate portions may receive different exposures, so that the operator can give more or less time, according to the degree required for each.—*American Journal of Photography.*

THE FIRST PHOTOGRAPHER.*

BY DR. J. M. EDER, DIRECTOR OF THE IMPERIAL PHOTOGRAPHIC INSTITUTE, VIENNA.

In the year of 1727 a German physician, J. H. Schulze (born 1687, died 1744), and member of the Academia Cæsarea Leopoldino-Carolina, was engaged in making Baldwin's phosphorus—luminous stone. In these experiments nitric acid had to be saturated with chalk. Schulze wanted to try the influence of an addition of silver to nitric acid. He dissolved some silver in nitric acid, and poured this on the chalk. Accidentally he carried out this work at a window through which the sun was shining strongly. To his astonishment he observed that the surface of the chalky sediment which was turned to the light took a dark colour, whereas the side turned away from the light remained unaltered. Schulze continued experimenting on this phenomenon, and proved by unquestionable experiments that this bleaching was produced by light and not by heat; consequently he became *the discoverer of the sensibility of silver salts to light*. He found that the mixture mentioned turns violet, black in sunlight (*atro rubentem et in coeruleum vergentem*), and satisfied himself that this action is due to light, and not to heat; for when he exposed a bottle filled with the mixture to the dark heat of a stove, it did not at all colour darker. In order to convince himself if only those parts of the silver containing chalky deposit discoloured, which were directly exposed to light, he fixed a string to the side of the bottle, and indeed found that at those places from which the string kept the light away, the silver deposit remained white. He moreover pasted paper cuttings on the glass, in which words and sentences were cut out. It did not take long, when placed in the sunshine, for those parts which had not been protected from light to turn dark, and the words and sentences imprinted themselves with perfect exactitude in the deposit.† He exhibited these experiments to his friends, and to those who did not know the causes the whole appeared most wonderful. Through the simple shaking up of the deposit the writing produced by the light disappeared completely, and the deposit was ready for another light impression.

In Schulze's Essays there is, moreover, mentioned the fact that the silver-chalk deposit is instantaneously blackened by sunlight concentrated by a burning glass, and that also *a pure nitrate of silver solution*, not containing chalk, gradually discolours in light.‡

From these records it will be seen that Schulze without doubt, so early as 1727, not only fully knew the sensibility of silver salts to light, but also used the same in order to copy writing by means of sunlight. *Consequently Schulze, a German, must be regarded as the inventor of photography.*

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* Translated for this journal at our request by Mr. C. Heinrich Trinks, from Dr. Eder's work, "Ausfuhrliches Handbuch der Photographie," Halle, 1884. Because of its historical value, it has been translated as literally as possible.—Ed.

† ". . . Vitrum pro maxima sui parte opacis corporibus obtegerem relicta exigua portione, quae liberum luci accessum permitteret Sic non raro nomina vel integras sententias chartae inscripsi et atramento notatas partes scalpello acuto caute excidi, et sic chartam hoc modo perforatam vitro, mediante cera, affixi. Nec longa mora fuit, quum radii solares, qua parte per apertam chartam vitrum tetigeret, illa verba, illasve sententias sedimento cretaceo tam *accurate et distincte inscriberent*, ut multis curiosis, experimenti autem nescus, ad nescio quod artificium rem hanc referendi occasionem subinde diderim."—On account of the difficulty of access to the source, I (Dr. Eder) here enter more exhaustively into the important part.

‡ Schulze: Scotophorus pro phosphoro inventus sui experimentum curiosum de effectu radiorum solarium. Acta physico-medico Academiæ Cæsareae Leopoldino-Carolinae 1727, I., 528.—Also quoted (but without mention of content) in Karsten's "Fortschritte der Physic für 1845," pag. 228

EXPERIMENTS WITH EIKONOGEN.

BY F. GOLDBY.

The editor of this journal having recently had a new sample of eikonogen sent to him, and being himself too busy over the Year-Book to attend to the matter, handed it to me for purposes of experiment.

The specimen now under consideration is supplied in a wide-mouthed corked bottle with metallic capsule, and differs very much in appearance and solubility from that described by me in this journal of 25th October last, the latter being of a chocolate colour and minutely crystalline character, and also more freely soluble than the present sample, which is in comparatively large crystals of a light yellow colour, very similar in appearance to ferrocyanide of potassium broken small.

I first tested its solubility in distilled water, which I found to be 16 grains to the ounce, but it should be mentioned that this solution was effected at a temperature of 45° F.; possibly at 60° a slightly larger quantity might be taken up. This was at first of a very pale green tinge, slightly opalescent, gradually changing in the course of a few hours to a deep claret colour. This solution was neutral to litmus paper.

Being particularly asked to ascertain whether glycerine had any greater solvent power than distilled water, and also whether it was likely to act as a preservative, I next prepared one ounce of a mixture of equal parts of glycerine and distilled water; this dissolved 18 grains of the eikonogen. This solution was also of a very pale green colour, quite clear, very slowly changing to a dark sherry colour. From this it appears that glycerine is of no great value as a solvent; but if, as may be assumed, the change of colour is an indication of decomposition, it must act to some extent as a preservative, for on both the solutions in plain distilled water and that in glycerine and water being allowed to remain for thirty-six hours exposed to the air, the former is of a very dark reddish-brown colour and opaque to transmitted light in an ordinary one-ounce long vial, while the latter has only reached the colour of brown sherry.

Having read Mr. Lyonel Clark's statement that in preparing an eikonogen developer the addition of the alkali appeared to assist its solution, I prepared a weak solution of caustic potash (4 grains to the ounce of distilled water), but in this solution I could not dissolve more than 18 grains. In this case the discoloration set in very rapidly, commencing even before complete solution was effected, and in three or four hours the mixture was of a very deep colour and thick consistence. This seems to indicate that, as might be expected, eikonogen oxidises very rapidly in presence of an alkali, and tends to prove that, in preparing a concentrated developer, it is safer to keep the alkali in separate solution.

Lastly, I prepared a mixture of one ounce of equal parts of glycerine and distilled water, and dissolved in this one drachm of borax, but this mixture would not take up more than 10 grains of the eikonogen.

Some experiments in developing positives on Alpha paper with this eikonogen were next tried. For this purpose I prepared a developer modified from Mr. A. Cowan's, as follows:—

Eikonogen	...	...	...	44 grains
Pure carbonate of potash	...	...		44 ,,
Sulphite of sodium	...	...	...	88 ,,
Glycerine...	...	...	...	½ ounce
Distilled water	...	...	to	5 ounces

This formed much too strong a solution for the purpose, so I prepared from it a developer for use thus:—

Concentrated solution (as above)	...		1½ drachms
Bromide of potassium solution (10 per cent.)			1½ drachms
Distilled water	...	to	2 ounces

This developer worked well and without stain, and appears to me to be preferable to the ferrous oxalate developer recommended by the makers of the paper, giving a more vigorous image, and requiring no clearing bath; the prints merely needing about ten minutes' washing in running water before placing in the sulpho-cyanide toning and fixing solution. The prints developed by eikonogen also appear to tone more quickly than those developed by the ferrous oxalate.

For bromide prints I found it necessary to use a stronger and less restrained developer, and a formula which gave good results is appended:—

Concentrated solution ...	...	...	½ ounce
Bromide of potassium solution 10 per cent.			20 minims
Distilled water ...	...	to	2 ounces

It may be of interest to state here that after developing two prints on alpha paper with the dilute eikonogen solution given above, I poured the developer back into a glass measure, where it was allowed to remain freely exposed to the action of the air till the next evening, when I found that it had very slightly deepened in colour, and, on again using it, it produced a good print, although slightly slower in action than when freshly mixed.

This occurrence led to the following experiment, in order to find whether this preservation was due to the glycerine in the developer, or the sulphite, or the mixture of the two. Three ordinary 2-oz. vials were taken. In the first I placed a mixture of glycerine 1 drachm, distilled water 7 drachms; in the second, sulphite of sodium 20 grains, dissolved in 1 ounce of distilled water; and in the third, 20 grains of sulphite of sodium, 1 drachm of glycerine, and 7 drachms of distilled water; then dissolved in each 10 grains of eikonogen and 10 grains pure carbonate of potassium, and allowed them all to remain, uncorked, for twenty-four hours. These were all, when freshly made, quite clear, and of a very light olive green tint. At the expiration of twenty-four hours the first solution had become dark and thick, like the solution with caustic potash described above; the second was of a light brown colour; and the third had slightly deepened in tint, but retained its olive green colour. From this it appears that glycerine, added in small proportion to a concentrated developer with sulphite, is likely to prove of value in assisting to protect the eikonogen from oxidation.

In conclusion, my experience agrees with that of others, that eikonogen is an excellent developer for rapidly exposed plates; and in this respect I found the sample above described much superior to the chocolate coloured specimen dealt with by me in a previous article.

Wilson's Photographic Magazine says:—Bottles containing developing solutions should always be kept filled to avoid oxidation. This result may be obtained by replacing the liquids used by fragments of glass.

At a recent meeting of the French Photographic Society, Mr. Stebbing presented to the Society, in the name of M. Orell Fusoli, an interesting view in Switzerland, obtained by a process of photographic chromo-lithography based on the use of the old bitumen process on stone. By this process very remarkable results are obtained—so cheaply that the Austrian government has purchased the right of use, so as to illustrate its divers publications.

DETECTIVE CAMERAS.

MESSRS. PERKEN, SON, and RAYMENT have exhibited to us a new detective camera, in which the tendency is to reduce everything to extreme simplicity. From the outside everything is governed by the motions of one or other of two buttons, and the plates are changed without the opening of the box. Some details of the instrument may be explained by the aid of fig. 1. Some sheathed plates slide along the top of an inner box which forms the camera proper; a plate, when wanted, is made to fall at the back of the said inner box, and is then in the position for exposure; afterwards it is drawn backwards along the floor of the larger box, and another plate from above takes its place. The instrument permits the use of a lens of either long or short focus at the will of the operator, and it seems likely to prove useful in practice from its extreme simplicity.

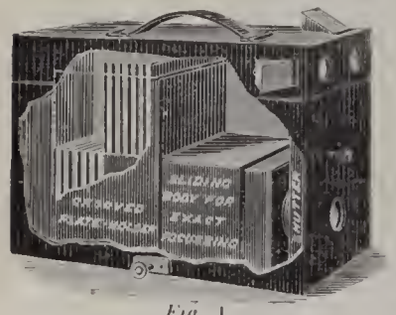


Fig. 1.

Mr. Oscar Schölzig has recently submitted to our inspection the "Apollo" detective camera of Messrs. Unger and Hoffman, of Dresden. Its exterior is represented in figs. 2 and 3. It is not much bigger than a large cigar box, yet carries fifty plates, which can be changed by the operator without opening the instrument. Fig. 3 represents the handles, which are suitably pulled out and pushed in to effect the changing of the plates. The inside of the camera is remarkable, for beyond a couple of frames for moving the plates, and a simple spring or two, it is nearly destitute of mechanism, and the more

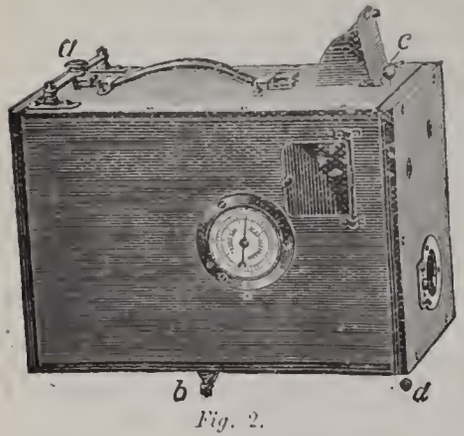


Fig. 2.

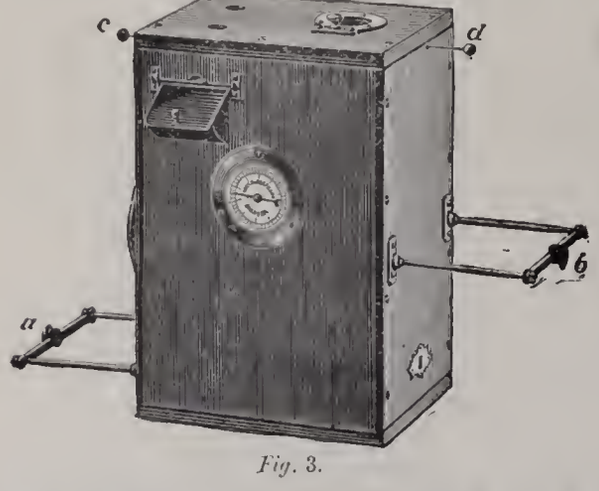


Fig. 3.

mechanism there is in a camera, the more likely is it to get out of order, all other conditions being equal.

Messrs. Unger and Hoffman say that by drawing out knob *d* the shutter is put into action and the exposure is effected. The changing of the exposed plate is done by drawing out the two slides *a* and *b* and pushing them back again. It does not matter which slide is drawn out or pushed in first, but it is essential that both slides are drawn out before either of them is pushed back. When pushing in slide *b*, which is in connection with the indicator, do not press too hard, as this may cause the hand of the dial to turn too far. It must, however, be pressed until the spring catches, and the hand moves one number on, which indicates that another plate has been brought into position for exposure. This simple and convenient way of changing may be continued according to the number of exposures to be made, but we would recommend always to change plates at once after exposure, so that there be no doubt afterwards that you always have your camera ready for exposure. The shutter can be regulated for instantaneous as well as for time exposures, and this is done by means of a screw placed at the side of the lens. By screwing out in the direction M, the shutter works instantaneously, by turning in the direction Z, and by pulling out and holding the knob *d* which controls the right hand shutter slide, the exposure can be prolonged at will. The shutter must be set previously by pulling the knob *c*.

Patent Intelligence.

18,936. R. TEMPERLEY, Central Chambers, Halifax, "Automatically Exhibiting Photographs."—November 26th.

18,955. F. H. SANDERSON, 48, Bridge Street, Cambridge, "Dark Slide."—November 26th.

19,024. F. J. SMITH, 23, Southampton Buildings, London, "Apparatus for Obtaining Instantaneous Photographs by Artificial Light."—November 26th.

19,099. A. K. SIMPSON, 2, John Street, Bristol, "Excluding Light from Focussing Screens."—November 28th.

19,157. E. EDWARDS, 35, Southampton Buildings, London, "Photograph Preservers."—November 28th.

19,191. W. R. BAKER, 9, Belmont Villas, Wallington, "Cameras."—November 29th.

19,229. R. FOWLER, 6, Lord Street, Liverpool, "Cameras."—November 29th.

19,319. A. PEARSON, 3, Commercial Street, Halifax, "Reducing Cameras for Lantern Slides."—December 2nd.

19,349. H. E. NEWTON, 6, Bream's Buildings, Chancery Lane, London, "Cameras."—December 2nd.

19,508. W. E. DEBENHAM, Massingham House, Haverstock Hill, London, "Magnesium Flash-Light."—December 5th.

19,691. O. FREEWORTH, 41, Eastcheap, London, "Cameras."—December 7th.

19,737. R. BROWNLIE and ISABELLA BROWNLIE, 75, Victoria Street, Belfast, "Advertising by Photographic Means."—December 9th.

19,770. FRANK MIALL, 13, Shelgate Road, Battersea Rise, London, "Photographic Carriers or Sheaths."—December 9th.

19,896. A. J. BOULT, 323, High Holborn, London, "Photographic Films." (George Eastman, United States).—December 10th.

19,897. A. J. BOULT, 323, High Holborn, London, "Apparatus for Making Photographic Films." (George Eastman, United States).—December 10th.

19,903. W. P. THOMPSON, 6, Lord Street, Liverpool, "Copying Drawings by Light." (C. Rolland, France).—December 10th.

19,976. G. ISAAC, Rochford House, Southtown, Suffolk, "Frame for Lantern Slides."—December 12th.

2,009. R. HADDAN, 18, Buckingham Street, Strand, London, "Cameras."—December 12th.

Specifications Published.

18,562.—19*th December*, 1888. "A Machine for Mounting Photographs." JAMES SYRUS TULLEY, Photographer, 1, Newington Green Road, Essex Road, Islington, London, N.

The invention consists of two receptacles attached to each other or unattached at the will of the operator, one receptacle holding the photographic prints, the other holding the card mounts; a tray is fixed on the lower half to contain the mounting material.

The two receptacles, when brought together, bring the prints to the face of the cards; the prints and cards are kept pressed up to the top of each receptacle by springs. The prints having the mountant passed over their backs when the two receptacles

are brought together, attach themselves to the cards or mounts. A tray is used, the exact size of the prints, to place them in to keep them in one position previous to being put in the mounting machine.

359.—*January 8th*, 1889. "The Extraction of Aluminium from Cryolite." Professor CURT NETTO, of 16, Lindenaustrasse, Dresden, Engineer.

My invention relates to the extraction of metallic aluminium from cryolite and other aluminium compounds by the reduction of the same by means of sodium or similar reducing agents, or by the aid of electricity.

In the specifications of former Letters Patent, No. 1,228, dated 21st March, 1887, and No. 17,532, dated 20th December, 1887, I have described processes whereby I provide for obtaining metallic aluminium containing a small percentage of impurities as compared with the aluminium produced by the processes employed previous to the date of the said former Letters Patent, No. 1,228.

The object of my present invention is to provide for the production of practically pure aluminium from cryolite and other aluminium compounds containing silicon, iron or other impurities.

My said invention is based upon the discovery that nearly all the silicon, iron, or other impurities which are capable of combining with aluminium are reduced during the first stage of the reduction process for the extraction of the aluminium, and that, by interrupting the process when such impurities have been reduced, and withdrawing the impure aluminium thus formed, the impurities contained in the charge can be eliminated, so that, in the subsequent stage or stages of the process, pure aluminium will be extracted.

According to my said invention, therefore, I obtain the aluminium by fractional reduction, that is to say, I first separate or extract part of the aluminium with practically all of the impurities contained in the charge which are capable of combining with aluminium, and I then extract from the charge —which has, in the manner above indicated, been freed from the said impurities—the remainder of the aluminium in the pure state.

The inventor, after describing in detail how he achieves the above result, continues :—

Although I have hereinbefore described my invention, by way of example, as applied to the reduction of cryolite by means of sodium, for the purpose of producing pure aluminium from impure or contaminated raw material, my improved process of fractional reduction can also be applied to the extraction of aluminium from other substances, by means of the same or other suitable reducing agents (such as magnesium or potassium); for instance, in cases where chloride of aluminium, or the double chloride of aluminium and sodium are to be treated. Moreover, in cases where the decomposition is effected by electricity, or by electricity and carbon, a fractional reduction can be applied with advantage for the purpose of removing or eliminating, during the first stage or stages of the process, the impurities contained in the charge, and subsequently completing the reduction from the material thus purified.

To more effectually ensure the purity of the aluminium, I line the crucibles or other receptacles in which the reduction is performed, with basic materials of such a nature that the aluminium cannot gather from the wall of the crucible or other receptacle silicon or other impurities.

The inventor claims :—

1. The extraction of aluminium from cryolite or other aluminium compounds by fractional reduction, for the purpose above specified.

2. In the manufacture of aluminium, the fractional reduction of the aluminium compounds in such a manner that first a part of the aluminium contained in the charge is precipitated together with the impurities—or the metals reduced from such impurities—and then the remainder of the aluminium is obtained in a practically pure state from the part of the charge thus purified.

3. In the manufacture of aluminium, the treatment of the aluminium compounds in such a manner that first the impurities contained in the charge are precipitated and removed, and then the aluminium is reduced from the purified charge in a practically pure state.

4. The treatment of cryolite or other aluminium compounds by a decomposing metal in a vessel lined with a basic material, as and for the purpose above specified.

1,255.—*23rd January*, 1889. "Pottery Transfer Paper." THOMAS PHŒNIX, Liverpool Road, Newcastle-under-Lyme, Paper Maker, and GEORGE KIRK (administrator of the personal estate and effects of Mary Ann Lamb, Widow, Paper Manufacturer, deceased), of Uttoxeter, in the same county, Gentleman.

The inventor claims :—

The process for preparing pottery transfer paper in narrow widths, consisting in assembling a series of rollers of wood or other appropriate material upon a shaft, then winding a broad paper thereon into a roll, then dividing the roll circumferentially at the intervals between the rollers, and, finally, removing the rollers from the shaft each with the paper thereon.

9,198.—*June 3rd*, 1889. "Albums for Photographs." SIEGFRIED MARKUS, Bookseller, and BERNHARD FUCHS, Bookkeeper, both of Rawitsch, Germany.

This invention relates to improvements in albums for photographs, by which the durability and the good appearance of the same are considerably increased.

The improvements consist essentially in the fact that each single leaf of the album is made of two parts, and that these two parts are firmly connected on one (the left) side in a hinge-like manner with each other and with the cover.

The other (right) sides are provided with closures in such a manner that they may easily be closed and readily opened again by means of a hollow key or similar instrument.

The advantages offered by the new arrangement are as follows :—

The album, even when entirely filled, preserves its original thickness, and does not stand open on the front side; it is, furthermore, impossible to purloin photographs without having the key of the album. The leaves are much more durable, as they will not be injured by tearing caused by the difference of the size of the photographs, when the latter are pushed into the frames.

The inventors claim :

In albums for photographs and the like.

1. The application of partible leaves connected together in a hinge-like manner on the inside, and provided near the outer edges with locks, whereby a firm connection of the two halves of the leaves can be effected.

2. The application of metallic clips or clamps to the borders of the openings in the leaves for holding photographs to be inserted from the inside.

3. The hereinabove described arrangement for adapting photographs to partible leaves, and for securing them against improper removal.

AT the commencement of the new year, the *Optical Magic Lantern Journal* will be published on the 1st, instead of the 15th, of the month.

PHOTOGRAPHING INTERIORS.—Mr. G. Alpers says that gelatine plates should be exposed proportionately much longer than wet collodion ones. He had made the photograph of an interior with the aid of this last process, exposing for three hours, and he desired to reproduce this same interior on a gelatine plate which was from ten to fifteen times more sensitive. He supposed that an exposure of thirty minutes would be sufficient, but in developing he obtained almost nothing, and he was obliged to give an exposure of five hours. The author explains this singular fact as follows :—Bromide of silver is much more sensitive than the iodide of the same metal to the intense rays, whilst it is not more sensitive than iodine to the very weak rays. This explains why the negatives of portraits on gelatine are generally harder, than those on collodion. To reproduce interiors having windows placed opposite the objective, the author covers them with red tissue paper, which he removes for a few seconds at the end of the exposure.—*Deutsche Photographen-Zeitung.*

Correspondence.

THE OXY-CHLORIDE THEORY.

SIR,—It is always difficult to apportion the relative degrees of merit attaching to individual investigators, who separately attack a problem, and lend help towards its solution; and even more difficult does this task become when the proof of a certain theorem is not yet definitely arrived at.

Pretty much in this position stands the oxy-chloride theory, and the credit of its revival, upon which Dr. W. R. Hodgkinson addressed you a letter last week. No one had less intention than myself to divert from the eminent Woolwich professor anything that is due to him, and when answering my correspondent in the NEWS of December 6th, I directed his attention to pages 53 to 57 of Professor Meldola's book on the "Chemistry of Photography," wherein this hypothesis is discussed, and one of these is actually devoted to the description of Dr. Hodgkinson's results. Page 56 runs thus:—"If oxygen, either in the free state or in the form of water vapour, is essential to the photographic decomposition of silver chloride, it is evident that the darkened product must contain some compound of the nature of an oxychloride. It is in this direction that I venture to think we must look for the future solution of the problem of the chemical constitution of the photo salt. This view has been suggested more than once, but it rests at present without rigorous experimental proof. I may state that the subject is undergoing investigation by Dr. W. R. Hodgkinson, and although his results are not yet completed, I believe I shall not be guilty of a breach of confidence if I state, on his authority, that the darkened product contains an oxychloride of the probable formula Ag_4OCl_2, or

$$O < \begin{matrix} Ag. & Ag \\ Ag. & Ag \end{matrix} \begin{matrix} Cl \\ Cl \end{matrix}$$

and, in a foot-note, the author goes on to say: "Dr. Hodgkinson has since informed me that he has confirmed this result." So that, although I did not actually mention Dr. W. R. Hodgkinson by name, here is, at any rate, a point-blank reference to his work; and, as I have not heard that the research is even now published in a completed form, perhaps this is all that can be said about it on the present occasion; for, short of the quantitative demonstration, Robert Hunt's statement comes first as enunciating the oxy-chloride hypothesis, and Dr. Hodgkinson's analysis of the darkened product, given in the NEWS of June 17th, 1887, accounts for only "a little more than one per cent. of oxygen," instead of the *three per cent.* required by the above-mentioned formula.

It will be seen, on further reference to Professor Meldola's recently published work, that he bases his contention on the presumed analogy of the darkened cuprous oxy-chloride with the product obtained by exposing white chloride of silver to sunlight. More work, or a more specific declaration on the part of the investigators, would seem to be demanded before it can be said that the precise chemical interpretation of a confessedly delicate problem is finally set at rest.

London, December 14th, 1889. JOHN SPILLER.

ANSCHUTZ'S INSTANTANEOUS PICTURES.

SIR,—Referring to the illustrations and notes on these photos. in the PHOTOGRAPHIC NEWS of 13th inst., we beg to inform you that we supply the series of these photographs. We mention this, as some of your correspondents may wish to know where the photographs may be obtained in England.

4, *Saleott Road, S. W., Dec. 18th.* ERDMANN & SCHANZ.

ARGENTIC BROMIDE ENLARGEMENTS.

SIR,—We are informed by several customers that representatives of competitive firms are circulating the report that we are no longer undertaking the production of argentic-bromide enlargements, for which we have obtained some reputation.

We ask the advantage of your wide circulation to state that this is a most unscrupulous attempt to injure our business, and that the report is absolutely devoid of a vestige of truth.

SAMUEL FRY & Co., Limited.
A. E. HAYMAN, Secretary.

Proceedings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

THE usual weekly meeting was held on Thursday, December 12, Mr. J. J. MORAN in the chair. Mr. R. Poulter Drage was duly elected a member of the Association.

Mr. P. EVERETT showed prints from a negative, one half of which had been treated with ferricyanide of potassium and re-developed. The parts were identical, showing that the slight yellow stain had no retarding effect on the printing.

Mr. J. B. B. WELLINGTON exhibited some transparencies on very thin glass. He said the only advantage was portability. He thought there was great risk of breakage when the glass was so thin.

Mr. P. EVERETT asked what was the cause of the difference in the colour of the deposit on slides.

Mr. DEBENHAM said the warm colour was due to stopping the development at any early stage.

Mr. WELLINGTON said it was due to the size of the particles of silver.

Mr. A. COWAN thought it would not be possible to get a dark deposit on a plate that had been over-exposed, even if the developer were allowed to continue for some time, if the plate used was of such a quality as to produce red tones.

Mr. WELLINGTON said that by leaving plates for different periods in the same developer, different colours could be obtained: the longer the plates were being developed, the darker the tone.

Mr. KELLOW showed a print in which the shadow of a chimney on one roof was dark, while the shadow of the same building on a neighbouring roof was light. No explanation could be given. Mr. Kellow promised to bring the negative to some future meeting.

CAMERA CLUB.

ON Thursday, December 12th, Mr. CHARLTON WOLLASTON read a paper on "Timing Shutters": Mr. A. PRINGLE occupied the chair.

Previous to the lecture, Mr. FERRERO explained a focimeter he had made for enlarging purposes, in which the actual distance of object and image from lens were given on the scale of the instrument.

Mr. SHIPTON exhibited a collapsing American clothes-drier, which he had found eminently suited for drying prints or films upon. He also showed fish glued strips of paper for binding lantern slides. These strips were cut from gummed sheets produced by Messrs. Dennison.

Mr. WOLLASTON, in his address, criticised the several well-known methods of timing shutters, and, after describing the process he wished to put forward, he produced the apparatus and gave a demonstration of its action. The instrument was devised to give a record of the exposure given by the different portions of the lens from centre to margin during the opening and shutting.

In the discussion, the Rev. A. B. COTTON exhibited and explained a small camera he had made for the purpose of timing shutters.

Mr. H. STURMEY described Wilson's shutter chronograph, and exhibited plates showing tests made with a great variety of instruments.

Several shutters brought by Mr. Wollaston, and some lent by Messrs. Hinton & Co., were on view to illustrate the subject under discussion.

On Monday, December 16th, the Club opened the fifth of its series of "one man" exhibitions; the pictures shown were a collection of the works of the late Mr. O. G. Rejlander.

Mr. FRANCIS COBB opened the Exhibition, drawing attention to the distinctive feature of Rejlander's career, that he was the first in photography to see and prove some of the higher possibilities of the camera as applied with an artistic aim to portraiture and figure subjects. He also spoke of the amiable personal character of the artist, his training as a painter, his devotion to, and faith in, photography, and, at the same time,

his readiness to admit its limitations. In referring to the pictures in the room, Mr. Cobb mentioned specially "The Two Ways of Life," an elaborate attempt to illustrate pictorially the opposite courses of virtue and vice. In this photograph, he stated, over fifty negatives were said to be combined. Of the other work, perhaps the most notable are the clever humorous subjects, which are well known to photographers and the public—"Ginx's Baby"; "She is looking at me, the dear creature!"; "Catching—Caught!"; "Cats caught by Rejlander"; "Did She?"; "I don't know"; and others. Amongst other interesting photographs are "Dr. Brown and his Dog," "Rab and his Friends," and portraits of Tennyson and Doré; also the strange attempt to depict by photography such subjects as "John the Baptist's Head in a Charger," and "A Vision from Aspromonte." Rejlander posed himself as Garibaldi in several photographs. Perhaps the most completely satisfactory of the pictures are those in which Rejlander devoted himself to representing incidents of street Arab life. In these bits of humorous characterisation he showed himself a master as regards infusing his idea into his models, and securing natural and spirited expression of the subject. "Adding Insult to Injury," "Is it a good'un, Jem?" and the pathetic figure of the little waif huddled up on steps, are especially effective.

After the opening of the Exhibition—which will continue for about six weeks, and is open to visitors on presentation of their cards—an exhibition of lantern slides was given upon the Club screen.

Hackney Photographic Society.

On Thursday last this Society held its members' lantern evening.

Mr. Gosling showed a contrivance he had constructed for taking oneself in a group. It consisted of a clock which had had the pendulum removed, and on being wound up, rapidly "ran down," allowing time for the operator to place himself in the midst of a group before the hour hand touched a catch which released a drop shutter and made the exposure. Various lengths of drops were shown, which of course lengthened the exposure.

Mr. Hubert was asked for his flash-light formula, and it was given as follows:—

Antimony	⅓ part
Chlo. potash	2 parts
Magnesium	1 part

the whole to be well mixed.

The meetings will cease until January 9th, 1890.

Photographic Society of Ireland.

The members of this Society met on the evening of Dec. 13th for the first time in their newly acquired premises, 15, Dawson Street, Dublin. The attendance taxed to the utmost the resources of the apartments.

After the formal business, the incoming President, Mr. Geo. Mansfield, delivered his inaugural address, in the course of which he said, that on the present occasion it would not be unsuitable for him to call to mind the present position of photography, and the critical position in the existence of their own Society. After something more than half a century of existence, photography appeared to be entering upon a new era. The struggle for life that marked its history has long passed, and the battle of rival processes which diverted the attention of its highest exponents from the higher aims of artistic excellence was now practically over. Of course this could not be interpreted as conveying that the study of the scientific branches—chemical and optical—had been laid aside, but that both their processes and apparatus had now attained to a perfection which, if not complete, was sufficient to enable the photographer to turn his undivided attention to the highest branches of his art. Their art was above all an imitative one; its aim was the reproduction of nature, and he was sure they would agree with him that a love of nature was one of the first requisites to the art of photography, and he thought it was equally important that it should be a discerning love. Because they were bound to follow nature closely, it did not ensue that they should show no discernment; they should select the highest forms of beauty. He was glad to be able to report an increasing number of members, and a good balance to their credit, and he hoped that this state of affairs would continue to exist.

Mr. Greenwood Pim and Dr. E. M. Cosgrave having spoken, the evening concluded with a display of lantern slides.

Leicester and Leicestershire Photographic Society.

A regular meeting was held in the Mayor's Parlour, Old Town Hall, on December 11th, Mr. Geo. Bankart in the chair.

Mr. J. B. Cooke delivered an address on "Photographic Dodges." He opened by saying how necessary it was to commence with accuracy in all manipulations, the "dodges" being a useful adjunct. He called attention to the desirability of extreme cleanliness in dishes and measures; this he always found brought about in a most expeditious manner by the use of Brooke's Monkey soap, which was thoroughly effective. Vaseline smeared on the stoppers of bottles and rubbed off again, prevented sticking. For halation he found a rag dipped in methylated spirit and the halated part rubbed with it, to speedily reduce to any degree. To those who found their negatives lose intensity on fixing, he recommended the addition of ten drops of ammonia to the pint of fixing bath, and he gave a practical illustration of the superiority of two buttons for securing the end of the brass springs of printing frames, which effectually prevented shifting of the print after being examined.

Derby Photographic Society.

The usual monthly meeting was held at the Society's Rooms, Derwent Street, on Tuesday, December 9th, Mr. Richard Keene chairman.

Mr. Lovejoy, the retiring hon. sec., presented the committee's annual report and balance sheet, which were adopted.

This Society is now in a flourishing condition, having acquired a large lecture room with a dark room attached for the use of its members.

West London Photographic Society.

An ordinary meeting of this Society was held at the Addison Hall on Dec. 13th, Mr. Bilton in the chair.

Mr. St. Clair Buxton, F.R.C.S., was nominated for election by Dr. Harrison Low.

The Secretary, Mr. Hodges, read the following question from the question box:—"What is the best means of blackening diaphragms when worn bright?"

Mr. Blackmore recommended the stops being sent to the opticians, who would renovate them for a very small sum.

Mr. Foxlee said if clean brass work were immersed in a weak solution of bichloride of platinum, the metal would be darkened, but the colour was not very good.

Mr. Blackmore had used for other work, though not for diaphragms, a solution of eight parts hydrochloric acid and one part white arsenic. After prolonged digestion, the metal was immersed in the solution, and then gently dried before a fire.

Mr. Hodges wished to know whether the colour so obtained was of a permanent nature, or merely superficial and liable to be easily rubbed off?

Mr. Blackmore said the solution seemed to affect the surface particles of the brass itself.

The President had tried the effect of a solution of 40 grains of silver nitrate in 100 minims of water added to another solution of 40 grains of nitrate of copper in 100 minims of water. The stops were dipped in the solution, and then subjected to heat. The result was disappointing, the colour produced being greyish-black, and producing a strong deposit on the brass itself, which, upon analysis, proved to be nitrate of silver.

Mr. Stein then proceeded to read his paper upon "Detective and Hand Cameras," after which representatives from the firms of The Eastman Co., Rouch & Co., Mawson & Swan (Mr. Winter), Fry & Co., Abrahams, Shew, and Marion & Co., attended and explained the working of the cameras made by their respective firms.

The discussion was adjourned to the 27th inst., and as the meeting on that date will be technical, the President requested members to bring with them any matter which might be of general interest.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

A SPECIAL general meeting was held at the Society's Room, Grand Hotel, Almore Row, on December 11th, to consider the feasibility of making a photographic survey of Warwickshire, the object being to secure an accurate and unbiassed record of the scenery, monuments, life, and natural history facts of the county as they now exist. Mr. J. B. STONE, J.P., F.L.S., F.G.S., presided.

The circular convening the meeting having been read by one of the Hon. Secretaries (Mr. J. H. Pickard), Mr. STONE said that he took this opportunity of returning them thanks for the honour they had done him in electing him as their President in succession to a man so distinguished in science as Dr. Hill-Norris. He called attention to the splendid work done photographically in connection with the geological survey of the United States, and expressed the opinion that there was no branch of science in which it could not render most useful aid.

Mr. W. JEROME HARRISON, F.G.S., then read his paper, entitled "Some Notes upon a Proposed Photographic Survey of Warwickshire" (see page 859).

The PRESIDENT proposed the following resolution from the chair:—"That a committee be appointed, consisting of the council of the Birmingham Photographic Society, together with representatives from each local society—scientific, literary, or artistic—which is willing to co-operate, to consider the best means of making a photographic survey of Warwickshire, and to report to a future meeting." He urged the necessity for carrying out the scheme, describing the manner in which objects of the greatest interest were continually disappearing from decay and accident; and giving as illustrations the "ducking stool" in the crypt of St. Mary's church at Warwick; the old chair at Astley Castle used by the Duke of Suffolk when he hid in a tree to escape capture; and the portraits of the conspirators in the Gunpowder Plot which are in Combe Abbey.

Professor HILLHOUSE (Mason College) seconded the resolution, saying that he thoroughly believed in photographic surveys. At the Mason College, the plan which he had urged, of each professor being photographed on joining the staff, had already given interesting results. Speaking as a botanist, he said that a photograph of *Osmunda regalis*, growing in boggy ground at Moseley, near Birmingham, would furnish a proof that could not be gainsaid that the plant really did once grow there, a fact which was now disputed. In attempts to acclimatise plants, photographs taken at frequent intervals would be of great service. He strongly emphasised the statement which had been made by the president, that there must be no "doctoring" or "retouching" of any of the work done in connection with the survey.

Mr. JETHRO COSSINS (Archæological Section of the Midland Institute) said that the charming village scenery of Warwickshire was changing with a rapidity which few imagined. Again, he quite lately found a farmer near Oldbury pulling down a small Norman chapel which formed part of an ancient castle. The churches of Warwickshire have already, for the most part, been "restored," so that such a scheme as this photographic survey was wanted long ago.

Councillor ANDREWS (President of the Coventry Photographic Society) sympathised with the scheme, but thought it was rather an enormous one. Of one ancient church in Coventry alone he had secured one hundred and twenty negatives before its restoration. He hoped, however, that the movement might be carried to a successful issue.

Messrs. H. STURMEY and F. W. DEW (Coventry) agreed with Mr. Andrews; and Mr. Sturmey proposed that the Committee to be appointed should report to another meeting, to be held at an early date, as to the exact manner in which the survey should be carried out. This was agreed to, and words to that effect were incorporated in the resolution.

Mr. E. C. MIDDLETON said that the pictures must be printed by a permanent process, and the use of wide-angle lenses must be avoided as much as possible.

Mr. W. B. GROVE, M.A. (late President of the Birmingham Natural History Society) urged the importance of photo-micrography, especially of the fungi.

Answers to Correspondents.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper & Carter, 5, Furnival Street, London.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

BOSTON, U.S.A.—Beyond the use of chloride of calcium (not so good as chloride of strontium) in collodio-chloride emulsions, we have never heard of the application of this salt in connection with the collodion process, and do not anticipate any useful purpose would be served by such addition.

G. D.—The invitation acknowledged with thanks. We congratulate you upon having got together so large a collection of the late O. G. Rejlander's works, which cannot fail to prove of interest to the art-photographers and students of the present day.

W. R. H.—Answered at length in the "Correspondence" column this week.

MEMBER.—Mr. Debenham's paper is only postponed for a month; Mr. Whipple's communication occupied the entire evening, and was full of interesting details, some of which were further illustrated by means of the optical lantern.

P. R.—Woodburytype process. The size of the plates is necessarily dependent upon the power of the hydraulic press. Messrs. Waterlow and Sons are producing a series of portraits, "Men and Women of our Time," which measure 11 by 7 inches, and they could as easily turn out square plates if wanted, or go on to one foot square with their present appliances. Beyond this size we cannot say with certainty, for the pressure on the gelatine mould then requires to be enormous.

J. B.—Dark-room illumination. The use of yellow or orange light, if pure, is certainly gaining ground; the ruby glass is very trying to the eyes, and appears to be altogether unnecessary, even with rapid plates. In the latter case one has to develop by guess-work, for the imperfect illumination tends to exaggerate the density of the produced negatives, leading to much uncertainty in working.

W. S. T.—The photo-mechanical processes are well described in Mr. W. K. Burton's manual, published by Messrs. Marion and Co. For general manipulation consult Captain Abney's "Instruction in Photography," to be had of our publishers.

A. L.—Iridium toning is no better than platinum, except for enamel plaques, and the cost would be considerably greater, on account of the rarity of the metal.

TYRO.—Grammes per litre is not a per centage proportion, but one-tenth of that; for a thousand grammes or c.c. of water make one litre, and this weighs a kilogramme.

A. M. S.—The collotype ought to suit your purpose. Enquire of Mr. Walter S. Bird, 74, New Oxford Street, W.C., sending him an ordinary silver print from your negative.

TOP LIGHT.—Have nothing to do with ground glass, for it soon gets dirty, and your object is equally well attained by curtains, which, in any case, must be provided. Besides, in dull weather, you lose so much light, and require to be constantly cleaning the roof, even if you glaze with the ground side inwards.

R. R.—Extraction of platinum from paper clippings, &c. Burn the paper, and digest the ashes with strong hydrochloric acid to dissolve out lime and iron salts; wash two or three times with warm water by decantation, and collect the platinum deposit on a filter, drain, and dry it. Treat the black matter with warm aqua regia to dissolve out the platinum—a rather slow process; then add water, and filter. Add sal-ammoniac to the solution, and evaporate to half bulk, to drive off the excess of acid. Allow to cool, and collect the precipitate (ammonio-platinic chloride) on a filter, slightly wash, dry, and ignite, to get pure platinum black, which you may either sell in this form, or again dissolve in aqua regia, and prepare from it the required platinum salt.

IT is desired that questions requiring to be answered in this column may be sent early next week, on account of Christmas intervening.

A. B. and L. N. received.

SECRETARY N. M. P. C.—Your letter was not received until Monday morning.

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ALBUMEN AND GELATINE IN PHOTOGRAPHY.

In another column will be found some particulars about plain paper printing by Mr. Lyonel Clark, in which there is little of novelty; but details are given which are likely to be of use to beginners. In the course of his deliverance, he made some disrespectful remarks, as is his custom, about albumenized paper, and perhaps few but those who are compelled to use it because of the public demand will be inclined to speak of it in higher terms. The family albums in many a home contain pitiable objects, resembling the faded leaves of autumn, consisting of portraits in various stages of disappearance, and all slowly passing out of this transitory world because of the failings of albumenized paper. When a bootmaker sells bad articles, the faulty boots are not kept constantly in the drawing room for the inspection of visitors; but such is not the case with photographic portraits; the miserably discoloured objects are kept for the examination of everyone so long as any traces of a picture remain. With such defects in photography constantly before their eyes, it is no wonder that of late years there has been a slight revival of the almost lost art of miniature painting on ivory, and that the phrase, "only a photograph," is commonly heard. Fortunately for photography, the merits of prints by platinum processes are becoming more and more known in the educated section of society.

What, however, does Mr. Clark mean by substituting gelatine for albumen? Gelatine is a hygroscopic substance, and about as complex in its chemical constitution as albumen. It might perhaps be rendered more permanent by tanning it, and some German experimental photographers have been trying to do this without discolouring the prints. Gelatine is so bad for the platinum process, that Mr. Willis, in early times, had occasional defects in platinotype paper, which defects he traced to the presence of gelatine in the sizing of the paper. Glass-supported silver transparencies toned with gold, in which gelatine had been used in making the emulsion, have been found in some cases, if not in all, to discolour with lapse of time. In fact, there seems to be an affinity between certain kinds of organic matter and certain metallic salts, so that minute portions of the salt are taken up by or enter into combination with the organic matter, and afterwards cannot readily be separated. Chloroplatinic acid and gelatine have an exceedingly strong affinity for each other, a fact which was first made known at one of the meetings of the Royal Society in the early part of the present century. Sugar of liquorice is remarkable for giving precipitates with a long range of metallic salts.

For photographic use, starch is a better substance than gelatine for the sizing of papers, and genuine Bermuda arrowroot is a convenient and easily obtainable form of starch for the purpose. In the substitution of gelatine for albumen, time may possibly prove that little or no advantage has been gained, so far as the durability of pictures printed out fully by sunlight is concerned.

SOME POINTS IN THE CONSTRUCTION OF THE STUDIO ROOF.

An interesting and animated discussion on the subject of the glass roof of the studio occupied the members of the Berlin Photographic Society at their last meeting. Questions of this practical character have such an abiding interest for so many of those who make photography their profession, and even for those who, whilst their general photographic labours are unconnected with the studio, yet desire for the portraits which they may occasionally produce to work under the most favourable conditions available, that it is almost a matter for surprise that they are not more frequently brought forward at meetings of our own societies. True, there are some photographic societies where the reading of a formal paper is not regarded as the essential business of the evening, and where the utmost catholicity as to the subjects to be discussed, and the greatest freedom of remark from those present at the meetings, are not only permitted, but encouraged. One of our London societies stands conspicuously forward in these respects, and its usefulness and interest may be estimated by the

fact that it is rare to find any of its meetings pass away without something to be learned, or some truth to be enforced which had escaped a sufficiently general recognition.

To return, however, to the subject of the form of glass roof which was discussed at the Berlin Association, the special question raised was whether it is more desirable to rest content with the usual arrangement of a roof in one slant united with the side by eaves, or whether it is better to employ curved glass at the place of junction, so as to cause the slant of the roof to change gradually into the upright of the sides. There is, as is generally the case, a good deal to be said on both sides, which the photographer contemplating the erection of a new studio, or the alteration of an existing one, would do well to consider. The amateur, too, who proposes to put up a conservatory with the idea of utilising it occasionally as a studio, will also doubtless feel more satisfied if he has weighed the advantages of various forms of roof before entering upon the actual construction.

In favour of curved glass at the place of the eaves, it is urged that there is, with the ordinary overhanging arrangement, and the gutter which usually accompanies it, a cutting off of the light in a direction where it is of most value. To the extent to which this stoppage of light takes place, this objection to the ordinary form of studio roof is doubtless a good one, and the mere demonstration which the curved glass affords of the possibility of having a clear continuous source of light from the highest point to the bottom of the glass used in the sides, should awaken photographers to the desirability of at all events reducing the blocking of light at the eaves to the smallest amount consistent with strength, even when using the general form of the ordinary construction. In some studios that we have visited, there has been so much woodwork at the top of the side panes, and the bottom of the framing holding the roof panes has been so wide, that a very considerable amount of loss of light has resulted—a loss which is to be regretted, not only on account of the increase of exposure thereby rendered necessary, but, as has been pointed out, by the fact that it occurs just at the point where the light comes in most usefully to illuminate the model. By constructing the roof of iron, with sash bars and roof bars rivetted or screwed to a length of angle iron running along the whole of the side of the studio, the obstruction of light may be reduced to a minimum.

There are several advantages about an iron construction of the roof, advantages which we think have not received so much consideration by photographers as the subject deserves, or the use of wood would not be so common as it still is. Not only does a narrow piece of angle iron suffice for the "plate" instead of a much broader and thicker piece of timber, but when iron is used for all the sash work, the bars may be much narrower, and being yet so strong, they may be trusted to support broad panes, so that they may be fewer in number. Another advantage of a different character is that there is much less liability to shrinking and alteration, and consequently induced leakage. We know a photographer who had to abandon the use of carpet in the studio, and content himself with covering the floor with floorcloth, solely because he could not keep his roof sufficiently sound to be secure against leakages that made unsightly wet patches, and ultimately destroyed the carpet. At last, however, he had the whole of the wooden roof bars removed, and their place supplied by iron, with the result of achieving a remedy for the plague with which he had been afflicted.

Another advantage claimed for the curvature at the junction of the roof and sides is that the roof keeps cleaner than with the ordinary construction. There seems to be some reason for this contention as far as concerns the particular portion of the glass surface that is affected. If, however, the curve, instead of merely cutting off the usual angle at the junction of roof and side, is made so large as to necessitate the top being flat or nearly so, a lodgment of dirt must of course be expected. Both these varieties of roof construction may be seen in conservatories, where they are employed principally for their ornamental effect. If selecting either for the studio roof, we think that we should give the preference to the merely rounded angle, leaving the greater part of the roof in one slope.

The obvious advantages, on the other hand, of the usual angle at the eaves are that there is thereby afforded a convenient fixing for blinds, cords, wires, or other fittings; that there is less danger of running the corner of a background frame through the glass; and lastly, that flat glass, to replace a pane broken by accident, can always be obtained without delay, and at a comparatively light expense.

NEW FIXING BATH. By H. W. Vogel. (*A. B.*, 20, 615.)—A litre of hyposulphite solution (about 1:4) is mixed with 50 c.c. or more of acid sulphite lye. This lye is prepared by introducing gaseous sulphurous acid into concentrated solution of sodium bisulphite. Yellow stained plates developed with pyrogallol can be cleared by washing them in a dish of water, to which is added several cubic centimetres of the acid sulphite lye with some muriatic or sulphuric acid.—*Photographic Journal.*

THE SOLAR ECLIPSE.—In reference to the total eclipse of the sun which took place between eleven o'clock in the morning and half-past two in the afternoon of Sunday, a daily paper says:—"The corona is supposed to consist not only of incandescent gaseous matter—hydrogen we know is present—but also of solid or liquid particles which reflect the sun's rays. Of its exact constitution, however, there is still much to be learned; and although the flame-like prominences can be photographed at all times, it is only when the sun is eclipsed that the corona can be properly studied. The main purpose, therefore, in the minds of the observers was to obtain correct estimates as to the form and constitution of this remarkable appendage, and among other things, the next important was to find out whether, in the time embraced within the period of total obscuration, any material change took place in the size and shape of the corona. For this purpose photography, which has of late years served the astronomers so good a turn, was to have been largely employed, and there can be no doubt that, given fine weather, the eclipse will have presented us with many durable records, which can be carefully studied at leisure."

PHOTOGRAPHIC SURVEY OF WARWICKSHIRE.*

BY W. JEROME HARRISON, F.G.S.

OF undoubted Saxon remains we can only point to two places in Warwickshire. The first of these is at Tamworth Castle, just within the north-eastern boundary of the county, where the "herring-bone work" in the base of the lower wall is very characteristic. The second example is at Wootton-Wawen, where the lower half of the church tower is certainly of Saxon masonry. In each of these cases we want photographs taken from a moderate distance, showing the entire building, &c., and also several near views, in which each stone would be distinctly represented. The best evidence of the complete colonisation of Warwickshire by the Saxons consists in the numerous Saxon place-names which still remain. The names of the rivers and hills—as Arden, Avon, Rea, &c.—are certainly Celtic, but most of the towns and villages have the truly Saxon affixes of "ham," "ton," "ley," "thorpe," &c. It is now pretty well acknowledged that the name of our new city, Birmingham, represents the dwelling-place (*ham*) of the tribe or descendants (*ing*) of Beorm: the said Beorm or Biorn being a Saxon chieftain.

The Danes, who ravaged the east and south of England so unmercifully in the ninth and tenth centuries, are thought not to have advanced beyond Rugby, the termination *by* being distinctively Danish. The gigantic ruddy animal which—carved out in the turf—ornaments the "Vale of Red Horse," near Kineton, in the south-east of the county, may be either of Saxon or of Celtic age; although there is a legend which assigns it to Neville, Earl of Warwick, in the fifteenth century. Neville may perhaps have "scoured"† it.

In the same direction, and just on the county boundary, are the famous Rollright Stones, some of which are seven feet in height. They resemble somewhat the famous stone circles (Druidical) of Stonehenge and Avebury, and are more probably of Celtic rather than of Saxon times.

The famous legend of Lady Godiva belongs to the very close of the Saxon period. Godiva (properly Godgiva) was the wife of Leofric, a powerful Saxon noble who died in 1057. He and his wife richly endowed a monastery and church at Coventry; and Dugdale records that in a stained-glass window in Trinity Church, Coventry, the stout Earl and his fair wife are depicted, the former bearing in his hand a scroll with the inscription:—

"I Luriche for the love of thee
Doe make Coventre Tol-free."

As in Leofric's time the population of Coventry was only 350, while the houses were but one storey high, with a door and *no windows*, the legend of "Peeping Tom" is in the highest degree incredible. As a fact, the tale probably originated during the latter part of the seventeenth century. Possibly some future historian will find in "Peeping Tom" the prototype of the man who carries a detective camera.

Many Saxon laws and customs have survived down to our own times; and to the Saxon rulers, in fact, we owe the very outlining of our county, as indicated by the word "shire." They divided the "shire" into large divisions called "hundreds," and in Warwickshire we have:—

1.—Hundred of Hemlingford, including Birmingham Solihull, Atherstone, Tamworth, &c.
2.—Hundred of Barlichway, including Alcester, Stratford, Henley-in-Arden, &c.
3.—Hundred of Kington (or Kineton), including Warwick and the south-east of the county.
4.—Hundred of Knightlow, including Kenilworth, Rugby, Southam, &c.
5.—Coventry, with a district around it, known as the "County of Coventry."

It is possible that these "Hundreds" may form convenient sub-divisions for the purposes of our photographic survey; in which case the Birmingham Photographic Society would naturally commence with the Hundred of Hemlingford, whose area is about one-fourth (say 220 square miles) of that of the entire county. It is somewhat unfortunate that our city of Birmingham should be situated on the extreme north-west margin of the county; but the "county," as a unit, is so much superior to any other that it must, perforce, be adopted.

Mediæval Warwickshire.—With the conquest of England by the Normans, in 1066, the written history of Warwickshire may practically be said to commence. In the Domesday Book we have a survey of the county, which includes the names of all the possessors of land, with the area and value of their possessions. With the Normans, too, we get the first important building operations—they erected many churches and castles.

The monuments of the mediæval age—which extended from the eighth to the fifteenth centuries—include the most striking buildings in Warwickshire. The great castles of Warwick and of Kenilworth were, until the invention of gunpowder, practically impregnable fortresses; while Maxtoke Castle, if smaller, is even more interesting, for its "moat and outer walls and its old iron-bound gate and gatehouse are scarcely changed during six hundred years." Astley Castle, near Nuneaton, dates from the thirteenth century, when a castle was a fortified house with a moat. Tamworth Castle we have already mentioned.

The close of the mediæval period saw also the destruction of the monasteries and other religious houses by Henry VIII. (1539); but Maxtoke Priory, Polesworth Nunnery (near Tamworth), Merevale Abbey (near Atherstone), the Whitefriars Monastery at Coventry, &c., still remain—in a more or less delightfully ruinous and picturesque condition—to testify to the religious zeal of our ancestors.

And the old churches: how delightful they are! Shall it not be our pleasure to record their every detail and architectural feature, so that when the hand of the "restorer" is laid upon them there shall be evidence retained of their original structure and condition? To take but two cases. "As an example of a preceptory and church of the twelfth century, of which neither restoration nor neglect have changed any important feature, Temple Balsall is unrivalled in Warwickshire, and not surpassed in any part of England." Let the Beauchamp Chapel (1465) in St. Mary's Church, Warwick, be our second example. It is, without doubt, as a sepulchral chamber, "one of the most famous in the kingdom," containing among others the tomb of Richard Beauchamp, Earl of Warwick, the cost of which alone exceeded £40,000 of our money.

Of moated houses, and picturesque old mansions, Warwickshire has many. Compton Wynyates (1510) is described by Timmins as "a marvellous and harmonious combination of the best and most artistic work in brick, stone, and wood. Its variegated colours of bricks, its richly-moulded brick chimneys, its exquisitely carved

* Continued from page 861.

† See that capital book, "The Scouring of the White Horse," by Tom Hughes, in which he describes a similar work in Berkshire.

gables and beams and wainscoting, its bold and vigorous and delicate stone carving, its noble rooms and great hall, with minstrels' gallery, its ninety rooms, with a secret chapel in the roof, its long lines of dormitories for soldiers, its venerable moss-covered and picturesque quadrangle, combine a series of charming views which are unequalled in Warwickshire, and unsurpassed elsewhere."

Of slightly earlier date is the old fortified manor house of Baddesley Clinton—"charmingly picturesque, for it has a fine ancient moat surrounding its grey walls, and quaint gables and chimneys, and its pretty garden parterres surrounded on three sides by the rooms of the house."

Guy's Cliffe, two miles north of Warwick, is pleasingly described in Camden's "Britannia," written in 1586:—"Hard by the River Avon standeth *Guy Cliff*, the very seat itself of pleasantnesse. There have ye a shady little wood, cleere and cristall springs, mossy bottomes and caves, medowes alwaies fresh and green, the river rumbling here and there among the stones with his streame making a mildc noise and gentle whispering; and, besides all this solitary and still quietnesse, things most gratefull to the muses. Heere, as the report goes, that valiant knight and noble worthy, Sir Guy of Warwicke—so much celebrated after he had born the brunt of sundry troubles and atchieved many painful exploits—built a chapell, led an eremit's life, and in the end was buried. Howbeit, wiser men doe think that the place took that name of later time by far, from Guy Beauchamp, Earle of Warwicke; and certain it is, that Richard Beauchamp, Earle of Warwicke, built St. Margaret's Chapell heere, and erected a mighty and giant-like statue of stone, resembling the said Guy."

Warwickshire in Later Times.—During the sixteenth century many most interesting buildings were erected in Warwickshire, including Pooley Hall, near Tamworth; Weston Park, Shipston-on-Stour; Wormleighton; the Leycester Hospital, at Warwick, &c. Aston Hall (1618) is a fine Elizabethan mansion standing in a northern suburb of Birmingham, and now the property of the corporation.

At the opening of the seventeenth century we find a Warwickshire man, Robert Catesby, acting as the proposer of the "Gunpowder Plot"; and, quite lately, it has been shown that the famous, or infamous, Guy Fawkes himself hailed from our county. Catesby was born at Bushwood Hall, Lapworth, and it is believed that the details of the plot were arranged there and at Norbrook, Clopton (near Stratford), and Coughton, the seat of the old Roman Catholic family of the Throckmortons. The Princess Elizabeth was then rsesiding at Combe Abbey, near Coventry; and the local conspirators arranged a hunting match at Dunsmore, near Dunchurch, for the fifth of November, intending, as soon as they heard of the success of the plot, to carry off the Princess and proclaim her Queen of England. When the news of the arrest of Guido Fawkes arrived, the conspirators fled into Staffordshire, where they were pursued and captured at Holbeach, Catesby being shot dead in the attack.

The Civil War in Warwickshire.—The first battle between the Royal and the Parliamentary forces was fought in 1642 on the plain below Edgehill, near Kineton, in the south-east of Warwickshire. The scene remains almost unchanged, and, with the assistance of a few lantern slides—especially if our friend Mr. Jaques would supply movable bodies of troops for the occasion—the eventful struggle of that day could be pictorially reproduced in a most graphic manner. This would be a novel and interesting way of teaching history.

Warwickshire Worthies.—To illustrate the local incidents connected with the lives of famous men and women who have been born in Warwickshire will be a pleasant task for the camera carrier. The plain stone farm-house at Griff, near Nuneaton, acquires a halo when we know it as the birthplace of "George Eliot;" and all the country round is described in her various novels as accurately as in a guide-book. We shall associate the great antiquary, Dugdale, Garter King-at-Arms, with his home at Coleshill; David Cox with the Birmingham suburb of Harborne; Bishop Vesey with Sutton Coldfield; Dr. Priestley, the discoverer of oxygen, with the Birmingham suburb of Sparkbrook; Dr. Arnold and Rugby School; Matthew Boulton, who sold "what all the world desired, *power*"—with Birmingham; Michael Drayton, the poet, with Hartshill; and many another famous name shall add interest to our work. But, far above all, we possess in Stratford-on-Avon and the neighbouring country such an illustration of the life and work of the immortal Shakespeare that this alone would be sufficient to render Warwickshire one of the most interesting spots of the whole world in the eyes of all civilised nations. When the first Shakespeare jubilee was held at Stratford in 1768, the most popular song was that written by Garrick, in which the main feature is the connection of the bard with the county:—

"Ye Warwickshire lads and ye lasses,
See what at our jubilee passes;
Come revel away, rejoice, and be glad,
For the lad of all lads was a Warwickshire lad,
Warwickshire lad,
All be glad,
For the lad of all lads was a Warwickshire lad."

(To be continued.)

We understand that Mr. F. York is proceeding to the West Indies for the purpose of securing photographic illustrations for lantern slides, and that he will be accompanied by Mr. A. L. Henderson. Both gentlemen expect to be absent from England for about four months.

Algol.—At the meeting of the Royal Prussian Academy of Sciences, held on November 28th, Prof. Vogel gave the results he had obtained from photographs of the spectrum of this variable. Prof. Pickering had pointed out, some years ago, that if the variation in stars of the Algol class were due to the transit of a dark satellite across the disk of its primary, producing a partial eclipse, then since in every case yet known the two bodies must be close to each other, and of not very disproportionate size, the primary must revolve with very considerable rapidity in an orbit round the common centre of gravity of the two, and, therefore, be sometimes approaching the earth with great rapidity, and sometimes receding from it. Six photographs of the spectrum of Algol—obtained, three during last winter, and three during the November just past—have shown that before the minimum the lines of the spectrum of Algol are markedly displaced towards the red, showing a motion of recession; but that after the minimum the displacement is towards the blue, showing a motion of approach. Assuming a circular orbit for the star, and combining the details given by the spectroscope with the known variation of the star's light, Prof. Vogel derives the following elements for the system of Algol:—Diameter of Algol, 1,074,100 English miles; diameter of the dark companion, 840,600 English miles; distance of centre, 3,269,000 English miles; speed of Algol in its orbit, 27 miles per second; speed of the companion in its orbit, 56 miles per second; mass of Algol, $\frac{4}{5}$ of the Sun; mass of the companion, $\frac{2}{5}$ of the Sun; speed of translation of the entire system towards the earth, 2 miles per second.—*Nature.*

DARK-ROOMS.*

BY H. EDWARDS-FICKEN.

THERE is not such a great contrast between the simple, improvised home "contrivance" and the specially fitted up dark-room of the "society," as need dishearten or deter the amateur photographer; the difference is in degree, and not in kind. As good negatives have been produced in the one as in the other. There is, however, one element that must be preserved in the most rudimentary dark-room, and that is ventilation. With this one great need provided for, almost any room or closet may be utilized in the ordinary dwelling by the least effort and ingenuity. A bath-room, *par excellence*, comes first, and can be adapted to every need of the photographer without interfering in any way with its ordinary uses. Running water is here the great boon, but even the absence of water, in using any other room or closet, is not a great calamity, and can be gotten over by the exercise of a little more trouble. It is my purpose to describe some simple methods of getting up a dark-room, taken from actual experience, either of myself or of friends whom I have assisted, with such hints and suggestions as I thought might prove helpful.

In a country house, where the only supply of water was from a well outside, and the most available nook for developing was a linen closet in the attic—selected because well shelved, and offering plenty of room for the storage of plates, chemicals, and the usual *impedimenta*—a dark-room was made that filled its purpose admirably. A clearance was made at one end to give working space, and a table was formed by a board fitted between the side walls. At one end the board was sawn out, and an ordinary square-sided tin pan about 12 by 16 inches, and 5 inches deep—a baking pan—fitted under the opening. A hole was bored at one end, and a small funnel inserted with a rubber cork for stopper. This made a fairly good sink, with a pail under to receive the waste water. On a shelf above was placed an old stone filter which had the usual small faucet. This was filled in advance of an evening's developing with a few pails of water from the well. The closet door was taken off its hinges, four inches sawed off the top, and re-hung. A shelf projecting three inches over the head of the door-trim was hung with a valance of black cloth about eight inches deep. Half-a-dozen one-inch augur holes were bored through the partition at the opposite end of the table or board, where the ruby lamp stood, into an adjoining room, and protected by another small valance of cloth. With the windows that lighted this adjoining room and the hall opened, ventilation was secured, and with the sink, the water supply, the shelving, and an extra pail for the plates to soak in after the hypo bath, this dark-room was used with great comfort, and many beautiful negatives came from it.

It might be well to accentuate here the extreme luxury to be derived from adjusting the height of the developing table to its user, so that the plate may be watched in development by one standing in an almost upright position, or, in other words, without stooping. This principally applies where room is limited; where the room is ample and everything well within reach, I put the table at such a height that the plate may be watched in a *sitting* position, and without being obliged to lean over it. By observing this one point nearly all fatigue is eliminated from developing.

In another country house the study adjoined the dining-room. Here we cut an opening in the wall between the study and a closet on the other side containing a pantry sink. In this opening was fitted a light of ruby glass, and an ordinary kerosene lamp placed behind it in the closet. Here one great object was attained, the getting rid of the heat and of the lamp altogether.

In the study, under the ruby glass, was placed a table with a lid hinged to open against the end of the room, and which, when down, concealed the developing sink, the waste being connected below through the wall to the waste of the pantry basin. Rubber tubing, with a faucet on the end, led from the pantry supply cock to the developing sink, held there in place by a screw-eye, and adjusted only when developing. Under the table were shelves concealed by Japanese cretonne. When not in use there was not a hint of anything to disturb the usual appearance of the room, a picture hanging over the ruby glass. In this case the study was only used for developing at night.

Living once for a short time in a suite of rooms in an apartment house of which one was lighted by a doorway from a larger connecting room at one end, and by a window into a light shaft at the other with a washstand under it, I was able in the very simplest manner to work comfortably and safely. I hung a heavy portière over the doorway weighted with shot at the bottom to keep it in place, stretched "ruby fabric" over the fanlight of the doorway and the window to the light shaft, set a drawing-board on a trunk stood on end beside the washstand, and developed there an entire summer's product of negatives. During the day the portière was looped back, the trunk and drawing-board stowed away, and the ruby stuff over the fanlight and window seemed but a rosy bit of decoration.

I fitted up a bath-room once that was an ideal dark-room, even though it was very narrow. It had a window, fortunately small, and in front of it I fitted a hinged ruby sash. Between the two I led a branch from the gas bracket in the room by tubing, and having a key *outside* the ruby sash. Under the sash I hinged a broad shelf with a bracket pivoted to open out and support it when up. In the bath-tub I stood a high stool which held the washing tray, and to which was led a length of tubing from the bath-faucet, and through this I let water run continuously, for I thus made the washing of my negatives between each period of development take care of itself while developing successive plates. The heat of the gas behind the ruby sash I got rid of by opening the outer sash, little or more according to the weather, and the outside key enabled me to commence the development of extra rapid plates in a very dim light, and increase it as development proceeded and became more safe. When the bath-room was restored to its normal use, the inner sash was thrown back against the side wall, the shelf let down, the tubing released from gas and water connections, and the stool lifted out of the tub.

With these illustrations of what a little ingenuity may accomplish under diverse circumstances and surroundings, I can only say, to encourage others, that as perfect negatives were produced in these extemporized dark-rooms as in the more elaborate and perfectly fitted special ones I have also enjoyed, and with a wonderful degree of comfort and ease in working. The want of a special dark-room need never be a barrier to the amateur photographer, who, though he works infrequently, is ever encouraged by the thought of the accessibility of his occasional dark-room that needs so little preparation, and demands no sacrifice of room or space.

* The *American Annual of Photography and Photographic Times Almanac*.

THE PROGRESS OF QUINOL DEVELOPMENT.*

BY ALFRED MASKELL.

The claims which have been made on behalf of quinol are: greater simplicity and ease in working; with over-exposure the development more under control than with pyro; quite as good as pyro with under-exposure; latitude of exposure; absence of fog; absence of stain; portability and cheapness; keeping qualities in solution; advantages of clear glass in shadows for purposes of transparencies, photomechanical, and photomicrographical work; suitability for bromide paper printing; the disadvantages being: in negatives hard contrasts, and clear glass in shadows; yellow fog; slowness; not suitable for every brand of plates or for stripping films; ignorance of the state of energy of the bath used.

In examining these questions we must remember that the point to be arrived at is not only whether pyro or quinol is the best developer for artistic landscape negatives; we have to consider at the same time transparencies and line or photomechanical work, photomicrography, and detective work.

As to the claim that with over-exposure the development is more under control, and that with under-exposures better results can be produced with quinol, I do not think that in the hands of operators of experience either of these is to be admitted, and the question of latitude of exposure is therefore equally disposed of. Certainly, however, less experienced hands will work both these cases with greater ease and certainty with quinol than with pyro. Dr. Vogel, whose name is well known, in a communication to *Anthony's Bulletin*, says that over-exposures can hardly take place. He exposed a plate for one second and another for 170 seconds, and developed both with the same developer at the same time, both being equally good. I cannot myself understand this. I do not know his method, but with my experience I could not claim to do the same. The comparative absence of fogging qualities with quinol is, I think, admitted. The action of the developer seems to be practically restricted to those portions of the plate upon which light has acted; we are not, therefore, liable to the troublesome sorts of chemical fogs which are so difficult to deal with or avoid with other developers. Certainly you can produce fog. If you use a powerful new bath to develop a plate which has received appreciably more than the normal exposure, you will infallibly do so. One of the early claims made by M. Balagny was even the ability to develop by a white light. At a meeting of the Société Photographique he exposed a plate under a negative to the ordinary gas lights in the room, and afterwards developed it at a little distance from the light without producing any fog. But the reason of this result is easily shown by M. Londe to be in the fact that development was pushed far enough to bring out the effects produced by the stronger light of the first exposure, and not far enough to bring up the fog which would inevitably have appeared had the development been more prolonged. As to stain, the developer is admitted to be most cleanly. When it does stain, however, it stains abominably, and the stain is very difficult to remove. If, however, the hands are washed soon after using a very old and stained solution, there is never any trouble. As a rule, negatives require no washing between developing and fixing, nor the use of alum at any time. The want of colour is, in fact, one of the disadvantages.

* Continued from page 852.

Mr. Dresser writes to me that he has given up quinol for very under-exposed negatives on account of the yellow stain or fog invariably produced. This I believe to be entirely due to the brand of plates used. I show some specimens: the reason, so far as I know, has never been given. With some lantern plates also it is certain to occur with under-exposure. I think Lumière's plates are free from this objection, and the rapid Ilfords also, but I have no experience of such quick exposures in instantaneous work, as a dog jumping, or horses racing, for instance. Numerous experiments with various brands of plates and different formulæ and methods of quinol development would be necessary to determine the question. With regard to solutions and their keeping qualities, I find quinol very easy to dissolve in hot water, and this sample —Mercier's, of Paris—is easily dissolved in a few minutes in cold water by shaking in a bottle. The mixed developer keeps extremely well, especially if you are careful to keep your bottles full up to the stoppers. This is a sample of a solution I made up on the 25th of September last. To the eye it is absolutely unchanged. M. Londe, however, in his "Traité du Dévelopment," maintains that the mixed developer, although unused, continues daily to lose in energy. This result can only, I imagine, be produced by oxidation; in that case I am surprised that there should be no visible signs of it. My paper is already so long that I will not stop to describe the experiments he carried out to show this. As described by him I do not think they were altogether satisfactory. In any case the loss of energy is not great, and can be allowed for. As to portability and cheapness, concentrated solutions are easily made, and I think that even a solution of quinol in distilled water without any sulphite will keep well. Dr. Vogel estimates that in 90 c.c. of pyro developer there are about 8 grammes of pyro, while in the same quantity of quinol developer there are only 5 grammes of quinol. Quinol is, weight for weight, cheaper than pyro, and the same bath is used over and over again. Here is a bottle containing 8 ounces of quinol developer made on the 25th of September last. With these 8 ounces have been developed eight whole plates, eight half-plates, and twelve lantern slides. You see it is still clear and light in colour, and of use for over-exposures. The cost to make would be about a shilling, half that amount with Schering's as quoted to-day. In the same way Hinton's excellent developer, called Hintokinone, costs 4s. 3d. for 10 ounces of the concentrated solution, sufficient to make 120 ounces of full-developing strength. With reference to prints on bromide paper, I think the excellence of quinol as a developer is generally acknowledged. It is so cleanly, and the use of the acid bath becomes unnecessary. The results are, with many negatives, fully equal to platinum printing in effect, if not in durability. Mr. Andrew Pringle, in his letter to me, says, "With any medium quality negative I will undertake to produce with quinol development of bromide paper-prints that no man will distinguish from platinum if he is prevented from handling the surface." Some members will recollect, perhaps, the beautiful prints shown in this room in January last by Mr. Wilson Noble. Still, I would say, if you want platinum effects use platinum, unless, as it may be, you have not the appliances or capability of properly working that process.

To come to the disadvantages of this developer. The most serious one—indeed, the only one worth consideration—is the tendency in ordinary photography to produce hard contrasts and clear glass in the deep shadows;

pretty negatives, in fact, wanting in the finest scale of gradation between the high lights, half tones, and shadows: wanting, also, in the tone of the pyro-developed negative, which is of such value in the production of prints. Comparing quinol with pyro the great points for comparison are the capabilities of bringing out the effects of light in the most searching analysis of gradation. We must remember, too, the axiom of exposing for the shadows and letting the high lights take care of themselves, and consider how great latitude in this respect is allowed to one developer compared with the other without producing evil effects. The greatest of all difficulties in landscape photography is to produce negatives capable of giving prints which are not wanting in air, and which can render the effects of distance so far as photography is capable of rendering it. For these effects, in capable hands, hydroquinone, as at present understood, stops short of pyro; how far short is even yet a matter upon which opinions may reasonably differ. With regard to the tendency to clear glass in the shadows, I fancy that this defect may be traced to the large proportion of sulphite of soda used as the preservative. My means and appliances do not permit me to experiment in the manner in which experiments should be carried out. I have used quinol without sulphite or any preservative, but not successfully; enough, however, to show me that with a sufficiency of experiment with differently composed baths, which I am not inclined to make at present, it can be so used; no doubt others have done so, and I should like to know the comparative result as regards the shadows. The most trite objection to quinol is that of slowness in working. I think this defect has been much exaggerated, especially with regard to development with the hydrates, and for amateur workers it is not worth consideration, unless a quick development produces finer results than slow; with quinol I do not think this within reasonable limits is the case. In some tabulated forms, the result of experiments made by Professor Eder, the duration of development with different pyro developers is given as 2 to 3¼ minutes, the image appearing in 12 to 25 seconds; with quinol developer, from 2 to 12 minutes, appearance of image, 15 to 75 seconds. With regard to stripping films, Major Nott, who is phenomenally clever at this kind of work, as his demonstration last week showed us, declares that he has never succeeded in stripping quinol developed films. Others, on the contrary, have met with the most entire and unqualified success. Ignorance of the state of energy of a bath which has frequently been used is, to a certain extent, true in quinol development, but the method of working being pre-eminently a tentative one, this ignorance is speedily overcome by an observation of the behaviour of the plate.

The first of the favourable qualities of quinol development which I placed on the list I gave just now, I take last in order, because it is to a certain extent the *clou*, as the French would say, of my paper. It is that from its greater simplicity and ease of working it is pre-eminently suited, not to the meanest capacities, but to those amateurs who are prevented from mastering, in its most advanced stage, the more involved process of pyro development. Were it not that the younger re-agent runs the elder very hard for the first place, the claim just made would not have so much weight, but I believe it to be true so far as regards the attainments and practice of the great majority of amateurs. There is an immense army of workers, of limited experience, who have neither the time, inclination, nor ability for the highest flights. A knowledge of the sciences either of chemistry or optics is not indispensable for the production of very excellent work, and it is essential to many that they should acquire these results by the simplest and most expeditious method. I hold that the great majority of amateur photographers—90 per cent. perhaps—can never educate themselves to the use of pyro as at present practised, so as to enable them to produce as uniformly good results as they can obtain by the more simple process. The first requires, for the best results, a large amount of perception and experience. Take, for instance, an over-exposed plate. Supposing an insufficient quantity of bromide has been used, fog quickly appears, and it becomes difficult, if not impossible, to save the negative by the necessary addition. Too much bromide, on the contrary, will keep back the image, at the same time that it necessarily modifies the character of the negative. To judge development, to know that if the image appears regularly throughout the plate it is necessary to counteract the effect of what would produce a flat picture without contrast, to know how to give it pluck and vigour, in fact; or, if the high-lights only appear, to know how to avoid a harsh negative with too strongly-marked contrasts; how in one case to add pyro, and judiciously even more bromide, and in the other to push forward the detail by the addition of alkali; how, again, to regulate the degree of intensity on the completion of development; these and other questions demand a great amount of judgment and experience. Throughout it appears to me that pyro is less amenable to different degrees of development; has, in fact, for the inexperienced, less latitude of exposure than quinol. With pyro, supposing the plate has received a correct exposure, no doubt the progress of detail and intensity will go on simultaneously in their due and proper proportions. But with under or over-exposure, or when the subject or view presents difficulties, the relative proportions of the developing constituents and their application are more difficult to regulate. In the case of under-exposures the difficulties are increased, and in both we are liable to be met with fog at a stage when a remedy is hopeless.

(*To be continued*).

Photographic Star Spectra.—An examination has been made by Dr. Scheiner of the star spectra photographed at Potsdam (*Astr. Nachr.*, No. 2,923). The wave-lengths of lines in the spectra were determined by comparison with the solar spectrum, and as the probable error of the measure is estimated so small as 0·005, the identification of the lines seems beyond doubt.—*Nature.*

Photo-Engraving, and Printing.—*The Inland Printer* has an interesting article with the suggestive title, "Photo-Engraving as observed from a Printer's Standpoint." It is the opinion of the writer that the progress of the art has been greatly retarded by the ignorance of the experimenters—chiefly photographers and electrotypers—of the requirements of the printer. He observes that "when a photographer attempts to make an article to be used by a printer with such knowledge as he may have occasion to use in his own business, and is uninformed as to the merits of a printing art, he must not blame the printer for offering a slight objection to the merits of his work." Singling out one commercial process as the best in the market, he finds the fault which belongs to all photo-engraving processes in a more or less degree: that when used upon an ordinary quality of paper it becomes impracticable, for the reason that the very fine linings are of such a small depth as to cause them to be filled up with the fine fibres of the paper, and thus present a smudgy appearance.—*Boston Photographic Review.*

Notes.

It is said, in connection with a libel action now pending, that the police obtained evidence of the identification of persons who entered a certain house by engaging rooms in a house on the opposite side of the way, and taking photographs of everyone who went up to the door. We are rather sceptical on the point. It shows an appreciation of modern appliances which hitherto the police have failed to exhibit. Besides, it presupposes that to be successful everybody must have turned his face to the opposite side of the way, and gone in backwards, which, as Euclid would say, is absurd.

A very successful dinner to celebrate the fiftieth anniversary of the discovery of the Daguerreotype took place last week in Paris. The dinner originated with the Syndical Chamber of Photography and other kindred professions, which, on its opening meeting, held on the 12th November, had before it, at the suggestion of several members, the question whether the banquet of the 19th of August, held under the auspices of the French Photographic Society, could not be repeated on a more comprehensive scale. A great number of persons were not able to assist at this banquet by reason of their absence from Paris, in addition to which, the cost of thirty francs fixed by the committee was not suited to all purses. These reasons kept away a great number of members of the photographic profession. The banquet was confined absolutely to associates of the Syndicate and their friends, and was deprived of all official character. The feature of the evening lay in the fact that everyone present was either a photographer, or was in some way engaged in a trade or profession which had to do with photography. The variety infused into the gathering, so far as the occupation of the visitors was concerned, was very remarkable, and significantly showed what an enormous industry of various kinds of which photography is the centre has grown up during the last quarter of a century. MM. Block and Yves, to whom the arrangements were entrusted, are to be congratulated upon the success of the undertaking.

Several photographic topographical maps, produced by the camera from a balloon, were exhibited in the photographic department of the French Exhibition. Some photographs of this kind were shown by M. Gaultier; others by M. Gastou Tissandier, who reproduced two or three in *La Nature*, of which he is editor; and several were exhibited by the Minister of War. M. Marcel, writing on this subject in the *Revue Scientifique*, says that these experiments were extremely curious, and ought to be studied and encouraged, for it seems easy to suppress the aërial perspective, the picture to be photographed being the base of a cone, of which the lens is the summit.

The story, unhappily true, of the officer who in Burmah had the execution of three Dacoits delayed in order that the scene might be photographed, seems to have found its way to the wilds of Central Africa. Mr. Stanley naturally feels sore and indignant that a report should have got abroad that an execution of a woman was delayed by his aides-de-camp Jameson and Bartellot, in order that a photographer might make ready his apparatus, and he emphatically states that there was no photographic apparatus of even the smallest kind within five hundred miles of Stanley Falls at any time near the date mentioned The whole story seems to have been a concoction, but it is satisfactory to be able to infer that Stanley had with him photographic apparatus, or he would not have placed a limit on the distance between it and the scene where it was supposed to have been used.

Some time ago a paragraph went the rounds of the papers to the effect that a Miss Lilian Paul, of Plainfield, New Jersey, while standing at an open window watching a thunderstorm, had her portrait taken by a flash of lightning, which imprinted her photograph on a brass plaque which happened to be near. We now learn that the young lady is seriously ill, and that her physicians attribute her condition to the shock she then received. It is not stated whether the shock was caused by the lightning flash, or by seeing her photograph produced under such singular conditions. However, we can easily believe that either cause might produce the lady's illness. What we do find a difficulty in believing is the statement that such a photograph exists. Has anybody of undoubted authority ever seen the brass plaque in question?

Apropos of the solar eclipse we may say that the Hon. Charles F. Crocker, University of California, has defrayed the expenses of the two senior astronomers of the Lick Observatory, who travelled, with over a ton of scientific baggage, thousands of miles by sea and land to Cayenne, in French Guiana, solely in order to secure photographs of the total eclipse. Liberality in regard to scientific research is not one of the virtues of English millionaires.

The advantage of photography in observing a total solar eclipse is well pointed out by a writer in the *Mining and Scientific Press*, of San Francisco. Formerly it used to be an invariable result of a total eclipse to have one observer announce the discovery of a new intra-Mercurial planet, and for someone else to as flatly contradict him, and state that the "planet" was really a well-known star. The photographic plate will show a planet that might readily be overlooked in the hasty "sweeps" of the observer, and, moreover, this plate may be easily compared with the sky itself when the sun has so changed its position in the heavens as to make such a comparison possible.

According to the *Phonetic Journal*, a Hansom cabman the other day bought a work on shorthand at a well-known phonographic establishment, and, in reply to

some curious person's inquiry, answered, "You see, sir, I've plenty of time, and I use the top of my cab for a desk." We see no reason why a cabman should not employ his spare moments in this or any other occupation. From phonography to photography is but a short stage, and we should not be at all surprised to learn that some aspiring Jehu had armed himself with a secret camera, and, from his elevated position, was securing bits of London life. We wonder, indeed, that photographers have not adopted this plan before. Any cabman, while on the rank, would be glad to exchange his seat for an hour or so at the regulation fare while the photographer went to work. Of course, cabby would have to remain within call, as it would be rather awkward if the photographer were hailed by a would-be passenger.

The new King of Portugal, according to that omniscient individual the London correspondent, is a kind of monarchical cherub, and so short in stature that, when he is photographed with his queen, who is the tall daughter of the Comte de Paris, he invariably makes her sit down while he stands up. Only one portrait has ever been taken of the royal couple on their four feet, and then the king was mounted on a footstool, which was artfully concealed in the picture by the Queen's flowing robe. The King of Portugal is not the only monarch who has to adopt this device. Our own Queen, when she is photographed in her robes of state, invariably stands on a footstool. If not, to do justice to the train, the picture would be broader than it is high, owing to the lack of inches of Her Majesty.

Madame Patti has set a fashion which society ladies may perhaps follow. Finding that she had to go in mourning, and that, to use her own words, she looked "positively wicked in a black wrap," she solved the difficulty by boldly dyeing her hair of a bright red. She then was photographed in her new coiffeur, and sent copies to her friends. The latter precaution was a very necessary one, because it prevented possible moments of embarrassment when, with her changed hair, she met a friend for the first time. But to convey a full idea of the alteration in one's appearance, the photographs ought to be coloured, because red hair has an awkward knack of looking like black in a photograph.

In the same way, we are inclined to think, any alteration made by men with regard to beards and moustachios ought to be notified photographically. Beards are now quite out of fashion, and hosts of men who used to rejoice in flowing appendages are now contented with a modicum of hair on the upper lip. But the transformation in such cases is often startling; so much so, that we have known men to be unrecognisable by their nearest relations and friends. If it were generally acknowledged that a man, after taking upon himself a new face, was bound to distribute photographs of himself, much trouble would be saved.

Notices of Books.

THE ART OF RETOUCHING NEGATIVES, AND FINISHING AND COLOURING PHOTOGRAPHS. By Robert Johnson. (*Marion and Co.*)

THIS is a new edition of a work published some three years since. The title, however complete and descriptive for the former issue, does not by any means convey the whole scope of the present volume, which has been enlarged by the addition of chapters on artistic composition; the eye compared with the lens and camera; accessories; perspective in backgrounds; simplicity in composition; full and three-quarter length studies; chiaroscuro; and photographic composition out-of-doors.

The part of the work which has appeared before, the subjects of which are indicated by the title, will be familiar to many readers; but in the interest of those who may not have obtained the book, or remember the favourable reception with which it was greeted on its first appearance, it may be desirable to make passing reference to it here. The author sets out with a concise description of the appliances necessary for retouching, and of the method of preparing the negative for the work. As to the instruction which learners are so anxious to obtain with regard to the direction which lines should assume in order to get up a "grain," he holds that such instruction only serves to confuse and retard the beginner. The texture will, in a measure, he says, take care of itself. This view, although by no means universal, is one which we have heard put forward by very competent retouchers. A remark which we commend to our readers runs: "Let the photograph rely for its beauty upon the excellence of the operating, the pose, the lighting, and the general composition of the picture; and remember that retouching is only an assistance; that the photograph is just as good a photograph without it." If the author does not approve of giving directions for obtaining the grain, he at all events gives very full instructions in the chapter on modelling and the following one, as to the parts of the face that require most, and those that require but little work upon them, as well as indicating the treatment of the neck, hands, &c. Moreover, the retouching of hair, and even of dress, of foliage, grass, and of various landscape subjects, receives attention at his hand.

In the chapters on colouring, directions are given not only for the use of water colours, but of oil paints; also of crayons and pastels, and a separate chapter is devoted to working up carbon enlargements in water-colour monochrome.

Coming to the newer part of the work, we find it well introduced by a sentence in the opening paragraph: "It is written for those who, not having the skill or taste to draw or paint sufficiently well to satisfy their own taste, and so produce pictures with which they should be pleased, have taken up photography as a means to that end." He has, he says, frequently had the question put to him, "You say such a photograph is artistic, and such another the reverse. Why is the one artistic and not the other?" It is to those appreciating the need of a simple intelligible guide that he addresses himself. A remark which will be appreciated by most portraitists of long standing, refers to the fact that when professed artists undertake to pose in the portrait studio, the result is seldom so satisfactory as when the photographer has been allowed to do the whole of the work himself. In the next chapter, however, on "The

Eye Compared with Lens and Camera," he affords himself an illustration of the artistic worker making a very curious statement when entering into technical scientific details. He says of "one difference that exists between the eye and the camera is that in the eye the rays of light, after coming through the lens, are concentrated upon one spot in the retina, whilst in the camera they cross and expand again before reaching the sensitive plate." Again, he speaks of the single lens as having the quality of showing everything sharp with a depth of focus that is limited only by the depth of the landscape, whilst showing everything in perspective diminishing in size as it recedes from the eye, and concludes therefore that "it is evidently not a desirable instrument to produce anything either artistic or mechanically accurate," and further speaks of the compound or portrait lens as "showing things in more correct proportion than a single lens." As a matter of fact, the relative proportion of near and distant objects in the same part of the field is absolutely the same, whatever lens is employed. We refer merely in passing to these failings in scientific accuracy which are perhaps not important in a work professing to deal with the subject especially from the artistic point of view. Rigid adherence to the pyramidal form in the composition of groups he treats as a fetish from which photographers would do well to emancipate themselves. Those photographers who desire help in gaining the artistic standpoint may do well to spend some little time in the study and digestion of the work before us.

THE AMERICAN ANNUAL OF PHOTOGRAPHY FOR 1890. Edited by C. W. Canfield. (*The Scovill and Adams Company, New York.*)

THE Eastman Dry Plate and Film Company forward us a copy of this annual, which is on sale at their establishment. The book treats of a variety of photographic subjects, and is illustrated by twenty full-page pictorial plates, representing more than twelve processes of photo-mechanical reproduction. For one of these plates, representing a basket of fruit, the claim is made that "the superiority of colour-sensitive plates over those coated with a pure bromide of silver gelatine emulsion is shown to perfection." The annual contains, in addition, the standard formulæ, recipes, &c., usual in a photographic almanac. The price, we may mention, is double that of the English annuals.

A HISTORY OF WOOD ENGRAVING.—An engraver on wood whose name has been well-known for a long time, Mr. W. J. Linton, of London, is about to publish a work which will be unique of its kind. For about twenty years Mr. Linton has been preparing a "History of Wood Engraving," but his numerous occupations have prevented him, up to the present time, from completing so important a work. In 1883 the author received from the British Museum the permission to reproduce, with the aid of photography, about two hundred specimens of old engravings; and it is with the aid of these photographs that he has been able to finish his work, not without very considerable labour. The book is now in the hands of the printer.—DR. PHIPSON, in the *Moniteur*.

INTENSIFYING BY MEANS OF HYDROQUINONE.—(*Phot. Rundschau*, 3, 191; *J. Soc. Chem. Ind.*, 8, 725.)—If a gelatine negative has been treated with mercuric chloride to intensify it until it has become quite white, instead of then treating it, as usual, with ammonia, it is advised by Dr. Mallmann to wash the plate quite free from any adhering mercuric chloride, and then pour over it a solution of hydroquinone containing sodium sulphite, or dip the plate into this solution. The result is an intense negative, of a bluish-black tone.—*Photographic Journal*.

ARTISTIC FEELING.

BY A. J. TREAT.

IN one of Hamerton's books of etchings he tells of the man who claimed that "the reason why nature presented such glorious sunsets was because she had learned how."

Compared with the art of painting, picture-making by the camera is as an infant to Methuselah. There are no old masters from whom to copy, and the work of the few excellent photographers who have passed away is known only to the small circle in which they lived. Even these examples give but few hints of treatment and possibilities, for, with rare exceptions, the best productions of the camera are but studies. As some may object to so sweeping an assertion, let us, for convenience, define the word "picture" to mean: A meritorious work presented by the artist thereof as complete—complete because it is presumably to his satisfaction so far as his skill will admit. So the photographer cannot call his production a picture when it contains faults which, though he may realise, he cannot correct. The painter can work upon his picture from time to time, correcting and improving it; but if a photographer wishes to make the slightest change in a figure he must make the entire study over again, with the chances two to one that he will have some small detail again unsatisfactory.

As for landscapes, aside from changing the position of his camera, he cannot alter objectionable features at all. Therefore, save in the very few instances where they will stand impartial criticism, his productions are but studies.

As a rule, photographs are painfully lacking in spirit. There is too little "swing," too much stiffness. The portrait, though exact enough in the matter of detail, fails to give the character of the individual. This fault is generally due to indiscriminate retouching. The photograph of a landscape seldom makes one feel that he is looking at a transcript of illimitable Nature: rather that before him is a cross-section sharply cut out of a certain locality; and in genre pictures there will generally be found one figure which, lacking the action necessary, spoils the work as a whole. I do not mean that there is an impassable gulf between the impressionism of the brush and the realism of the camera, but that photographers do not, as a class, give to the composition of landscapes and the posing of figures that careful study which is absolutely necessary to do good work. And that they do not get the best possible result is because they have not the cultivation necessary to the successful artist.

That photographs—of landscapes especially—are generally hard and lacking in feeling is due to the abuse of the small diaphragm. It is seldom that a negative made with a small stop has much feeling. In large negatives the detail is not so sharp as in small ones, and it will be noticed that the former have more depth—more atmosphere.

The average mind wants to see the leaf on a tree one hundred yards away, and then demands detail in the petal of a flower in the immediate foreground. No picture can have this mixture and be artistic, or even true. The focus of the eye changes according to the distance of the object. It cannot study the form of a mountain and the detail of a wild flower at the same moment; therefore, when more is presented than it is natural the eye should see, it cannot be wondered that the result is hard. In looking upon a landscape the eye takes in the general effect. Whatever object is of greatest importance attracts the most attention, and in studying it other things be-

come subservient. Though they form part of the view and help its attractiveness, they must keep their place. So soon as they become prominent, just so soon is the interest in the principal object diverted.

In criticising a photograph one must consider its pretensions. For instance:—Jackson presents views of certain localities. They are, perhaps, as artistic as the subject will admit. He has, presumably, made the best arrangement out of the view, and if he has done so, further criticism is disarmed when the name of the place is given. He shows a locality only, and cannot be held responsible for the lack of harmony if he has done the best that could be done with the subject. (Let it here be noted that few get the best composition possible.) On the other hand, when Robinson presents a genre picture, one is at liberty to criticise each fault; for the production is presented as a whole. It has been partly manufactured, therefore it is permissible to criticise the landscape in which the figures are placed, the figures themselves and their relation to each other, their place in the landscape, and finally, the study as a whole, in its relation to the domain of art. If his effort has been successful, Robinson has done more than Jackson, and is entitled to greater credit. If he has not been fortunate, photographers will realize the difficulties in his way—difficulties not experienced by the painter. Nevertheless, the stolid rules governing the fine arts will not bend, and all pictures must be measured by that standard. Results only are considered.

The homely philosophy of Josh Billings is preferable to platitudes expressed in finely rounded sentences. But art appeals principally to the eye, therefore a fault is always present. One cannot, in his mind, straighten a misshaped leg or arm, change a misshaped figure, raise a tree, or lower a mountain. And as, in photography, change cannot be made even after the fault is discovered, one must carefully discriminate from the very start. To this end he should study, until he feels them instinctively, the rules by which painters construct their pictures. They may be summed up as follows: A general form. The balance of the several parts in the matter of construction. The union of the several parts, and their unity and harmony with each other. The attainment of breadth, or the feeling of space—the suggestion of atmosphere around each object. These rules, though they seem so simple, must be thoroughly understood; a knowledge of the delicate relation of one to another can only be cultivated by close observation of Nature and a careful study of the work of those painters who are skilful in their calling. It is the careful work possible to them, together with the course of study they must first go through, which makes their work so good a standard for our guidance.

With so many obstacles in the way of producing pictures with the camera which will stand the criticism of students of art, it is all the more necessary for the photographer to cultivate the artistic feeling. A man cannot become a writer without long practice, though he has the rules of grammar and rhetoric at his finger-ends. No one ever became famous in the world of letters who had not read extensively the works of those celebrated in literature. The writer must have a reservoir to draw from, and it must be filled. Who can expect to rise above mediocrity who confines his observations to the small field in which he lives?

The artistic feeling is possessed by comparatively few; without it one cannot make pictures. It is an intuitive knowledge born of cultivation. A person may possess inherent taste, but without study and cultivation it amounts to little, for he cannot construct. He cannot better, for he cannot build.

The artistic feeling is that which enables one to instinctively recognize pictorial arrangement, the harmonious relation of objects to each other—the balance of the grouping. It corresponds in music with the ability to catch a discord, or detect a wrong note from any of the many instruments of an orchestra. It is the ability which leads the artist to quickly select the place from which the composition is the best, and to pose a figure so that it is graceful. It enables him to avoid those elements which would be out of harmony with the general arrangement, and to add those necessary to its entirety. In other words, the artistic feeling is the result of training, and its possession is absolutely necessary to good selection.

To attain it, one should read and study the fine arts. Time will be well spent in learning and thoroughly mastering the laws of composition as laid down by Burnet. After him as an author comes Hamerton, who is to be preferred to Ruskin, for that brilliant writer soars beyond even the realms of the painter. Comparatively few artists have read him. There is a charming little book by William Hunt, called, I think, "Talks on Art." I know of no better way to define what is meant by the "spirit of the studio" than to compare it to the atmosphere which pervades this little work.

The modern magazine, containing as it does the work of those whose names stand high in the world of art, gives fine opportunity for the study of compositions in black-and-white, while the journals devoted entirely to art give invaluable hints for posing and composing, lighting, and costuming.

The work of the modern school of French painting offers the best field for the study of the photographer, as its pictures have more swing and spirit, life and action, than those of any other. I know of no more enjoyable or more profitable entertainment than a close study of the catalogue of the Paris Salon. There are innumerable examples of all kinds of work, marines, landscapes, figure studies, and portraits. It contains reproductions of pen-and-ink-sketches of all the pictures exhibited. These sketches having been made by the artists themselves from their own pictures, contain the spirit of the original, giving a better idea of them than could any other reproductive process.

Only by a constant study of woodcuts and engravings, pen-and-ink drawings and etchings, and, above all, of boundless Nature herself, can one's artistic perception be gradually developed. The person who cultivates the artistic feeling places himself upon the high plane of intellectual appreciation. He becomes critical, and can analyze the causes which make one object more attractive than another. The world becomes brighter, for a new sense is awakened. Where before he admired that which was beautiful, now, with ripened judgment, his enjoyment is more keen; and where before only wonder was aroused when contemplating the sublime, now, possessing a higher understanding, he feels a lofty veneration.—*Wilson's Photographic Magazine.*

ROYTON PARISH CHURCH PHOTOGRAPHIC EXHIBITION.—The time for receiving applications for space for exhibits has been extended to January 15, 1890. Among the awards offered is that of the Britannia Works Company of a silver medal to the first prize winner in every class if the winning pictures be from negatives on Ilford plates, or are printed on Alpha or Ilford bromide paper, or Alpha lantern plates.

NEW PHOTOGRAPHIC DEVELOPERS.

Eikonogen, introduced but a few months ago by Dr. Andresen, of Berlin, as a developing agent for dry plates and bromide paper, seems to have grown into favour with more extended tests, and to justify in a high degree the expectation formed. The following are the most prominent facts of its current literature, already quite extensive. Chemically it is the sodium salt of amido-β-naphthol-β-sulphonic acid, having the symbol

$$C_{10}H \begin{cases} SO_3Na \\ OH \\ NH_2 \end{cases}$$

The formulæ for its use, as well as its action, are closely analogous to those of hydroquinone. The deposit formed by it is, however, said to be finer and of a very delicate bluish-black colour, thus bringing out all the finest details. By some hydroquinone is regarded as giving stronger negatives, all things being equal, but the eikonogen as giving better half shadows, and consequently better for portraiture than for landscape photography. It is said to be particularly well adapted for lantern slides and line work negatives; and in spectroscopic photography it seems as sensitive as pyrogallol in giving the shades of depth corresponding to variation in brightness of the spectral lines, and at the same time to give a picture with blacker lines, more easily seen under the microscope.

For bromide paper, according to General Brown, it is undoubtedly the developer of the future, affording warmer tones than the oxalate, and beautifully clear whites, without acid flushing, with simple rinsing with water before fixing. Whilst the appearance of the picture is slow, especially as a used developer, preferably twenty-four hours old, is preferred, the development is regular and uniform to every detail, without risk of staining; and the same solution can be used for a number of prints. It is said to be unaffected in its action by variation in temperature, and therefore adapted to all climates. It is non-poisonous; does not stain the fingers; will keep over a month mixed; acts so energetically that only half the exposure is required as that with pyrogallol, and development occupies a much shorter time. The solution can be used over and over again without staining until its reducing power is exhausted. It is, on the other hand, especially adapted to development of over-exposures. With all its excellencies it is a cheap developer, and will keep indefinitely as a dry powder. Its slight solubility, however, will prevent its use in concentrated stock solutions, as pyrogallol.

The commercial article is accompanied by formula for its use, and the recommendation by some to reduce the strength of these does not seem to be approved by the most successful experimenters with it. The following formula, by General Brown, for a normal developer, will serve to indicate the general character of solutions used.

Solution 1.

Sodium sulphite	15 grains
Eikonogen	7½ ,,
Water	1 ounce

Solution 2.

Carbonate of potassium	80 grains
Water	1 ounce

For use mix with three parts of 1 one-half to one part of 2, according to exposure.

Pyrocatechine.—Orthodihydroxybenzol, an isomer of hydroquinone, with the formula $C_6H_4(OH)_2$ is at present a subject of careful investigation as a developing agent for dry plates. The results thus far are quite promising. Its use as a photographic developer was suggested as early as 1859 by Wagner. Eder and Toth announced its developing power in alkaline solution in 1880. Professor Benoist, of Toulouse, last year published results of considerable experience with it. Dr. Arnold pronounces it fifteen times as energetic as hydroquinone, and enumerates among its chief excellencies the excellent tone and good qualities of the negatives produced by it; the absence of fog; loss of sensitiveness to light of the plates after immersion in the developer, so that development may be continued after immersion in ordinary gaslight, or even in diffused daylight, without injury; great latitude of exposure, as development proceeds slowly, but uniformly; freedom from stain to the hands; simplicity of formulæ for solutions, and possibility, on account of its solubility, of preparing concentrated stock solutions which will keep well if the pyrocatechine is chemically pure, and which can be used by the drop; convenience in carrying the small quantities of ingredients required for development; development without motion, and withal, on account of its high-reducing power, the expense, at twenty-five cents. per gramme, is not exorbitant, as that quantity will develop 100 to 150 plates 13 by 18 c.m. He employs the following stock solutions: *a*, one per cent. solution of pyrocatechine; *b*, twenty per cent. solution of potassium carbonate. Sodium carbonate he does not find to answer as well. For development of a well-exposed plate, 7 by 9 inches, one cc. of *a*, and 5—10 cc. of *b* are mixed with 60—80 cc. of water. Sulphite of soda does not seem necessary or desirable. The mixed developer will not keep, and should be used only once. Carl Irna, employing it with carbonate of soda and sodium sulphite, as in Balagny's formula for hydroquinone, found it more energetic than the latter, whilst others have found it less so. Dr. Eder, in his more recent experiments, was particular to employ it in its purest form, as was Dr. Arnold, and found it a rapid, energetic developer, yielding coffee-brown negatives of good quality. He employed the following solutions: *A*, pyrocatechine 1 part, sulphite of soda 4 parts, water 40 parts; *B*, carbonate of potash 4 parts, water 40 parts; mixing for use one volume of *A* with two of *B*. The sulphite of soda is not absolutely necessary, but with it the solution will keep clear much longer.

Paraphenylendiamin—$C_6H_4(HN_2)$—has been found by Dr. Eder to act well as a developer for dry plates, having about the same energy as pyrogallol or hydroquinone. As far as experiments have been conducted, the development with it is regular, and negatives produced are delicate and soft. It was used with potash, without sulphite, which retards the development greatly, but prevents the solution from becoming coloured.—C. F. H., in the *Journal of the Franklin Institute.*

Photographic Club.—The subject for discussion on January 1st will be "Lantern Matters." Lantern meeting instead of December 25th.

Reduction of Negatives.—The following method of reducing negatives is recommended by Dr. Gosselin, as quoted in *Progrès Photographique*:—The negative is placed in water for half an hour, and then removed to a bath composed of water, 100 c.c.; sulphuric acid, 4 c.c.; solution of bichromate potass (30 per cent.), 6 c.c. As this solution is very energetic, it requires careful watching of its action on the negative. The reduction proceeds uniformly, and the plate is not stained, as is so often the case with some reducers.

OPTICAL LANTERNS.

THE increasing popularity of the optical lantern for purposes of instruction and amusement is attested on all hands. Lantern exhibitions form now an important feature at meetings of photographic societies; the value of illustrations of oral explanations is recognised by literary societies, Sunday schools, political and other associations, and the natural result is shown in the large variety of apparatus now placed before us. As say the compilers of that admirable cyclopædia on the subject of optical lanterns and accessories, "The Indispensable Handbook of the Optical Lantern," "The optical lantern of the present day has quite grown out of its position as a scientific toy only, and the many improvements which modern science has introduced in its construction, together with the adaptation to its purpose of photography, microscopy, and other sciences have made it to-day an instrument of the highest use, both for educational and scientific purposes, and the great attention which has been given to its construction of late, together with the increase in its use as an educational medium, have brought many commercial competitors into the field." Among these is the firm of Messrs. Perken, Son, and Rayment, who manufacture lanterns on a very large scale, employing for the purpose a large number of skilled artisans. Upon their premises (over which we were courteously shown by a member of the firm) every requirement for such apparatus is made. The special feature to which our attention was called was the size of the instruments for lectures and drawing-room entertainments.

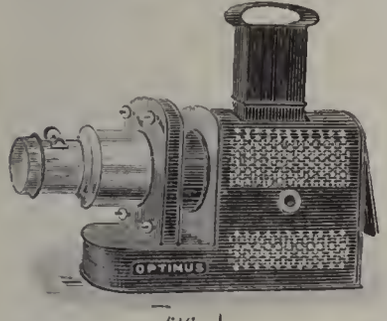


Fig. 1.

We here display diagrams of two, each of which has a single optical system, consisting of compound condensing lens of four inches diameter, and a front or projecting lens of the Petzval (photographic portrait) construction. The illuminant is a refulgent lamp of two, three, or four wick, burning mineral oil, which gives a powerful light, and yields a brilliant picture on the screen at a distance not greater than twenty-five feet. If the room be very large, and a still longer distance intervene between lantern and screen, the limelight must be used, as by its aid the maximum brilliance of light is obtainable. This system of illumination may be employed in the above style of lantern, though the bi-unial with its two sets of lenses, or the triple instrument with three optical systems, may advantageously be used, for it is with these compound lanterns that dissolving effects are created. Respecting the important feature of optical construction, we can but confirm the generally-expressed opinion of its excellence. The casings or bodies are made in various forms, and of different materials, in order to suit different ideas of necessary expense; but the main features requisite for the production of pictures is carefully studied in all makes.

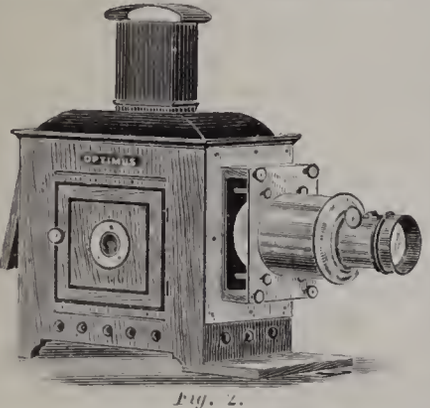


Fig. 2.

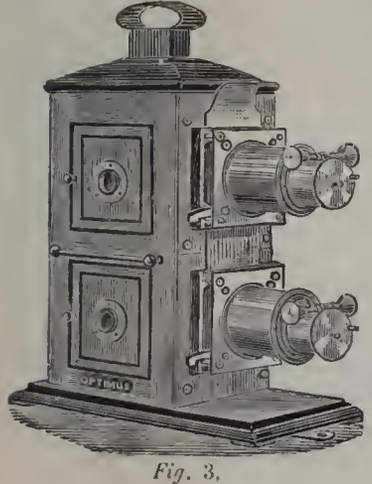


Fig. 3.

During the winter months, many amateur photographers employ their leisure profitably by copying the negatives taken during the sunny months, either as glass positives for magic lantern transparencies, or on a larger scale for wall ornamentation on gelatino-bromide paper. Perken, Son, and Rayment make a projecting lantern, of which we display a diagram, that permits of a change being made in the condenser. A carrier with a condenser of four inches is provided for projecting the image on to the screen for exhibitions; this can be removed and a larger one substituted, according to the size of the negative to be copied on an enlarged or reduced scale.

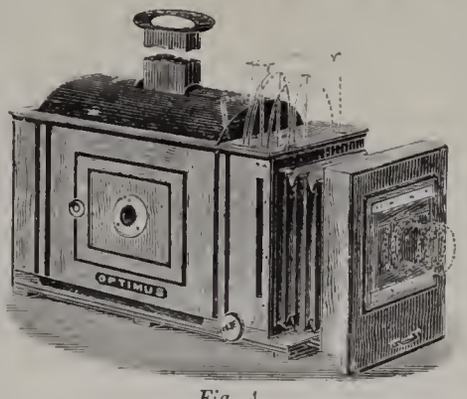


Fig. 4.

DAGUERREOTYPE.

THE following extract from Mad. de Girandin's "Lettres Parisiennes," dated 12th January, 1829, is interesting, both because it marks the time when Dagnerreotype became popular in Paris, and because it shows what was thought of it in social circles.

People are greatly taken up with the invention of M. Daguerre, and nothing is more amusing than to hear the explanation of it seriously given by our drawing-room philosophers. M. Daguerre may rest contented; no one will take his secret. No one thinks of telling it; when people speak, they think only of one thing, namely, how to use with advantage the few scientific phrases—no matter what—that they happen to remember. Those who have a friend or an uncle who is a physicist, make of the invention a physical phenomenon; those who have been in love with a chemist's daughter consider it to be a chemical operation; while those who have suffered much from eye maladies reduce it all to a simple effect of optics. The best means of delivering oneself from these people with their inconceivable definitions is to set them to discuss with each other, and this will bring forth an interchange of scientific words, false Latin, and truncated Greek, which leads to irresistible complications. What delirium! What nonsense! Enough to make a very idiot mad!

Up to the present, this is what we understand; the discovery is the method of fixing the image. Thus, you get by reflection a faithful picture of the *Pont des Arts*, for example; you hold your *Pont des Arts*. Well, are you content? Not at all! A man passes over the bridge with his wife, and, without knowing it, effaces your picture. "Take care, sir, you are interfering with the artist who is up there at his window."

Really this discovery is an admirable one. But we don't understand anything about it; we have had it explained too much.

OBSERVATORIES.—The following is a list, as given by Mr. G. M. Whipple in his paper at the Photographic Society, of the principal observatories, at home and abroad, where photographically recording meteorological and magnetical apparatus is in action at the present date. *Great Britain and Ireland.*—Aberdeen, Falmouth, Glasgow, Greenwich, Kew, Oxford, Stonyhurst, Valentia. *Colonial.*—Adelaide, Bombay, Hong Kong, Mauritius, Melbourne, Sydney, Toronto. *Foreign.*—Batavia, Brussels, Coimbra, San Fernando, Lisbon, Lyons, Madrid, Nantes, Nice, Paris, Perpignan, St. Petersburg, Utrecht, Vienna, Washington, Wilhelmshaven, Zi-ka-Wei.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—A Technical Meeting will be held on Tuesday, December 31st, at 5A, Pall Mall East, at 8 p.m.

Correspondence.

EXPERIMENTS WITH EIKONOGEN.

SIR,—In my paper entitled "Experiments with Eikonogen," in PHOTOGRAPHIC NEWS of last week, I regret to find that I erroneously mentioned Mr. A. Cowan's name in connection with a development formula. The formula in question was reprinted from the *Scientific American* in the PHOTOGRAPHIC NEWS of 6th inst. F. GOLDBY.

ATTENDANCE OF COUNCIL, 1889.

DEAR SIR,—At page 38 of the *Photographic Journal*, which reaches me to-day, I find a list of attendances at Council meetings held during the present year. Aware of the fact that Captain Mantell, our Honorary Secretary, has no discretionary power in the publication of these details, may I be permitted to explain, on behalf of some of my colleagues, that absence on other duties has, to my knowledge, prevented them from giving attendance on several occasions? Your readers probably know that Mr. H. Trueman Wood has been, during the whole year, doing important service in Paris: Capt. Abney was also there for part of the time. Mr. G. L. Addenbrooke has been to Australia, but immediately on his return we have him with us, and so it may be with some of the others.

We have seen the indefatigable President, Treasurer, and Honorary Secretary always in their places, and nearly all the London members have attended very regularly. Great credit is due also to Mr. Robinson, Mr. Brownrigg, and Major Darwin, who have come long distances to meet us; in fact, with rare exceptions, the Council of the Photographic Society has been uncommonly well served during the year. May we look for an equally good return at the end of the next annual period; and, in the selection of candidates about to be nominated (on or before 21st January), may the attendant circumstances, as well as the actual facts, be properly taken into account in the true interests of the Society. JOHN SPILLER.

Canonbury, December 21st, 1889.

Proceedings of Societies.

CAMERA CLUB.

ON Thursday, December 19th (Mr. W. CLARKE in the chair) Mr. LYONEL CLARK read a paper upon "Salting and Exciting Ordinary Drawing Paper for Silver Printing." The paper was accompanied by a demonstration.

Mr. CLARK described the qualities and characteristics of the different rough papers employed, and specified the particular treatment required for each. After giving details of the salting and exciting, he proceeded to show the processes, floating the paper upon the salting and sizing solution (a thick gelatine sizing being required for the rough stout papers). After drying he sensitised the sheets, employing a brush, which was a modification of the Blanchard brush, swansdown calico being folded over a 10-inch sheet of celluloid bent till the two edges met, and the whole held by wooden-clip handle, after the manner of a squeegee; this brush was pliant, and yet firm. In sensitising, Mr. Clark stated that Mr. Burton suggested twice sensitising; he himself found once sufficient. The difference in opinion was due, no doubt, to the fact that Mr. Burton *soaked* his paper in salting, whereas he (Mr. Clark) only floated it and used a strong sizing. Mr. Burton's method would appear to require more silver salt in exciting. Mr. Clark also exhibited a large number of examples, and demonstrated several methods of toning and intensifying prints, the silver intensifier serving to bring up to full strength prints very faintly printed.

Thursday, January 2nd, will be a lantern evening.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT a meeting on the 19th inst. Mr. A. L. HENDERSON occupied the chair.

The CHAIRMAN laid on the table a large collection of stereoscopic views; many of these had been taken by him during his recent Australian tour, the remainder being the work of Mr. W. F. Hall, Sydney, N.S.W. Two hand-stereoscopes had also been provided by the Chairman, which the members freely made use of. Special attention was drawn to one of the pictures—a stereo-photograph of a vessel lying at anchor; this was taken by the chairman from the deck of the vessel in which he was returning home. Prints from this negative proved to be perfectly stereoscopic without the usual transposition of the two pictures. The negative was also shown, which, when viewed with the stereoscope, gave a perfect stereoscopic picture. In reply to questions from the members, Mr. Henderson said the photograph was taken with twin-lenses, a drop shutter being used. The stereoscopic exhibits also comprised some very fine pictures of the Jenolan caves. With regard to these, several members commented upon the bad taste of the photographer in printing the name of the view in some cases nearly in the centre of the picture. A series of direct photographs of dogs, 15 by 12, were also shown by the Chairman—the work of Mr. F. Radford, S. Australia.

The HON. SECRETARY passed round one of Messrs. Mawson Swan's transparency frames.

Mr. J. TRAILL TAYLOR had recently had several lantern transparencies sent to him for examination which appeared clouded. Upon separating the glasses, the image was perfectly clear, but the inner surface of the cover glass had become corroded, producing the appearance of very fine ground glass. This had not extended to that part of the glass protected by the mask, but was confined to that part of the cover glass in contact with the photographic film. Viewed under the microscope, a very fine powder was observable. He had tried various acids without effect in clearing the surface of the glass. There was no appearance whatever of any transfer of the image.

Mr. P. EVERETT asked whether the transparency had been intensified.

Mr. TAYLOR said the slides were of French make, and had, in all probability, been intensified with mercury; the theory set up was that the surface of the cover glass had been attacked from the affinity of the mercury left in the film from the lead in the glass.

Mr. T. E. FRESHWATER referred to an instance of a 4-inch object glass, of French manufacture, being rendered quite useless from the inner surface of the convex lens becoming quite dull. He said some samples of French glass were more easily affected by the atmosphere than others.

The CHAIRMAN showed two prints from a negative that had been cut in half by Mr. F. York and separately developed; the developing formula in one case being—

Pyro	2 grains
Bromide	1 grain
Ammonia...	2 minims
Water	1 ounce

and in the other—

Carbonate magnesia and pyro	2 grains

In the Chairman's opinion the latter gave the best print.

Mr. J. B. B. WELLINGTON said when in Norway, he exposed and developed a negative: this was partly washed and dried, and afterwards packed next to an undeveloped plate. This plate, when developed, showed traces of a second image, which, upon examination, proved to be from the plate it had been in contact with, although a sheet of tissue paper had been placed between the plates. The negative was handed round for examination.

Mr. J. TRAILL TAYLOR said he remembered a member of the Photographic Society of Scotland, the Rev. T. Melville Raven, having a somewhat similar experience when developing wax negatives, part of the image of one negative setting off on another by contact in the bath.

The CHAIRMAN thought, in Mr. Wellington's case, that the second image might be due to pressure on the two plates while in contact. Referring to one of the stereoscopic photographs on the table of a very distant view, he said it had been taken with a long-focus lens, and the camera had been shifted about ten feet along the deck between the exposures.

Mr. J. TRAILL TAYLOR suggested a method of taking stereoscopic pictures from the deck of a moving vessel of a coast known to be indented, although appearing quite straight. An

exposure is made, and after the vessel has proceeded a short distance, the second exposure is made. The resulting picture will show a beautiful indentation of coast.

Mr. A. Cowan exhibited the Nassau vignetting frame. It was of cardboard, and in shape similar to an oblong book. The vignette opening was made with various pieces of cardboard of different sizes and shapes, the distance from the negative being regulated by inserting the pieces of cardboard composing the vignette opening in different insterstices in the thickness of the frame.

East Dulwich and Peckham Photographic Society.

The first lantern entertainment of this Society was held on Friday, 20th, in Shawbury Hall, which was tolerably well filled with members and friends.

Mr. Banks, in opening the proceedings, craved the indulgence of the audience towards the quality of work to be shown, as the Society was yet an infant.

The exhibition, however, indicated an extreme degree of precocity on the part of the infant, as all the slides shown were excellent specimens of this branch of the photographic art. A goodly number of members exhibited, but especial mention may be made of the work of the president, Mr. F. W. Edwards, mostly photographic statuary; Mr. Dowling, "bits" in Surrey and Sussex; Mr. Kelly, scenes on land and sea in Norway; and the Hon. Sec., Mr. Gardner, whose slides of interesting bits of local interest were well received. Other exhibitors were Messrs. Holmwood, Boydell, Banks, Walford. Old favourites in the shape of pictures of Burnham Beeches and Salisbury Cathedral re-appeared. No lantern exhibition seems complete unless it includes slides of these popular shrines of "bits" hunters. Each slide was introduced by a few bars of music, generally appropriate to the scene depicted. One such selection, which occasioned considerable amusement, was a picture of the "King's Arms," in the neighbourhood of Peckham Rye. As this slide appeared, the piano struck up the clasic strains of "We've both been there before," a suggestion repudiated by Mr. Gardner, the exhibitor of the picture.

The entertainment concluded by the exhibition of a fine set of slides sent by the Britannia Works Co., many of which have won prizes in various competitions.

The Society may fairly be congratulated on its first lantern entertainment.

North London Photographic Society.

December 17th.—The President (Mr. J. Traill Taylor) in the chair.

Mr. H. Hudson was elected to membership,

Mr. W. H. Smith, of the Platinotype Company, showed and explained the working of a new hand camera now being placed on the market by that Company. It could not in any sense be called a detective camera, as its appearance would at once betray its purpose, but the ingenuity of its construction was allowed by all, and the workmanship was much admired.

Mr. Smith then proceeded to explain and demonstrate "The Hot Bath Process of Platinotype Printing." He said the process of preparing the paper was attended with too many difficulties to make it worth while to attempt it in small quantities; it was, therefore, recommended that it be purchased ready prepared. The only condition with regard to the sensitized paper which it was necessary to observe was that it should be kept perfectly dry, otherwise the prints would suffer in quality, and, instead of being brilliant, would be flat and without vigour. The paper should, therefore, be stored in a calcium tube, which consisted of a tin case having a receptacle for chloride of calcium, and, when placed in the printing frame, it should be backed up with a sheet of thin india-rubber or mackintosh cloth. In the printing, although the paper did not print out, a faint image was formed, which was sufficient to indicate, after a little practice, when the exposure had been sufficiently prolonged. The demonstrator then passed round a number of exposed prints, and replied to several questions from members relating to the exposure they had received, &c. He then proceeded to develop these prints in the following manner, explaining each step as he proceeded:—A quantity of the developing solution, consisting of one pound of oxalate of potash dissolved in fifty-four ounces of water, was placed in an enamelled iron dish, and heated by means of a Bunsen gas burner to a temperature of 160°. A print was then floated on the surface of the solution for a few seconds, until the developing action was complete; when this occurred the print was removed directly into a bath of hydrochloric acid solution—about one part acid to sixty of water—and there left immersed for about ten minutes, after which time it was removed to a second similar bath, and then to a third, in each of which it remained the same time; a thorough washing in water completed the operations. Mr. Smith explained that some degree of modification was admissible in the temperature of the developing bath, which could be used cooler, but he thought it advisable not to use it at a lower temperature than 130°. It was certainly easier to use at the higher temperature. The function of the acid baths was to remove the iron salts from the paper, and if the third bath was in the least degree discoloured, another bath should be given to the prints. A large number of prints from negatives which had been supplied for the purpose by various members were developed.

Mr. N. P. Fox said he had used the bath with success at a much lower temperature than that recommended.

Mr. A. Mackie said the platinotype process was one of the many processes based upon that discovery by Sir John Herschel, that some of the per-salts were reduced by the action of light to proto-salts, which proto-salts have the power of reducing some of the metals from certain of their salts. In the present instance the per-salt employed is ferric-oxalate, a solution of which, mixed with a solution of potassic platinous chloride, is spread on paper and dried. The action of printing is to convert that part of the ferric oxalate which has been exposed to light to ferrous oxalate. The ferrous oxalate is capable of reducing the platinum from the platinous salt if brought into intimate contact with it, but is incapable of acting to any extent in the dry state. The required contact is attained by the action of the potassium oxalate solution, in which the ferrous oxalate dissolves, and, at the moment of solution, reduces the platinum.

The Chairman announced that Mr. N. P. Fox had found it necessary to resign his office as Secretary, and that the duties of that office had been undertaken for the present by Mr. G. J. Clark, of 52, of Queen's Road, Brownswood Park, N.

The next meeting will be held on Tuesday, January 7th, and will be a lantern night.

Bristol and West of England Amateur Photographic Association.

A meeting was held in the Queen's Hotel, Clifton, on the 13th inst., when the chair was taken by Mr. H. A. Hood Daniel.

Mr. Brightman gave the results of a series of systematic experiments in alkaline development, by means of which he had tabulated the effect of proportionate increase in strength of the various ingredients (pyro, ammonia, and bromide of potass). These series of differently mixed developers had been applied to a set of plates equally exposed under a sensitometer to a standard gas-light, and the results showed conclusively that, amongst other causes of weak image in development, a large percentage must be put down to the pyro being used in a concentrated form, a practice commonly supposed to procure increase of density. Mr. Brightman explained that the many permutations and variations in the three factors composing the developer have not by any means been exhausted, his own experiments having been confined to variations in the absolute, and the proportionate amounts of pyro used. He suggested that the remaining lines of experiment should be taken up by other members, and the results made be known at a future meeting.

Some of the plates treated by Mr. Brightman having been shown on the conclusion of his reading, a discussion arose on the causes of weakness in development, unaccounted for by over or under-exposure. A very general opinion prevailed that certain makes of plates were uncertain in this respect, thus making it at times impossible, with the most careful development, to obtain a plucky image.

Mr. W. C. Hemmons asked the question, "What proportion

should the exposure necessary for snow scenes usually bear to the normal winter exposure?"

The PRESIDENT thought about one-third the time would be a fairly correct exposure, adding that such scenes ought to be developed with less than the usual quantity of pyro.

The January meeting of 1890 will be held on Friday, the 3rd, at the Queen's Hotel, when the evening will be devoted to a private lantern exhibition of members' work, with special reference to the varieties of colour produced by different developers.

ABNEY CAMERA CLUB.

At the meeting on 20th inst., Mr. HIBBERD read a paper on "Transferotype," in which he briefly reviewed the whole process, giving his own method of working. He stated that he obtained the best results with ferrous-oxalate, preferring it to hydroquinone. At the end of the paper he demonstrated the operations of development, and fixing on the support, and successfully stripped a print which had been dry for a week.

In the discussion which followed, Mr. ADKINS suggested that to avoid any trouble in trimming, the edges may be cut straight by means of a knife and straightedge while the film is wet, the support being finally cleaned when dry with pumice stone.

Mr. LEEDS showed some "Fairy Lamps" with transferotype pictures mounted thereon.

The SECRETARY (Mr. Leeds) announced that the next meeting will be held on January 3rd, when Mr. Flack will read a paper on "Bromide Printing."

BATH PHOTOGRAPHIC SOCIETY.

A MEETING was held on December 18th.

Mr. J. DUGDALE handed round examples of printing, embodying both medallion and vignette style.

The PRESIDENT gave a lecture on "The Cities of Italy," illustrated by means of an oxy-hydrogen lantern, and wet collodion transparencies from film negatives, made in 1887. The series (eighty-six in number) included the chief objects of interest in Milan, Venice, Genoa, Rome, Florence, and other places, and a description of many of the subjects from a photographic as well as a general scientific point of view, was given.

A short discussion upon the best form of camera to use, and method of toning the transparencies, took place.

The following is the arrangement for forthcoming meetings: Jan. 8—a special evening to be devoted to flash-light photography; Jan. 29—lantern evening; Feb 26—annual meeting.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

December 12th.—Dr. J. K. TULLOCH in the chair.

Mr. W. D. VALENTINE, judge in the lantern slide competition, awarded the prizes as follows:—1st, Mr. H. S. Wybrants; 2nd, Mr. W. Salmond; and 3rd, Mr. J. Mathewson. His report stated that nearly all the slides were of very superior quality, and much above the average of such work. This competition was principally for technical excellence. Three negatives were selected by the Council, from which slides had to be made by each competitor.

A number of slides by members of the Society and of the Paisley Society were exhibited by the limelight.

Messrs. MAWSON and SWAN exhibited one of their transparency frames.

RECEIVED.—From Messrs. Samuel Fry & Co. samples of their ivory celluloid films for pictures, together with a specimen print. These films are intended for the production of positives by contact or by enlargement. The surface is a delicate and highly successful imitation of sheet ivory, and the result in positives, viewed either by reflected or transmitted light, are, as claimed, extremely soft and beautiful.—Messrs. G. W. Wilson & Co. send us a "Reading" to accompany a set of lantern slides illustrating the formation of the Forth Bridge, in which the object is to show, first, by means of skeleton sketches, the nature and qualities of the design and the foundations, and then, by photographs of the superstructure at different parts, and from various positions, the progress made from time to time and the manner of building adopted, till finally is reached the completed viaduct, a view of which completes the selection.

Answers to Correspondents.

All Advertisements and communications relating to money matters, and to the sale of the paper, should be addressed to the Publishers of the PHOTOGRAPHIC NEWS, Messrs. Piper & Carter, 5, Furnival Street, London.

All Communications, except advertisements, intended for publication, should be addressed to the Editor of the PHOTOGRAPHIC NEWS, 5, Furnival Street, London, E.C.

All questions requiring a reply in this column should be addressed to Mr. John Spiller, F.C.S., 2, St. Mary's Road, Canonbury, London, N.

A. B.—"The Art of Photographic Painting," by A. H. Bool (Messrs. Piper and Carter), gives exactly the information you require, as it treats of enlargements, working in monochrome and colours, and mode of finishing in crayons. An advertisement at the end of the book answers your second question.

L. N.—Abney's cloud cameras are worked in pairs by telephonic signal, at fixed stations, about half a mile apart. Mr. Whipple gave a description of the mode of mounting and adjustment, with a general view of the instruments, at the last meeting of the Photographic Society, and the official report will presently appear in their *Journal*. The records exhibited looked like stereoscopic prints, and by trigonometric measurement the height of the clouds could be calculated from the pair of photographs. This would not be the best time of year to go on a visit of inspection, but probably Mr. Whipple might be disposed to let you see the apparatus at Kew.

PATENT.—The extraction of aluminium from cryolite by reducing with sodium is no novelty, for we saw it done thirty years ago. The patent is granted for the method of fractional reduction, as specified, by which the separation of impurities is effected, and an exceptionally pure form of aluminium produced. We have nothing further to tell you about the aluminium leaf.

ONE MAN.—As we said last week, the Camera Club exhibition is open to visitors on presentation of address card. Some of Rejlander's later work was produced for the purpose of illustrating Charles Darwin's "Expression of the Emotions."

B. D.—In the flash-light formula given last week at the Hackney Society (page 867), "antimony" is probably intended to be the ordinary grey sulphide, or native antimony of commerce. If so, its incorporation with magnesium powder and chlorate of potash is a very dangerous proceeding, and the author would have done well to give a special word of warning to that effect. The materials should be powdered *separately*, and mixed with nothing harder than a brush, or an explosion and premature conflagration would be very likely to result. The directions for "the whole to be well mixed" might induce a young and ardent novice to fetch out his pestle and mortar and to use some force, unless instructed to the contrary. The penalty is too serious to be disregarded.

J. A. C.—1. The aristotype paper requires no development to bring out the image. 2 and 3. We cannot give you the ratio of sensitiveness of Obernetter's paper as compared with the preceding; nor with the most sensitive albumenized paper in the market. 4. A very small quantity of bromide of silver might be identified by heating in a test-tube with a few drops of concentrated sulphuric acid, when dark red fumes of bromine would be given off, known by its smell and giving an orange colouration with starch paste. 5. The ordinary test for ozone in the atmosphere is to expose a paper coated with starch and iodide of potassium (which turns blue), but it is open to criticism, because a trace of chlorine or of nitrous acid produces the same effect. 6. "Printing-out papers" are those which give the image direct, without resorting to any process of development.

F. M.—For comparative experiments with similarly exposed plates treated with different developers, see Mr. Bottono's article in the new YEAR-BOOK, page 74.

B. L.—Steel-facing zinc etched plates. Although it may be possible to increase the number of impressions from a zinc plate by depositing upon it a steel face by the well-known electrolytic method, this process could never be repeated, as with a copper basis, when the surface becomes worn, on account of the impossibility of stripping it by immersion in dilute acid, for this process would also dissolve the zinc. There is no known solvent for iron which does not also attack the zinc. Probably electrotype copies could be taken from the original zinc etching, and these might be steel-faced.

E. L., PRINTER, and C. G., in our next.

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